

2024-12-19

# Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

McLeod, Carolyn Joan

---

McLeod, C. (2024). Using integral theory to study the effectiveness of HeartMath biofeedback and social-emotional learning in adolescent emotion regulation (Doctoral thesis, University of Calgary, Calgary, Canada). Retrieved from <https://prism.ucalgary.ca>.

<https://hdl.handle.net/1880/120277>

*Downloaded from PRISM Repository, University of Calgary*

UNIVERSITY OF CALGARY

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-  
Emotional Learning in Adolescent Emotion Regulation

by

Carolyn Joan McLeod

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF DOCTOR OF EDUCATION

GRADUATE PROGRAM IN EDUCATIONAL RESEARCH

CALGARY, ALBERTA

DECEMBER, 2024

© Carolyn Joan McLeod 2024

## Abstract

This purpose of this study was to address the effectiveness of teaching social-emotional learning (SEL) and mindfulness with biofeedback to help Grade-9 students manage and regulate stress and anxiety. As a classroom teacher, I had been noticing a recent uptick in internalizing (withdrawal and avoidance) and externalizing (outbursts and aggression) student behaviours within the classroom and hallways. Students were discussing being stressed, uncertain, with many lacking self-confidence and emotional regulation skills. Students have recently faced large-scale disruptions to their daily lives, including the threat of illness, social isolation, loss of important milestones, school disruptions, and other related stressors. In response to this current state of adolescent emotional dysregulation, I was tasked with designing a targeted positive psychology option class to provide students with opportunities to calm down through focussed attention on the breath. HeartMath sensors provide biofeedback in the form of heart rate variability (HRV), a measure of autonomic nervous system control and regulation. Integral Theory informed the methodological framework to study these phenomena through four irreducible ontological perspectives. An empirical study using surveys found that students in the experimental group (EG) increased social awareness, focused attention, positive affect, and coping self-efficacy, while decreasing feelings of anxiety in a variety of situations over time and compared to a control group. Through sustained heart focused breathing practice with sensor and app, the EG significantly increased HRV over the 12-week time period. A phenomenological approach using semi-structured interviews found that students are experiencing anxiety and stress, however practicing mindfulness breathing every day helped them feel calmer, more emotionally regulated, focused, and better able to handle the stressors in their life. A structuralist approach using a perspectives study found that the EG were mainly operating at an ego/ethnocentric (red/orange) level of

development, whereas the alumni students had shifted towards a worldcentric (green) level, meaning they were more attuned to diversity, exceptions, and tolerance for differences than the Grade 9s. Focus groups provided insight into the coherent classroom culture and shared meanings between students and allowed them to engage in an authentic and commensurate way. An in-depth analysis of existing educational policies and practices found that infusing SEL in the curriculum and creating inclusive classrooms are expected, however, the means and resources to implement these elements are not always available and accessible to schools and teachers. Adding social and emotional literacy instruction to the playbook of numerical, read/write, and physical literacy is essential to the effective development of the whole child, particularly during these times of uncertainty and elevated levels of stress.

## Acknowledgements

I could not have completed this incredible journey without several very important people in my life. First, my entry into this work came from Catherine Burdett, who, during a parent teacher conference back in 2015, offered a way to help my students navigate through test anxiety. She shared with me the research from HeartMath and taught me the tools and strategies to bring into my classroom to help my students. Since then, she's been a constant companion, dear friend, and valued colleague, without whom I might never have discovered this brilliant work being done in the world of social-emotional learning. To the gifted and talented minds at HeartMath – Jeff Goelitz, Jenna Moniz, Andrea Trank – you have been an incredible support system and constant cheerleaders of my work. I am grateful for your belief in my research way up here in Canada!

Thank you to my dedicated research assistant, Lynn Moore, without whom I could not have conducted my study or collected my data. Her work allowed me to adhere to all ethics requirements while at the same time, providing me with an experienced mentor and research guide to bounce ideas off along the way. A big thank you to Mike Boyes for your seemingly boundless knowledge and love for assembling quantitative data. Thank you to my doctoral cohort colleagues – although our individual research journeys have been incredibly diverse, our common temporal path has allowed for rich and meaningful discussions and collaborations along the way. To all of the inspirational professors who have touched my work along the way – Ian Winchester, Shirley Steinberg, and Brent Davis – you have challenged me to dig deeper and extend myself beyond my perceived ceiling. To my committee – Amy Burns and Mairi McDermott – thank you for believing in me and my work, and for your support throughout the process. To Veronika – you have been my Integral Guru since my master's degree and our monthly discussions for the past four years have truly been the difference for me even making it onto this journey. Your eternal support,

dedication, constant reassurance, and next-level wisdom are so appreciated and I am beyond humbled that you chose me as your student. Thank you to my parents who instilled in me a passion for science and the work ethic needed to make it through this research endeavour.

Deep gratitude to my school and division colleagues and administrators – principals Susan Poole, Eddie Polhill, Anne Kromm, and Jeff Chalmers – whose support for the purchase of sensors and green light to develop a Grade-9 course from scratch was deeply appreciated. To my dear friend, Donna Sheppard – thank you for your support, guidance, and wisdom from the research field. Our monthly Zoom chats kept me grounded and reassured. Who knew two best friends from high school would end up still close friends and on independent doctoral paths? Finally, to my family – Dave, Andrew, and Alex – thank you for your patience, understanding, support, and love along the way – from me transcribing interviews at half-speed in our trailer while camping to the hundreds of books I have accumulated over the last five years (and subsequent bookshelf you built for me!). I love all of you with the entirety of my heart and being and would be nowhere without you in my life.

## Table of Contents

Title .....	i
Abstract .....	ii
Acknowledgements .....	iv
Table of Contents .....	vi
List of Figures .....	x
List of Tables .....	xi
List of Vignettes .....	xiii
List of Appendices .....	xiv
List of Abbreviations .....	xv
 Chapter 1: Introduction .....	 1
Significance .....	2
Problem Statement .....	4
Purpose .....	4
Research Questions .....	5
Research Paradigm .....	5
Integral Theory .....	7
Research Conceptual Framework .....	7
Methodology and Methods .....	10
Limitations and Delimitations .....	11
Role of Researcher and Assumptions .....	12
Understanding Positionality .....	12
Personal Positionality .....	14
Definitions .....	15
Conclusion .....	18
 Chapter 2: Contextualizing the Problem in the Literature .....	 19
Introduction .....	19
Upper Left Quadrant (Individual Student Experience) .....	21
UL Quadrant: Zone 1 (Student Beliefs) .....	22
UL Quadrant: Zone 2 (Student Development) .....	30
Conclusion UL .....	36
Lower Left Quadrant (Collective Experiences) .....	37
LL Quadrant: Zone 4 (Collective Experiences) .....	37
Conclusion LL .....	44
Upper Right Quadrant (Student Attitudes/Behaviours) .....	45
UR Quadrant: Zone 5 (Student Attitude/Behavioural Changes) .....	45
UR Quadrant: Zone 6 (Student Physiological Changes) .....	54
Conclusion UR .....	69
Lower Right Quadrant (Educational Systems) .....	70
LR Quadrant: Zone 8 (Educational Systems) .....	70
Conclusion LR .....	78
Tetra-meshing the Quadrants .....	79
Individual Experience .....	79
Safety/Relationships .....	79

Integration/Regulation .....	81
SEL Programming in School .....	81
Conclusion.....	81
Chapter 3: Methodology .....	83
Introduction .....	83
The Research Paradigm.....	83
Ontology and Epistemology.....	85
Methodology Overview .....	86
Upper Left (UL) Quadrant.....	87
Lower Left (LL) Quadrant .....	88
Upper Right (UR) Quadrant .....	89
Lower Right (LR) Quadrant .....	90
Ethics.....	91
Student Welfare .....	91
Research Ethics Board Considerations.....	91
Role of Researcher and Assumptions .....	92
Context Assumptions and Potential Bias .....	93
Dual Role Implications.....	93
Personal Potential Bias .....	94
Research Context .....	95
Research Site .....	95
Participants .....	96
Inclusion Criteria .....	96
Participant Recruitment.....	96
Participant Demographics .....	97
Communication and Consent Processes.....	98
Participant Data Considerations .....	99
Risks and Benefits to Participants .....	100
Delimitations of Participant/Student and Researcher/Teacher Protocols.....	100
Limitations of Participant Protocols .....	101
Participant Withdrawal .....	102
Participant Sampling .....	103
Quantitative Quadrants.....	104
Validity .....	104
Qualitative Quadrants .....	109
Trustworthiness .....	109
UL Quadrant.....	112
Zone 1: Phenomenology.....	112
Zone 1: Journalling.....	115
Zone 2: Developmental Structuralism.....	116
LL Quadrant .....	118
Zone 4: Ethnography .....	118
UR Quadrant .....	121
Zone 5: Changes in Attitudes/Behaviours.....	121
Zone 5: Mindfulness Awareness State .....	123



Zone 6: Physiological Measures.....	125
LR Quadrant.....	128
Zone 8: Systems Analysis .....	128
Conclusion.....	130
Chapter 4: Findings.....	132
Introduction .....	132
UR Quadrant: Zone 5 – Individual Objective Inside Perspective.....	135
Student Opinion Survey – EG versus CG .....	135
Student Opinion Survey – EG, CG, AG (Time 2).....	143
Mindfulness Attention Awareness Survey for Adolescents (MAAS-A) (EG and CG) .....	146
UR Quadrant: Zone 6 Individual Objective Outside Perspective .....	150
Average Coherence Scores.....	150
UL Quadrant: Zone 1 Individual Subjective Inside Perspective .....	154
Analysis of Semi-structured Interviews from EG .....	156
Analysis of Semi-structured Interviews from Alumni Group .....	179
UL Quadrant: Zone 2 Individual Subjective Outside Perspective .....	200
DPS Quantitative Findings .....	200
DPS Qualitative Findings .....	202
UR Data Analysis .....	202
UL Data Analysis .....	207
LL Data Analysis .....	211
LR Data Analysis .....	215
LL Quadrant: Zone 4 Intersubjective Collective Outside Perspective.....	221
PP9 Focus Group Thematic Analysis.....	224
Alumni Focus Group Thematic Analysis .....	233
Comparison of PP9 with Alumni Focus Groups .....	244
LR Quadrant: Zone 8 Interobjective Collective Outside Perspective.....	245
Provincial Policies .....	248
Division/School Policies and Practices .....	253
Assessments and Measures.....	255
SEL Pedagogy and Practices .....	257
Growth Mindset in the Classroom and School.....	262
Final Thoughts from LR Zone 8.....	263
Conclusion.....	264
Chapter 5: Interpretation of Findings.....	266
Introduction .....	266
Theme 1: Anxiety Sources and Symptoms .....	267
Anxiety Sources.....	267
Anxiety Symptoms .....	270
Theme 2: Self Awareness .....	274
Self-awareness .....	275
Self-management.....	277
Developmental Perspectives.....	278
Mindful Awareness .....	283

Theme 3: Social Awareness .....	287
Emotion Regulation.....	287
Classroom Coherence.....	289
Relationships .....	293
Theme 4: Coping Strategies .....	297
HeartMath Biofeedback.....	298
Strategies Learned in the Class.....	301
Theme 5: Self-efficacy .....	306
Confidence in Stress Management .....	307
Continued Use of Strategies .....	311
Theme 6: SEL in the Classroom .....	313
Course Positioning.....	314
School Reflections.....	316
SEL Programming in the Curriculum.....	319
Conclusion .....	321
Students Understand their Anxiety.....	324
Students are Self-Aware .....	325
Students are Socially Aware.....	326
Students use Coping Strategies .....	326
Students Increase Self-efficacy .....	327
SEL in the Curriculum .....	328
Chapter 6: Conclusions and Recommendations .....	330
Context for the Study .....	330
Implications.....	332
Recommendations .....	333
Recommendation 1: For the Province .....	333
Recommendation 2: For the School Divisions.....	334
Recommendation 3: For the Schools.....	336
Recommendation 4: For the Teachers.....	336
Recommendation 5: For the Students.....	338
Reflections.....	339
Conclusion.....	340
References.....	343
Appendices.....	366

## List of Figures

Figure 1: <i>Integral Methodological Framework with Eight Hori-zones</i> .....	9
Figure 2: <i>Classroom for PP9 Course</i> .....	96
Figure 3: <i>Methodological Outline of Data Collection</i> .....	104
Figure 4: <i>Timeline of Data Collection</i> .....	133
Figure 5: <i>Repeated Measures ANOVA of EG and CG for Sources of Anxiety</i> .....	139
Figure 6: <i>Repeated Measures ANOVA of EG and CG for Anxiety Symptoms</i> .....	140
Figure 7: <i>Repeated Measures ANOVA of EG and CG for Self-Awareness Positive Affect</i> .....	142
Figure 8: <i>One-way ANOVA comparing the EG, CG, AG for Anxiety Symptoms at Time 2</i> .....	144
Figure 9: <i>One-way ANOVA comparing the EG, CG, AG for Positive Affect at Time 2</i> .....	145
Figure 10: <i>One-way ANOVA comparing the EG, CG, AG for Negative Affect at Time 2</i> .....	145
Figure 11: <i>One-way ANOVA comparing the EG, CG, AG for Coping Self-efficacy at Time 2</i> .....	146
Figure 12: <i>MAAS-A score on Factor 1 (Acting with Attention and Mindfulness)</i> .....	148
Figure 13: <i>MAAS-A score on Factor 2 (Attention to the present moment)</i> .....	149
Figure 14: <i>Average HRV Coherence for the EG over 3 Time Periods</i> .....	152
Figure 15: <i>Teacher Coherence Scores</i> .....	154
Figure 16: <i>Frequency of Responses Regarding Emotional Intelligence and Regulation</i> .....	159
Figure 17: <i>Frequency of Responses Regarding Classroom Coherence and Relationships</i> .....	161
Figure 18: <i>Frequency of Responses Regarding Sources of Anxiety</i> .....	161
Figure 19: <i>Frequency of Responses Regarding Anxiety Symptoms</i> .....	163
Figure 20: <i>Frequency of Responses Regarding Feelings about the Course/School</i> .....	165
Figure 21: <i>Frequency of Responses Regarding Strategies Learned in Class</i> .....	169
Figure 22: <i>Frequency of Responses Regarding Coping Self-efficacy</i> .....	176
Figure 23: <i>Frequency of Responses Regarding Classroom Affective Experience for Alumni</i> ....	181
Figure 24: <i>Frequency of Responses Regarding Personal Growth</i> .....	186
Figure 25: <i>Frequency of Responses Regarding Course Content</i> .....	194
Figure 26: <i>Frequency of Responses Regarding Coping Strategies for Alumni Students</i> .....	197
Figure 27: <i>Wilber's Altitudes of Development</i> .....	201
Figure 28: <i>Univariate ANOVA of EG and AG for UR Factor 2: Science is Truth</i> .....	204
Figure 29: <i>Thematic Frequency Analysis for EG and AG for UR Quadrant</i> .....	207
Figure 30: <i>Univariate ANOVA of EG and AG for UL Factor 2: Internal Locus of Control</i> .....	208
Figure 31: <i>Thematic Analysis Comparison of EG and AG for UL Quadrant</i> .....	211
Figure 32: <i>Univariate ANOVA of EG and AG for LL Factor 1: Tolerance and Equality</i> .....	212
Figure 33: <i>Thematic Analysis Comparison of EG and AG for LL Quadrant</i> .....	215
Figure 34: <i>Univariate ANOVA of EG and AG for LR Factor 1: Universal Acceptance</i> .....	216
Figure 35: <i>Univariate ANOVA of EG and AG for LR Factor 2: Punishment and Control</i> .....	217
Figure 36: <i>Thematic Analysis Comparison of EG and AG for LR Quadrant</i> .....	220
Figure 37: <i>Schematic Analysis of Focus Group Positioning for Grade-9 group</i> .....	223
Figure 38: <i>Schematic Analysis of Focus Group Positioning for Alumni group</i> .....	223
Figure 39: <i>Hierarchical Map of Documents Analyzed</i> .....	247
Figure 40: <i>Theme 1: Anxiety Sources and Symptoms Map</i> .....	274
Figure 41: <i>Theme 2: Self-awareness Map</i> .....	287
Figure 42: <i>Theme 3: Social Awareness Map</i> .....	297
Figure 43: <i>Theme 4: Coping Strategies Map</i> .....	306
Figure 44: <i>Theme 5: Self-efficacy Map</i> .....	313
Figure 45: <i>Theme 6: SEL in the Classroom Map</i> .....	324

## List of Tables

Table 1: <i>Research Conceptual Framework</i> .....	8
Table 2: <i>The Four Quadrants and Six Zones of IMP</i> .....	10
Table 3: <i>The Four Quadrants and Six Zones of Wilber's IMP – a Literature Review map</i> .....	20
Table 4: <i>Wilber's IMP: A Literature Review map UL, Zone 1 Focus</i> .....	22
Table 5: <i>Wilber's IMP: A Literature Review map UL, Zone 2 Focus</i> .....	30
Table 6: <i>Wilber's IMP: A Literature Review map LL, Zone 4 Focus</i> .....	38
Table 7: <i>Wilber's IMP: A Literature Review map UR, Zone 5 Focus</i> .....	46
Table 8: <i>Wilber's IMP: A Literature Review map UR, Zone 6 Focus</i> .....	54
Table 9: <i>Wilber's IMP: A Literature Review map LR, Zone 8 Focus</i> .....	71
Table 10: <i>Tetra-mesh Themes Within IMP</i> .....	80
Table 11: <i>The Four Quadrants and Six Zones of IMP: Methodology and Methods</i> .....	87
Table 12: <i>Participant Protocols</i> .....	103
Table 13: <i>Data Collection and Analysis Map</i> .....	111
Table 14: <i>Data Collection and Analysis Map: Zone 1</i> .....	112
Table 15: <i>Data Collection and Analysis Map: Zone 2</i> .....	116
Table 16: <i>Data Collection and Analysis Map: Zone 4</i> .....	118
Table 17: <i>Data Collection and Analysis Map: Zone 5</i> .....	121
Table 18: <i>Data Collection and Analysis Map: Zone 6</i> .....	124
Table 19: <i>Data Collection and Analysis Map: Zone 8</i> .....	128
Table 20: <i>Findings Map – UR Zone 5</i> .....	134
Table 21: <i>SOS Repeated Measures ANOVAs for EG and CG for Time 1 and Time 2</i> .....	136
Table 22: <i>SOS One-way ANOVAs for EG, CG, and AG at Time 2</i> .....	143
Table 23: <i>MAAS-A Data for the EG and CG for Time 1 and Time 2</i> .....	147
Table 24: <i>Findings Map – UR Zone 6</i> .....	151
Table 25: <i>Findings Map – UL Zone 1</i> .....	156
Table 26: <i>Quotes from the EG Students about Classroom Affective Experience</i> .....	160
Table 27: <i>Quotes from the EG Students about Anxiety Symptoms</i> .....	163
Table 28: <i>Quotes from the EG Students about the PP9 Course</i> .....	166
Table 29: <i>Quotes from the EG Students about Focus and Attention</i> .....	170
Table 30: <i>Quotes from the EG Students about the HeartMath sensor and InnerBalance app</i> ....	173
Table 31: <i>Quotes from the EG Students about Confidence in Managing Stress</i> .....	176
Table 32: <i>Quotes from the AG Students about Classroom Affective Experience</i> .....	182
Table 33: <i>Quotes from the AG Students about Classroom Environment</i> .....	183
Table 34: <i>Quotes from the AG Students about their Grade-9 Self</i> .....	185
Table 35: <i>Quotes from the AG Students about Personal Growth</i> .....	187
Table 36: <i>Quotes from the AG Students about Emotion Regulation and Stress Management</i> ....	188
Table 37: <i>Quotes from the AG Students about HeartMath Biofeedback Techniques</i> .....	189
Table 38: <i>Quotes from the AG Students about PP9 as a Core Subject</i> .....	192
Table 39: <i>Quotes from the AG Students about PP9 as an Option Subject</i> .....	193
Table 40: <i>Quotes from the AG Students about PP9 for Universal Mental Health Support</i> .....	194
Table 41: <i>Quotes from the AG Students about Continued Use of Breathing Practice</i> .....	196
Table 42: <i>Quotes from the AG Students about Confidence to Manage Stressful Situations</i> .....	198
Table 43: <i>Findings Map – UL Zone 2</i> .....	200
Table 44: <i>DPS One-way ANOVAs for EG and AG</i> .....	203

Table 45: <i>Thematic Analysis Comparison of EG and AG for UR Quadrant</i> .....	205
Table 46: <i>Thematic Analysis Comparison of EG and AG for UL Quadrant</i> .....	209
Table 47: <i>Thematic Analysis Comparison of EG and AG for LL Quadrant</i> .....	213
Table 48: <i>Thematic Analysis Comparison of EG and AG for LR Quadrant</i> .....	217
Table 49: <i>Findings Map – LL Zone 4</i> .....	221
Table 50: <i>Participant Descriptions of Classroom Affective Experience</i> .....	226
Table 51: <i>FG2 Brief Exchange</i> .....	227
Table 52: <i>Participant Descriptions of Stress Symptoms and Situations</i> .....	228
Table 53: <i>FG3 Conversation Flow for Favourite Course Activities</i> .....	229
Table 54: <i>FG2 Conversation Flow for Course Recommendation</i> .....	231
Table 55: <i>FG3 Conversation Flow for Favourite Course Activities</i> .....	231
Table 56: <i>Categories Emerging from School Beliefs and Feelings</i> .....	232
Table 57: <i>Focus Group Conversations about HeartMath Sensor/App</i> .....	234
Table 58: <i>AFG Conversation Thread about Personal Growth</i> .....	238
Table 59: <i>AFG Conversation Thread about PP9 Course</i> .....	241
Table 60: <i>AFG Conversation Thread about Daily Sensor Use</i> .....	242
Table 61: <i>Findings Map – LR Zone 8</i> .....	245
Table 62: <i>Comparison of Research Question to Relevant Theme</i> .....	267

## List of Vignettes

Vignette 1: <i>Jasmine's Story</i> .....	1
Vignette 2: <i>Jasmine Returns</i> .....	21
Vignette 3: <i>Connor's Story</i> .....	27
Vignette 4: <i>Jasmine's Dys-Integration</i> .....	37
Vignette 5: <i>Connor's HRV</i> .....	66
Vignette 6: <i>So Far not Good?</i> .....	267
Vignette 7: <i>The Stuff of Nightmares</i> .....	270
Vignette 8: <i>One Small Step</i> .....	274
Vignette 9: <i>Wellness Friday</i> .....	277
Vignette 10: <i>Two Steps Forward... One Back</i> .....	278
Vignette 11: <i>These Times They are a Changin'</i> .....	283
Vignette 12: <i>What Have I Learned?</i> .....	287
Vignette 13: <i>Second Class, Not Like the First</i> .....	298
Vignette 14: <i>Oh, My Heart!</i> .....	301
Vignette 15: <i>Their First Rodeo</i> .....	307
Vignette 16: <i>One Student Returns</i> .....	311
Vignette 17: <i>Unpacking the Pain</i> .....	316
Vignette 18: <i>Follow Up with Sienna</i> .....	319
Vignette 19: <i>A Surprise Visit</i> .....	324
Vignette 20: <i>Grad 2024: Time to Practice What I Teach</i> .....	330
Vignette 21: <i>Later That Day</i> .....	339

## List of Appendices

Appendix A: <i>Models of Consciousness Development</i> .....	366
Appendix B: <i>Integral Theory Levels of Development</i> .....	367
Appendix C: <i>The Basic Structures Associated with Stress (Amygdala and HPA axis)</i> .....	368
Appendix D: <i>Anatomy of the Brain: Lateral and Sagittal Views</i> .....	369
Appendix E: <i>Intrinsic Brain Networks (IBNs)</i> .....	370
Appendix F: <i>Branches of the Vagus Nerve</i> .....	371
Appendix G: <i>Physiological Pathways in Response to Environmental Stimuli</i> .....	372
Appendix H: <i>Thoughts, Feelings, Behaviours Related to Arousal Level</i> .....	373
Appendix I: <i>Polyvagal Ladder: Activation of Vagal System</i> .....	374
Appendix J: <i>Tracing From EmWave Program</i> .....	375
Appendix K: <i>Professional Development and Training and Program Fidelity</i> .....	376
Appendix L: <i>Warrants, Data, and Evidence</i> .....	377
Appendix M: <i>Student Semi-Structured Interview Questions</i> .....	378
Appendix N: <i>Developmental Perspectives Survey</i> .....	380
Appendix O: <i>The Mindful Attention Awareness Scale for Adolescents (MAAS-A)</i> .....	383
Appendix P: <i>Focus Group Format, Questions, and Confidentiality Statement</i> .....	385
Appendix Q: <i>The Student Opinion Survey (SOS)</i> .....	387
Appendix R: <i>HeartMath Coherence Tracking Data</i> .....	389
Appendix S: <i>Mindfulness Scripts</i> .....	390
Appendix T: <i>HRV Metrics Collected from the HeartMath Sensor and Inner Balance App</i> .....	391
Appendix U: <i>LR Quadrant Document Sources</i> .....	392
Appendix V: <i>Valley School Division Research Proposal Approval</i> .....	393
Appendix W: <i>TCPs-2 Certificate of Completion</i> .....	394
Appendix X: <i>HeartMath Certificate – Trauma Course</i> .....	395
Appendix Y: <i>List of Possible Pseudonyms</i> .....	396
Appendix Z: <i>Copyright Permission (MAAS-A)</i> .....	397
Appendix AA: <i>Letter of Recruitment: PP9 (EG)</i> .....	398
Appendix BB: <i>Letter of Recruitment: Options (CG)</i> .....	399
Appendix CC: <i>Letter of Recruitment: PP9 Alumni</i> .....	400
Appendix DD: <i>Parent/Caregiver Consent – PP9 (EG)</i> .....	401
Appendix EE: <i>Parent/Caregiver Consent – Options (CG)</i> .....	407
Appendix FF: <i>Parent/Caregiver Consent – Alumnus</i> .....	410
Appendix GG: <i>Student Assent – PP9 (EG)</i> .....	414
Appendix HH: <i>Student Assent – Options (CG)</i> .....	419
Appendix II: <i>Student Assent – PP9 Alumni</i> .....	422
Appendix JJ: <i>PP9 Interview Codebook</i> .....	426
Appendix KK: <i>Alumni Interview Codebook</i> .....	428
Appendix LL: <i>DPS Codebook</i> .....	430
Appendix MM: <i>HM Tracking Data (Jill)</i> .....	434
Appendix NN: <i>Sample PP9 Teaching Activities to Support SEL Competencies</i> .....	435

## List of Abbreviations

ACC	anterior cingulate cortex
ADHD	Attention Deficit/Hyperactivity Disorder
AFG	alumni focus group
AG	alumni group
ANOVA	analysis of variance
ANS	autonomic nervous system
AQAL	All Quadrants All Levels (the model for Integral Theory)
ASD	autism spectrum disorder
CASEL	Collaborative for Academic, Social, and Emotional Learning
CDC	Centers for Disease Control and Prevention
CEN	central executive network
CFREB	Conjoint Faculties Research Ethics Board (University of Calgary)
CG	control group
CMHA	Canadian Mental Health Association
DMN	default mode network
DPS	Developmental Perspectives Survey
DSM	Diagnostic and Statistical Manual of Mental Disorders
DVC	dorsal vagal complex
EG	experimental group
FG	focus group
fMRI	functional magnetic resonance imaging
HPA	hypothalamic-pituitary axis
HRV	heart rate variability
IBN	intrinsic brain network
IMP	Integral Methodological Pluralism
IT	Integral Theory
LL	lower left quadrant (of the AQAL model)
LR	lower right quadrant (of the AQAL model)
MAAS-A	Mindful Attention Awareness Scale for Adolescents
mPFC	medial prefrontal cortex
MYA	million years ago
PBIS	Positive Behavioural Instructional Supports
PFC	prefrontal cortex
PNS	parasympathetic nervous system
PP9	Grade-9 Positive Psychology course
QCT	Quick Coherence Technique (HeartMath)
RA	research assistant
SEL	social-emotional learning
SEN	salience emotion network
SNS	sympathetic nervous system
SOS	Student Opinion Survey
UL	upper left quadrant (of the AQAL model)
UR	upper right quadrant (of the AQAL model)
VVC	ventral vagal complex



## Chapter 1: Introduction

### Vignette 1: Jasmine's Story

Several years ago, after a Grade-11 biology lesson on food webs and ecology, one of my students remained several minutes after the bell, fixated in her seat, staring straight ahead. Jasmine\* was visibly agitated and when I asked her what was going on, she finally stammered “none of this makes any sense and I don’t understand your lesson at all.” At the time, I admit, I was perplexed, as students don’t generally have such a visceral reaction to these biology concepts, especially ones that I would consider to be quite straightforward. Jasmine left that class and didn’t return to school for three weeks. Her reaction to a typically low-level trigger seemed excessive and irrational, a possible indication of a hypersensitive fight/flight response – often from previous trauma. She finally returned one day, telling me that she could not figure out why she would get so anxious in school, causing her to draw blanks in every class. When we started to talk, the layers began to peel back, the bottle became uncorked, and a lifetime of tears poured out of her tiny frame. It was that day that I realized I needed to jump into this work with both feet – there were kids all around me falling apart emotionally, unable to find their way out of the chaos. I had been practicing heart-focused breathing using HeartMath biofeedback to regulate my own anxiety, and knew it was helping me achieve breath-heart-brain coherence and I wanted to share it with my students. As a teacher with solid educational underpinnings in science, I knew I was on to something but felt the pull of empiricism to somehow try to set out to prove it. At the time, I was halfway through a Master of Education degree and could not stop thinking about my anxiety-ridden students and how I might be able to help them.

\*Jasmine is a pseudonym

I begin here – with Jasmine’s story, because it was on this day that I felt compelled to find some way to help the anxious and dysregulated students I was seeing all around me. I felt that if mindfulness with biofeedback could help me regulate my own emotions, perhaps I could teach these regulation skills to my students. It seemed to me anyway, that the school system was not explicitly offering opportunities for students to learn and practice social emotional skills. Throughout this dissertation, there are a number of vignettes, based on real experiences in the classroom, with some details altered to protect the privacy of the individuals described. And while many of the vignettes appear to be quite specific, these stories could truly be coming from any of the 20–25% of our students who experience anxiety, depression, and other mental health challenges. My intention with these vignettes is to bring this important research topic right to the ground level – where my students are living and navigating through an often challenging, chaotic, and stressful world.

While rates of adolescent stress and anxiety have been slowly increasing (CAMH, 2021), the COVID-19 pandemic has since contributed to even higher stress, greater depression, and increased loneliness in adolescents (Ellis, Dumas, & Forbes, 2020). Additionally, students transitioning from middle school to high school often experience additional stress and worry, which, if not addressed, can lead to further downstream negative mental and emotional effects (Evans, Borriello, & Field, 2018). Students in my classes often tell me they feel like others are “staring” and “talking at me,” feeling disconnected from the social world around them. Recent research in social emotional learning (SEL) has uncovered some promising results, including improvements in student academic performance, stress management, emotional regulation, and increased prosocial behaviours (CASEL, 2021). Questions regarding what is going on, why is this happening, and what can be done informed this research process from a variety of perspectives to fully understand the phenomena. It is my hope that from here, solutions can be developed and then put into place to support students, teachers, schools, and communities. This research study examined SEL and mindfulness practice using biofeedback to support Grade-9 students with their transition into high school. Chapter one will explain Wilber’s Integral theory, as operationalized through the Integral Methodological Pluralism paradigm, and examine my role as a reflexive researcher throughout this process.

## **Significance**

To contextualize and situate the study and research questions being examined, a summary of the research currently underway will be provided. Using a meta-analysis of approximately 81,000 youth, Racine and colleagues (2021) found that globally, rates of child and adolescent anxiety and depression have doubled since the COVID-19 pandemic (from 12.9% and 11.6% to 20.5% and 25.2%, respectively). Racine’s (2021) team found that school interruption and closures, decreased peer interactions, increased family stresses, social isolation, and lost milestones were factors in these dramatic increases. Mental health disorders are now ranked as the second (behind injuries) cause for

healthcare and hospital expenditures, with only 20% of children and youth receiving the mental health supports they require (Public Safety Canada, 2022). Data from the Centers for Disease Control and Prevention (CDC) have recently reported that “many high school youth engage in some form of problem behaviour, such as violence, risky sexual behavior, substance use, or school dropout or failure” (Williamson, Modeki, & Guerra, 2015, p. 183). Children who have experienced excessive stress, trauma, abuse, or neglect are at higher risk for subsequent underdevelopment of neurological structures responsible for executive functioning, impulse control, and emotional regulation (Alberta Health Services, 2016).

As a classroom teacher with over three decades of experience, I have observed a recent increase in both internalizing and externalizing behaviours as well as learning gaps, particularly with our Grade-9 population. School curricula targeting SEL and stress reduction integrated into daily programming can be advantageous as children spend a significant portion of their day at school, all students can benefit (including disadvantaged students), and stigma around mental illness can often be reduced (Britton et al., 2014). SEL involves developing skills in goal setting, managing emotions, decision making, and forming and maintaining positive relationships, while lower SEL skills such as poor communication and time-management lead to poorer academic performance, attendance issues, and behavioural disruptions (CASEL, 2021; Tan et al., 2018). In Alberta, there are very few dedicated SEL high school program components, with sparse elements found only in physical health and education curricula (Alberta Education, 2020). Currently, there is a significant gap between SEL programming research and its application in the classroom, informing the need for evidence-based practice and proper implementation, ideally using delivery from the classroom teacher as practical, cost-effective, and efficacious given the inherent teacher-student rapport (Auger, 2011; Durlak et al., 2011). This research focused on the introduction of mindfulness, SEL, and coping strategies to help students handle stressful school situations, with an additional emphasis on developing resiliency and self-efficacy to navigate the often-

difficult transition from middle school to high school. The goal in using these interventions was to help students handle stressful school assessments and improve cognitive, emotional, and behavioural functioning. A second goal was to develop student's resiliency and self-efficacy in order to navigate the difficult transition from middle school to high school.

### **Problem Statement**

The problem that focused this study centres on the rising numbers of adolescents who are experiencing high levels of stress and emotional dysregulation without the tools and skills to manage, leaving them alone to figure it out. This study examined how students individually and collectively experience emotion regulation and coping strategies, and how their attitudes and behaviours change as a result of engaging with deliberate strategies to empower them to navigate through high school. Additionally, an investigation of the educational structures that either support or inhibit student social and emotional well-being was conducted.

### **Purpose**

The purpose of this study involved developing an understanding of how mindfulness, SEL, and coping strategies help student thoughts, attitudes, and behaviours, and how this type of program is effectively positioned within the educational structures currently in place. An examination of the individual student, students together in a class and school, and the system that the student finds themselves in framed this study.

### **Research Questions**

The overarching research question involved examining the individual student thoughts, attitudes, and behaviours after experiencing a course targeting SEL, mindfulness, and coping strategies. How does a course, focused on SEL, mindfulness with biofeedback, and coping strategies, influence individual student thoughts, attitudes, and behaviours? Given the four quadrant/eight zone IMP paradigm, I have constructed six research questions that addresses six of the eight zones to gain an integral, multi-

perspective understanding of the effects of this program. This delimitation to six zones was motivated by my concern to ensure that the project remained manageable to be implemented by a single researcher, within the timeframe of one school year.

1. What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback? (UL; Zone 1)
2. What developmental levels are students operating at and how does this affect each individual worldview? (UL; Zone 2)
3. How do the students collectively understand SEL and mindfulness with biofeedback within the culture of the classroom and school? (LL; Zone 4)
4. How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback? (UR; Zone 5)
5. What changes are observed in the student's physiology after this program? (UR; Zone 6)
6. How is this type of program affected and/or supported by school, division, and provincial systems? (LR; Zone 8)

### **The Research Paradigm**

Kuhn (1970) described a paradigm as a map, complete with instructions for map-making, allowing researchers to investigate specific phenomena using the criteria defined by the paradigm in use. An educational paradigm focused on practical, meaningful, and experiential research gained prominence through the work of John Dewey, William James, and Charles Sanders Peirce in the early twentieth century (Crotty, 1998). In education today, this approach is favored because it assumes a holistic, non-aligned position that seeks to observe, understand, and transform the lives of students, teachers, classrooms, schools, and educational systems through praxis (the connection between theory and practice) (Kalolo, 2015). Within this framework, the idea that goals are not fixed but constantly evolving over time is central, as individuals and their surroundings are continuously reshaped through interaction

(Crotty, 1998; Kalolo, 2015). This approach is seen as bridging the gap between positivism and constructivism, with educational research aiming to understand, reorganize, and reconstruct the experiences of learners as they engage with society (Dewey, 1944). While this framework incorporates elements of positivism, it also emphasizes the importance of multiple perspectives and lived experiences, as Dewey argued that interaction is essential for accessing knowledge (Crotty, 1998; Kalolo, 2015). Scholars like Rorty and Pring maintain that no single form of inquiry is superior to others, and in education, a democratic, moral approach is required to ensure that students and teachers are not exploited as mere tools for research, but instead engaged in a collective search for relevant multiple truths (Badley, 2003).

According to Rorty (1990), it is the journey that matters, and that our descriptions of the world, whether they are based on science (knowledge is already there and just needs to be discovered) or constructivism (learners generate their own knowledge based on their experiences), are partial and often fuzzy (as cited in Badley, 2003). Unlike mixed-methods research, pragmatism does not use one set of methods to explain or verify another, instead, each ontological dimension stands on its own, interacting with the others to “solve disputes of interest through dialogue, negotiation, argumentation, and consensus (Habermas, 1990; as cited in Kalolo, 2015, p. 165). Additionally, Rorty described the dialectical process of *reflective equilibrium*, as a type of critical discourse to examine cultural, social, and educational sensibilities such that they may be transformed in practice (Badley, 2003). In this way, pragmatic educational research is praxis, continually observing and reflecting, with multiple, partial truths emerging from the interactions of students, teachers, and other stakeholders within the educational system. Dewey (1929) described his principles of *continuity* and *interaction* as learning and living in the same world, both transforming and being transformed by the process (p. 44). As a teacher, I am modelling, embodying, and facilitating emotional regulation practices with my students – while as a researcher I am observing, interacting, and integrating meaning. In keeping with this paradigm of praxis,

the research conceptual framework guiding this research study was Integral Methodological Pluralism (IMP), operationalized from Ken Wilber's Integral Theory (Bohac Clarke, 2019; Davis, 2019; Esbjörn-Hargens, 2009; Wilber, 2007).

### ***Integral Theory***

Wilber uses a type of meta-map, or collection of paradigms, bringing together potentially incommensurable epistemologies in an integrated manner. Wilber (2003) stated:

*Integral* means comprehensive, inclusive, non-marginalizing, embracing. Integral approaches to any field attempt to be exactly that – to include as many perspectives, styles, and methodologies as possible within a coherent view of the topic. In a certain sense, integral approaches are *meta-paradigms*, or ways to draw together an already existing number of separate paradigms into an interrelated network of approaches that are mutually enriching (pp. xii–xiii).

Accordingly, the “pragmatic correlate of Integral Theory” (Integral Theory, 2017, para. 1), operationalized as the Integral Methodological Pluralism (IMP) served as a framework to investigate various dimensions of reality within this study.

### ***Research Conceptual Framework***

The IMP framework provides a glimpse into four non-competing and non-reducible dimensions of reality, each disclosing a truth about the studied phenomena that the others cannot (Esbjörn-Hargens, 2009; Wilber, 2007). By collecting data from the interior, exterior, individual, and collective, four distinctive facets of reality can be held up against each other making the IMP methodology more comprehensive and nuanced than a typical mixed-methods research methodology, which uses qualitative and quantitative measures as complementary knowledge of the same ontological reality. In fact, “research is strengthened by an Integral worldview and a more complex understanding of the world” (Bohac Clarke, 2019, p. 45). IMP provides multiple, distinct partial truths, each ontologically separate from the other. Table 1 outlines the research conceptual framework utilized in this study, using

the IMP framework.

**Table 1**

*Research Conceptual Framework*

<p><b>Upper Left Quadrant (UL) (subjective)</b>  Individual phenomenon as experienced from:  Interior – student felt experience of emotion regulation (obtained through phenomenology using individual student interviews)  Exterior – observed student cognitive developmental level (obtained using a developmental level survey given to each student to assess their current stage)</p>	<p><b>Upper Right Quadrant (UR) objective</b>  Individual attitudes/behaviours as experienced from:  Interior – measured changes in student attitudes/behaviours (using an individual student attitude/behaviour survey pre- and post-program, and compared to a control group)  Exterior – student HRV physiology changes (using HeartMath sensors and the Inner Balance app to measure HRV changes during mindfulness practice)</p>
<p><b>Lower Left Quadrant (LL) (inter-subjective)</b>  Collective understandings as experienced from:  Exterior – observed student shared meanings through group interaction (using an ethnographical investigation using focus groups to obtain group themes and understandings)</p>	<p><b>Lower Right Quadrant (LR) inter-objective</b>  Collective understanding of systems as experienced from:  Exterior – placement of SEL/biofeedback program within existing educational systems (obtained from school, division, and government documents pertaining to current system structures and procedures)</p>

Adapted from Bohac Clarke, 2019, p. 56

This multiple perspective approach operates with three main heuristics: *inclusion*, or consideration of all perspectives; *enfoldment*, meaning one methodology cannot be used to exclude or explain the others while at the same time some may be more encompassing than others (Kleineberg, 2016); and *enactment*, phenomena will be shared with subjects through their participation (Esbjörn-Hargens, 2009). The irreducibility of these quadrants is a concept seen in Plato's Good (LL), True (UR/LR), and Beautiful (UL) and Habermas' truth, rightness, and truthfulness (Esbjörn-Hargens, 2009). Within each of the four ontological quadrants are two zones of investigation – one from the inside, and one from the outside (Wilber, 2000a). The intention here is to ensure all angles and dimensions have been examined to synthesize a comprehensive understanding of the phenomena. According to Wilber, any collapsing of these mutually exclusive spheres leads to a “gross reductionism” or a “flatland” approach to explaining reality using only a positivistic, “objective” approach (Wilber, 2000a, p. 71). In fact, Wilber (2000a) stated that “The fundamental claim of AQAL Integral Theory is that any approach that leaves out any of these eight paradigms is a less-than-adequate approach according to available and reliable human knowledge at this time” (p. 33). While this does seem to cover all the bases and examine the issue from every angle, IMP is difficult for individual researchers and is more conducive to teams of

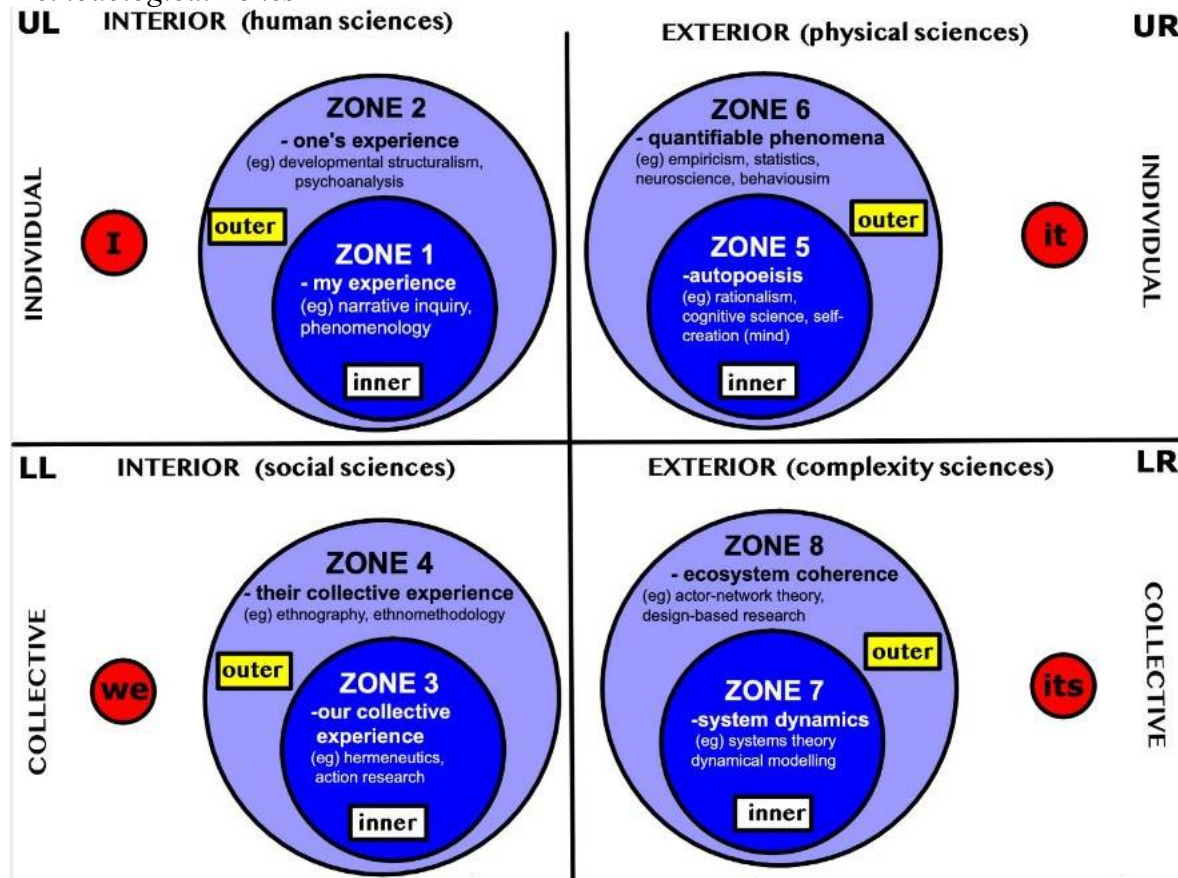


researchers (Bohac Clarke, 2019), each picking up a different quadrant to study and sharing results in a comprehensive study (Davis, 2019).

A glimpse into each quadrant reveals an interior and exterior view of the phenomenon being examined. Figure 1 illustrates the organization of the IMP model with 4 quadrants and 8 hori-zones, or zones. This study will examine both zones in the upper (individual) quadrants (zones 1, 2, 5, and 6) and the exterior zones (4 and 8) in the lower (the collective) quadrants. My rationale for selecting these particular six zones to work from stems from the research questions, which 1) places a heavier focus on the individual (upper quadrants), and 2) ensures practical considerations for completing the research within a reasonable timeline by a single researcher. Table 2 depicts each quadrant with its corresponding two zones, along with respective ontology, epistemology, and methodologies.

**Figure 1**

*Integral Methodological Framework with Four Ontological Quadrants and Their Respective Methodological Zones*



Adapted from: Davis & Callihan (2013); Davis (2019); Wilber (2000a)

**Table 2**  
*The Four Quadrants and Six Zones of IMP Used in this Study*

	INTERIOR	EXTERIOR	
INDIVIDUAL	<b>Upper Left (UL)</b> (individual student experience) RQ 1: What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback? <b>Zone 1:</b> student beliefs, understandings about their own experience (interior individual subjective experience) RQ 2: How do student developmental levels affect each individual worldview? <b>Zone 2:</b> student psychosocial development (exterior individual subjective experience)	<b>Upper Right (UR)</b> (student attitudes/behaviours) RQ 4: How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback? <b>Zone 5:</b> neurophenomenology; student attitudes/behaviours (interior individual objective experience) RQ 5: What changes are observed in the student's HRV measures after this program? <b>Zone 6:</b> neurophysiology; biological features (exterior individual objective experience)	INDIVIDUAL
	<b>Lower Left (LL)</b> (collective experiences) RQ 3: How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school? <b>Zone 4:</b> student experience within group setting; collective meaning (exterior collective subjective experience)	<b>Lower Right (LR)</b> (influence of educational systems) RQ 6: How is this type of program affected and/or supported by school, division, and provincial systems? <b>Zone 8:</b> examination of systemic structures (exterior collective objective experience)	
	INTERIOR	EXTERIOR	
COLLECTIVE			COLLECTIVE

Adapted from: Bohac Clarke (2019); Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

### ***Methodology and Methods***

As mentioned, Wilber's (2007) Integral Theory, and operationalized IMP, were chosen as a research paradigm as it provides a useful tool that links four irreducible and distinct ontologies to specific epistemologies, which then inform targeted methodologies outlined by methods designed to uncover the partial truths – “a research design that must provide the capacity to gather complex data and understand the complex relationships that constitute the research problems” (Bohac Clarke, 2019, p. 60). Each of the six research questions informs a zone within a quadrant. To observe the physiological effects of mindfulness and focused breathing, I used HeartMath sensors with an accompanying app to track student measures of heart rate variability (HRV). I used a survey to bring forth each student's thoughts, attitudes, and behaviours before and after the targeted course, as well as in comparison to a

control group who received regular school programming. Data was collected at the end of each course, at which point it was deidentified and remained unanalyzed until after each course was finished and marks were submitted (as per the Conjoint Faculties Research Ethics Board (CFREB) ethics requirements). To understand the subjective interior experience of each student after taking this course, I used phenomenological interviews with the students who volunteered to be participants in my study. To access the developmental level of each participant in the experimental group, I conducted a developmental perspectives assessment survey. To investigate the shared meanings and understandings of students in a classroom, I used an ethnographic study in the form of an interactive focus group, where I provided a small group of students with questions and conversation starters and recorded their statements. Finally, to get a sense of where and how this type of program might fit into existing curricula and school programming, with provincial, federal, and global mandates influencing these types of teachings, I conducted a comprehensive document analysis of current policies, practices, and structures in place that affect this type of experiential learning.

### **Limitations and Delimitations**

Limitations to this study included obtaining data from other schools within the division and/or province. I collected data solely from within my own school, one that I am familiar with, and one that has this particular program currently in place. Limitations also included selecting only 95 students from the Grade-9 cohort and 25 from the alumni group for interviews and focus groups. Ideally, interviewing all who had taken the course and were willing to participate in the study would have been best, however, time and logistics added constraints to the conduction of this study as the sole researcher while also teaching fulltime.

Delimitations included intentionally and purposefully leaving two zones out of the investigation. Zone 3, which falls within the LL, and involves the interior collective, was left out due to my focus on the student experience, and thus the observation of their collective inter-subjectivity from the exterior.

Future studies could look at an inside collective view from the teacher, administrator, or parent perspective within a hermeneutic methodology. Likewise, Zone 7, the LR inter-objective experience from the interior would have involved interviewing teachers, administrators, and other educational stakeholders who find themselves within the system and in turn, affected by it. Again, future studies could examine these important perspectives to fully flesh out the effects of the larger systems on these types of programs, however there was not sufficient time to explore all these angles, and as mentioned before, I wanted to focus my study on the student perspectives as fully as possible. I feel that this allowed me to focus more deeply and meaningfully with each participant – providing me with a more fulsome opportunity to understand the impact of HeartMath biofeedback, mindfulness, and SEL on student awareness.

### **Role of the Researcher and Assumptions**

Situating myself as a researcher is an important first step, as my observations and data collection arise both as an insider and outsider to the groups of study. Establishing this point of reference is essential such that biases, perceptions, and attitudes are affected from my position as a researcher (Hoey, 2014). As the teacher of this course, I was an insider, in that my position involved establishing strong, trustworthy relationships with the students, embodying my teaching practice of role-modelling concepts, skills, and learning outcomes as someone fully committed to the benefits of mindfulness and SEL in the classroom. My assumptions for this research also included the continual full support from teachers, educational assistants, administrators, and division personnel, in that I was able to offer this type of program, distribute surveys, and conduct the interviews and focus groups within school spaces.

### **Understanding of Positionality**

Being a reflexive teacher and researcher, “involves openly and honestly recognizing one’s location and experiences and deeply considering the implications of one’s power” (Kirby et al., 2017, p. 50). Holmes (2020) describes positionality as the researcher’s worldview and the position they take

while conducting the research, along with the relationship to the participants and any power dynamics within, ontological and epistemological assumptions, our choices of methodologies, ethics, protocols, logistics, and what brought us to the research in the first place.

Positivism, an ideology that has dominated science epistemology for the past several centuries, tends to equate subjectivity with bias, thus implying a threat to the integrity of the research process and data collection (Roulston & Shelton, 2015). Positivism avows that researcher bias must be eliminated at all costs and that subjective accounts are “not valid” due to their lack of objectivity. Despite this proclamation, researcher bias is inherent within the scientific research process and cannot be dissected out – the researcher (human) decides what/how to study and measure, what to include/discount, whose voices to listen to, how to assemble and visualize the data, what inferences/conclusions to pull out, and which theories are in line with the data obtained (Mruck & Breuer, 2003). The interaction between subject and object occurs within a dialectical process, where one cannot exist without the other and both are changed in the interactive process (Breuer & Roth, 2003). Karen Barad (2007) has taken it one step further, asserting researchers are “entangled materializations of which we are a part, including new configurations, new subjectivities, new possibilities” (p. 384). Bodies do not have sharp edges, and from an atomic level, there is no distinct separation of atoms to determine where one body ends and the next body begins. This interface, while distinct and apparent at a macroscopic level, becomes diffused and grainy the closer we examine it (Barad, 2007). Thus, positionality is not a fixed, stable, external place in space, but instead a dynamic intra-action (Barad, 2007) between, within, and through the phenomena being studied. As Wilber (2001) stated, “there is also an unavoidable and uncontrollable impression from the side of the *subject* onto the *object*” (p. 80, emphasis in original). Thus, my interactions as a teacher/researcher impacted, and essentially changed, the conscious experience of each student whom I interacted with throughout the course of this study.

### *Personal Positionality*

I am entering this research as a white, cisgendered, heterosexual, middle class, able-bodied, Western-educated teacher, wife, and mother of two incredible young men. I have been privileged to have never experienced war, drug addiction, poverty, or physical disability. Both of my parents have science degrees, raising me with the understanding that science is neutral and represents the Truth, whereas anecdotes and personal stories should be discounted as trivial, potentially inaccurate, and most definitely biased. I held fast to this indoctrinated worldview and carried it forward into my science teaching for the first few decades of my career, proud of my unwavering trust in the foundations of scientific empiricism. It was my graduate level training that opened my eyes to alternate epistemologies, slowly breaking down my concrete pillar of Truth, resulting in an expansive gravel pit of diverse perspectives and new possibilities for knowledge generation.

Despite my current stable state of mental and physical wellness, I have experienced anxiety and depression in the past. Eventually, I discovered coping strategies to regulate and centre myself, engaging in mindful breathing and yoga practices, running, and support from family and friends, giving me the strength to navigate the difficult times. Several years ago in my teaching practice, I began to encounter greater numbers of students experiencing bouts of anxiety and other indications of either prodromal or diagnosed mental illness. As I considered my own path to wellness, I wondered how I could also help my students. Not surprisingly, I entered this quest from my scientific worldview – learning about the neurophysiology of the brain and body during stress and how mindfulness and emotional regulation has been shown mitigate these deleterious effects. This intervention approach seemed fitting and typical of the current educational (and societal) structure where the individual is broken and needs fixing. A deeper and broader examination of the interwoven parts of a larger system will help me contextualize person, place, and space, with a careful examination of my own position of power and access, prejudices, biases, and overall purpose in this work.

As a teacher, I whole-heartedly believe that teaching students how to regulate emotions and learn coping strategies, particularly when making big educational and social transitions, can help them handle difficult situations with other students, teachers, parents, and even school-related assignments and tests. As a researcher however, I also acknowledge that students come to us from many backgrounds, experiences, developmental and academic levels, and not all are ready or interested in the strategies and practices taught in this course. Some may dive right in, embrace the new learning, and bring it into their everyday life, while others may need more time, or find it not to be as useful in their own lives. As a *researcher*, I would plant myself tentatively in the UR quadrant, as I have some experience with empirical data collection and analysis, however as a *teacher*, the partial truth most valuable to me is obtained from the UL/LL, or student and class experience from their own perspective/s. I might teach them something that is evidence-based, empirically tested, and pedagogically sound but if it does not resonate with them, then the best intentions can be lost in the process. As I consider my extensive background in biology and psychology, it seems fitting that my Kosmic address (Wilber's, 2007, notion of "altitude and perspective") lands in the upper quadrants, focussed on the conscious development, attitudes, and behaviours of the individual. As an Integral theorist, all four quadrant perspectives are collected and analyzed as partial truths towards a comprehensive whole. Indeed, as Wilber (2000a) proposed, the integration of the big three perspectives (we, it/s, I) allows for the good, the true, and the beautiful to emerge, bringing a different view from a different lens, culminating in a pluralistic "mutually determinant tetra-interact[ion]" (p. 186).

### **Definitions**

- *Amygdala* (*amygdalae* plural) – two small areas of the brain that serve as an alarm system—detecting potential threats and signalling the sympathetic nervous system to engage (turn on when anxious or afraid)

- *Autonomic Nervous System (ANS)* –sympathetic (fight/flight/freeze) and parasympathetic (rest/tend/digest) involuntary nervous systems, affecting heart rate, breathing, and other physiological functions
- *Biofeedback* – using a device such as the HeartMath sensor to visualize the HRV in real time, such that the student can use the breath to smooth HRV sine waves, increasing coherence. Student physiology can be measured before and after mindfulness practice.
- *Central Executive Network (CEN)* – a pathway in the brain responsible for decision making, focused attention, goal-direction, and working memory
- *Coherence* – during heart-focussed breathing, adding thoughts of gratitude or compassion towards another human, pet, or place can increase the regulation between the heart and brain rhythms, improving overall thinking abilities
- *Cortical Areas* – brain areas involving the four lobes of the cerebral cortex (frontal (decision-making, executive functioning), parietal (sensory perception), temporal (sound and language processing), occipital (visual processing))
- *Subcortical Areas* – brain areas below the cortex: thalamus, hypothalamus, pituitary, medulla oblongata, spinal cord
- *Default Mode Network (DMN)* – a pathway in the brain responsible for self-awareness, social referencing, and is activated during mindwandering
- *Dorsolateral PFC* – responsible for working memory, decision making, emotion regulation, novelty detection, attention, and theory of mind; rational processing with no connection to emotional brain (Van der Kolk, 2014)
- *Heart-focussed breathing* – slow, deep breathing, with attention focussed on heart or chest area. Thoughts are contained to the breath and body in the present; past and future thoughts are disregarded during this time to allow for deep relaxation and coherence



- *Heart Rate Variability (HRV)* – a measure of the timing between heart beats; low variability indicates low coherence and more dysregulation between heart and brain; the greater the amplitude of oscillation, the higher the coherence and healthier (cardiovascular) the individual (Porges, 2011)
- *Hippocampus* – two structures located in the temporal lobes associated with learning and memory; integrated into the limbic system
- *Insula* –cortex region associated with self-awareness, identity, pain perception (SEN)
- *Mindfulness* – paying attention intentionally to the present moment, keeping other thoughts and emotions out, and focussing on the breath (Kabat-Zinn, 2015)
- *Parasympathetic Nervous System (PNS)* – a branch of the autonomic nervous system responsible for regular internal functioning (rest, digest, growth responses)
- *Polyvagal nerves* – a collection of autonomic nerves sending bidirectional messages from the brain to the heart, lungs, stomach, and intestines (VVC, DVC) (Porges, 2011)
- *Prefrontal Cortex (PFC)* – the foremost part of the frontal lobe; responsible for decision making, personality, consciousness, executive functioning, social behaviour
- *Salience Emotion Network (SEN)* –cognitive control and emotion processing
- *Social-emotional learning (SEL)* – a learning strategy to develop skills in goal setting, managing emotions, making responsible decisions, and forming and maintaining healthy, positive relationships (CASEL, 2021)
- *Sympathetic Nervous System (SNS)* – a branch of the autonomic nervous system responsible for responding to stressors or threats (fight or flight responses)
- *Thalamus* – a midbrain relay centre receiving and redirecting incoming sensory input and sending outgoing messages back to brainstem; involved in sleep, consciousness, memory

## Conclusion

In summary, this study sought out to address the increasing trend in adolescent stress and anxiety, particularly in school and social situations through a targeted option course. Emerging research in SEL and mindfulness practices is revealing positive effects on adolescent stress, worry, and lowered self-efficacy. However, implementing the most efficacious evidence-based practice relies on acknowledging my positionality and bias as a researcher and on evidence from a multitude of perspectives. This includes the student's own lived experience, meanings collected from the dynamic culture of the classroom and school, the observable cognitive, emotional, and behavioural changes expressed by the students, and an examination of the complex educational systems in place that either support or oppose these practices. Wilber's Integral Methodological Pluralism provided the framework to direct and select corresponding research methods needed to tetra-mesh each of these ontological perspectives, resulting in a comprehensive and integrated understanding of the student experience.

## Chapter 2: Contextualizing the Problem in the Literature

### Introduction

This literature review will be divided into four quadrants, with a further breakdown into the six zones of focus. Ken Wilber's (2007) Integral Theory, with the operationalized IMP was used as a methodological paradigm in this study. Table 3 provides a map outlining the four quadrants and six zones with corresponding research questions and relevant themes from the scholarship.

I begin with the upper left quadrant (UL), as my doctoral journey has unexpectedly pulled me into this quadrant with a familiarity that has become my new Kosmic address. The interior student experience has been generally overlooked in much of the SEL research that I have come across, so I feel the need to begin with these important voices. Hearing Jasmine's story pulled me along a new path of wanting to understand her experience from her lens. After an exploration of the research involving the individual subjective experience from a first-person perspective, I will move over to the lower left quadrant (LL), where the inter-subjective experience of mindfulness and SEL within a collective, such as a classroom or school, will be examined. As Wilber (2007) described, when individuals come together in groups, they do not organize as separate and distinct "I"s, instead there is a "shared communication and resonance among members of the group" that evokes new, integrated meanings *as a result of* this collaboration (p. 150, emphasis added). The upper right quadrant (UR) will be used to measure individual changes in physiology (such as heart rate variability), attitudes, emotions, and behaviours. The lower right (LR) quadrant will analyze worldviews, educational frames, and other systems affecting this type of program. Finally, connections and interactions between the quadrants, sometimes called "tetra-mesh" (Wilber, 2007, p. 149) will be thoroughly explored and analyzed, providing an opportunity for "quadrants talking to each other" (Bohac Clarke, 2019, p. 57).

**Table 3***The Four Quadrants and Six Zones of Wilber's IMP – a Literature Review map*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)	<b>The Science of Emotion, Feelings, and Affect</b>	Lazarus (1966; 1991) Ekman (1999) Damasio (2019)
<b>Husserl's Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)	<b>Emotional Intelligence and Regulation</b>	Goleman (1995) Davidson (2008)
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)	<b>Social Emotional Learning (SEL)</b>	Durlak et al.(2011) Ross & Tolan (2018) CASEL (2021)
<b>Trauma Response</b>	Maté (2011) Perry & Szalavitz (2017) Van der Kolk (2014) Hübl (2020)	<b>Self-efficacy and Coping</b>	Bandura (1982) Pannebakker et al. (2019) McLeod & Boyes (2021)
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)	<b>Physiology of the Stress Response</b>	Selye (1950; 1956) LeDoux (1994) Van der Kolk (2014)
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)	<b>Integration theory</b>	LeDoux (1994) Menon, 2013 Siegel (2017; 2020)
<b>Consciousness Development</b>	Kegan (1994)	<b>Polyvagal Theory</b>	Porges (2011) Rediger (2020)
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)	<b>HRV and Mindfulness</b>	Kabat-Zinn (2003) Brewer (2022) HMI (2021)
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	
<b>Shared Meanings</b>	Nathan et al. (2007) Kilner & Lemon (2013)	<b>Current/Deficit Model of Education</b>	Eisner (2004) Alberta Government (2017) Youldell et al. (2018)
<b>Intersubjectivity Through Social Interactions</b>	Barad (2007) Bache (2008) Siegel (2017)	<b>A Reframing of Education</b>	Van Heertum (2006) Kent den Heyer (2018)
<b>Morphic Fields in the Classroom</b>	Bache (2008)	<b>SEL in the School System</b>	Lawlor (2014) Feuerborn & Gueldner 2019)
<b>Collective Trauma</b>	Hübl (2020) Maté (2022)	<b>Polyvagal Theory and Safety in the Classroom</b>	Porges (2015; 2022)

Adapted from Bohac Clarke (2019).

## Upper Left Quadrant (Individual Student Experience)

### Vignette 2: Jasmine Returns

As I sat at my desk after a long day of teaching, I looked up and saw Jasmine hovering at the classroom door. I motioned for her to come in, putting my piled-up work from the day aside so that she could have my full attention. Initially, she sat down sideways to me, staring straight ahead, avoiding eye contact. She was shaking, breathing erratically, stumbling over words, and occasionally crying. I didn't probe but instead titrated my questions such that she was in control of how much to divulge and at what time. I wondered if she would become stuck, or frozen, and then leave – but she didn't. She ended up telling me her story – in strange, disjointed pieces with no discernable chronology. She seemed to have no sense of a beginning, middle, and end, and said at one point that she didn't really remember much of her childhood and couldn't tell me if it was good or bad. Her story contained elements of physical and sexual abuse at the hands of a family member (eventually leading to their imprisonment), a collection of foster homes, siblings who were separated and sent to different foster homes, and a social worker who was aloof and unwilling to form any type of bond with Jasmine. Basically, this young girl was living by herself, with no family or supportive, trustworthy people in her life. She had a few friends, however, many were as emotionally dysregulated as she was and not particularly loyal. My heart was breaking as she laid out the pieces of her life.

This quadrant focusses on the individual subjective experience examined from the interior (Zone 1 through phenomenology) and exterior (Zone 2 through structuralism). Understanding the first-person perspective requires bringing the unconscious thoughts and feelings to the conscious to be reflected upon (Davis, 2010; as cited in Esbjörn-Hargens, Reams & Gunnlaugson, 2010). Importantly, each of our subjective experience is unique, however does not occur in a vacuum, thus context, values, beliefs, ideas, and understandings should be established before accessing the individual subjective interior (Wilber, 2007). This quadrant provides a look into an understanding of stress, emotion, mindfulness, and regulation, from a first-person perspective. Accessing these inner thoughts and emotions can be challenging, and even precarious, as these emotions that come out through interventions such as HeartMath biofeedback are expressed somatically, allowing the experience to unfold in an embodied way.

### *Upper Left (UL) Quadrant: Zone 1 (Student Beliefs)*

These subjective experiences are real, even if they can't be detected by someone outside ourselves. In this sense, subjective experience is not objectively observable by someone else, which is why we use the word *subjective* to describe these experiences (Siegel, 2017, p. 120). Each individual's recognition and recollection of their subjective experience is influenced by many internal factors such as stress, emotional dysregulation, trauma, and defense mechanisms.

**Table 4**

*Wilber's IMP: A Literature Review map UL, Zone 1 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)	
<b>Husserl's Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)	
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)	
<b>Trauma Response</b>	Maté (2011) Van der Kolk (2014) Hübl (2020)	
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom		How is this type of program affected and/or supported by school, division, and provincial systems?

Adapted from Bohac Clarke (2019).

**What is Consciousness?** The Buddha once declared, "All phenomena are preceded by the mind. When the mind is comprehended, all phenomena are comprehended" (Santideva (1961), p. 68; as cited in Wallace, 1999, p. 176). In fact, Buddhists believe that "the undisciplined mind was an unreliable, instrument for examining mental objects, processes, and the nature of consciousness" (Wallace, 1999, p. 176). Thus, practices such as meditation and mindfulness arose to focus attention and bring awareness to

the conscious mind, allowing for greater insight and attentional stability (Wallace, 1999). When the mind is either scattered (excitation) or distracted with slackened attention (laxity), the Buddhist tradition deems this “dysfunctional” (Wallace, 1999, p. 176). The Buddhist practice of *Samatha* (pronounced “shamata”) addresses these two mental states, by using mindfulness techniques such as focussing attention on a mental image – for example, imagining a pebble or tree and holding that image in the consciousness (Wallace, 1999, p. 176). This mindfulness practice is much like the one my students and I engage in daily – focussed attention on the breath while imagining it flowing in and out of the heart area, a little slower and deeper than usual (HMI, 2021). In this way, the student can still their wandering mind and focus their attention on this mental image, helping to cultivate a new mental stability.

When we think of consciousness and how to define it, we might use terms such as being awake and aware of one’s surroundings and self, access to internal mental and emotional states and a deliberate control of our own behaviours (Van Gulick, 2022). David Chalmers (1995) described this as the “easy problem of consciousness” (p. 200). He believed that the “hard problem of consciousness is the problem of *experience*” (Chalmers, 1995, p. 201, emphasis in original). It seems, indeed, that there are experiences within us that are visual and non-visual, experiences of emotion, and intangibility (Chalmers, 1995; James, 1892). William James (1884) describes consciousness this way:

Like a bird’s life, it seems to be made of an alternation of flights and perchings. The rhythm of language expresses this, where every thought is expressed as a sentence and every sentence closed by a period. The resting-places are usually occupied by sensorial imaginations of some sort, whose peculiarity is that they can be held before the mind for an indefinite time and contemplated without changing; the places of flight are filled with thoughts of relations, static or dynamic, that for the most part obtain between the matters contemplated in the periods of comparative rest. (p. 2)

Thus the “perchings” might be thought of as the “substantive parts” and the “flights” considered the

“transitive parts,” meaning we create content from our experiences that connects to other things – including past, present, and future phenomena (James, 1892, p. 160). James spoke of the stream of consciousness as a flux – with seemingly paradoxical substantive and transitive parts, melded in a way in which Bailey (1999) describes as “transitions are *part* of consciousness just as the joint in bamboo is part of the wood” (p. 144, emphasis in original). James (1892) compared the separation of thoughts and ideas as “no more a break in the thought than a joint in the bamboo is a break in the wood” (p. 240).

According to Kant and Husserl, the phenomenological experience is not only an intentional and representational construct of thoughts, ideas, and events, but also includes relational aspects such as space, time, self, and world as conceptual and non-conceptual forms (Van Gulick, 2022). Siegel (2017) described consciousness as what we need to “be aware of subjective experience, of the lived texture of life” (p. 284). He also proposed the notion that conscious awareness can be cultivated with intention, though mind training such as mindfulness or meditation, to “develop a state of mind with purpose and direction...important in shaping our mental lives, our within and between” (p. 284). In this way, consciousness becomes something with breadth, depth, and richness, and can be extended between other sentient beings. Trying to fully and deeply understand the nature of Jasmine’s trauma through her conscious experience becomes the difficult part. Can she describe her experience with all of its thickness, or does some of it get lost in the translation from her consciousness to mine, through the language and interpretation of experience – through an intra-active discourse?

**Husserl’s Phenomenology.** One cannot describe an approach to accessing the interior individual subjective perspective without first acknowledging the work of Edmund Husserl and his development of phenomenology. Husserl wanted to approach the viewpoint of the subject from a position other than the positivistic third-person observer. He focused on getting “back to the things themselves” (Husserl, 2002, p. 168), meaning starting with the raw, first-hand form of consciousness as a subjective experience, as opposed to observing from the objective world of science. For example, the fear reaction can be studied



as a physiological event – observable changes in heart rate, breathing, neural activity, hormone levels, and other bodily changes – in other words, from an objective, positivistic, or UR quadrant approach. Alternatively, the UL quadrant focuses on what it is like to *experience* fear – what happens to each of our thoughts and feelings? Our perception of time and the world around us? Colours and shapes? Husserl wanted to develop a systematic study of consciousness, where his focus was on the subject and used intentionality – or the “essential relationship between conscious subjects and their object. Consciousness is always consciousness *of* something” (Crotty, 1998, p. 79, emphasis in original). This “intentionality” is really about the *structures* of consciousness and how they pertain or relate to the individual – for example, perception, memory, interpretation, and understanding, among others. Husserl goes about this by “bracketing” or suspending our own thoughts and understandings and reducing the phenomenon to its rawest form, or “primordial phenomena” (Crotty, 1998, p. 79). This *epoché* allows us to set us aside judgements and other mental filters to truly experience the phenomenon we are trying to understand. *Eidetic reduction* is then used to find out its fundamental essence – in Jasmine’s example, accessing her sense of a lack of control over her world and her sense of freezing accompanied by her intense fear. This is the essence of the phenomenon, and the subjective experience that we are trying to understand. Martin Heidegger (Husserl’s student), however, believed that we are not just “things in themselves,” but are thrown into the world, interconnected with each other and the contextual culture that we have created (Husserl, 2002, p. 168; Packer, 2011). Thus, our ability to fully “bracket” can never be free from presuppositions, biases, or “fore-structure” (Heidegger, 1927/1962, p. 192; as cited in Packer (2011), p. 182). Merleau-Ponty recommended that we “slacken the intentional threads which attach us to the world” and focus our attention on an embodied subjectivity – or minds and bodies together in the world (Packer, 2011, p. 186). According to Merleau-Ponty, instead of using rationalism or empiricism to describe essences, we need to bracket our “natural attitude,” but then embody the full essence with our living body entangled within the world (Moustakas, 1994, p. 85; Packer, 2011).

**First Person Perspective.** Zone 1 seeks to access the student's experience from an interior first-person perspective. The difficulty of trying to understand what each person's experience might be like is realizing that our individual experience is unique and thus difficult to pull out and analyze in its original, uninterpreted form. It is much like what Thomas Nagel (1974) calls "the subjective character of the experience...not analyzable in terms of any explanatory system of functional states, or intentional states, since these could be ascribed to robots or automata that behaved like people though they experienced nothing" (p. 323). He aptly describes the impossibility of trying to "see" the world as a bat might – using sonar, without the necessary "internal neurophysiological constitution of a bat" (p. 324). He bridges the immense gap between human and bat with sighted/hearing human and one who has neither – trying to understand each other's inner worlds (Nagel, 1974). Likewise, the worlds of a 14-year-old student and adult teacher/researcher would most definitely look quite different from each interior view. Additionally, it is altogether possible that aspects of the student's consciousness may be accessible by the interviewer, but unknown to the student (Shear & Varela, 1999). The development of psychoanalysis to access another's consciousness (free association, dream analysis, hypnosis, and other techniques) has helped bring about a new understanding of the subjective experience – and awareness of it. A strictly first-person account of their experience is "purely private or even solipsistic," which does not help the researcher access the knowledge (Shear & Varela, 1999, p. 11). Thus, Shear and Varela (1999) propose the researcher take on a mediator role to provide a second-person account of the phenomenon.

**Second Person Perspective.** The second-person perspective (unlike the traditional UR scientific position of detached, unbiased, and neutral observer) is fully immersed in the language, culture, symbolism, meanings, and experiences of the individual they are accessing the narrative from. In fact, this second-person position involves "giving up explicitly his/her detachments to become identified with his role: an empathetic resonator with experiences that are familiar to him, and which find himself a resonant chord" (Shear & Varela, 1999, p. 10). In other words, this person has walked beside the

“subject,” interacting with them, understanding what their experience is like, a mediator “steeped in the domain of experiences under examination” (Shear & Varela, 1999, p. 10). It is from this approach that I interviewed my students myself, having walked beside them throughout the course, immersed in the same SEL and mindfulness practices daily, and in constant conversation with them in my attempt to develop deep and meaningful relationships with each of them. A UL approach attempts to seek out the personal and subjective experience, and this cannot be done using a third-person, “unbiased” and non-engaged outsider, unfamiliar with the general classroom experience that the students had. As a teacher who has become like a mentor or coach, I am now able to interview my students using language we both understand, shared memories from the classroom experience, and “phrasing, bodily language and expressiveness...which are inroads into the common experiential ground” (Shear & Varela, 1999, p. 10). Thus, this approach involves initial bracketing to suspend any prior personal thoughts and attitudes, followed by a “phenomenal filling-in” by the interviewee, and then explicit feedback and validation of the narrative that has emerged in the process (Shear & Varela, 1999, p. 11). As Husserl (1931) proposed, we “direct the glance of apprehension and theoretical inquiry to *pure consciousness in its own absolute Being*” (p. 154, emphasis in original).

### **Vignette 3: Connor’s Story**

Connor\* was added to my positive psychology class late in the semester. He had been shuffled through a variety of foster homes after having endured the worst forms of abuse leaving him with a constellation of social and emotional dysregulations and deficits. He had extreme difficulty speaking and struggled to put together an entire sentence. He had been removed from his previous school due to “inappropriate” social interactions with the other students – which seemed about right, since his whole previous world was inappropriate! When Connor first came into my class, my students were working on dream journals, excitedly discussing their dreams and their various interpretations with each other. For most students, this activity is innocuous and an engaging form of small group discussion. Before I could reroute the activity for Connor, he quietly called me over and told me he tried not to dream because when he did, they were always sexual and disturbing. I almost cried right there in the middle of class and had to pull back emotionally as I let him know that the dream journal activity was optional and I had another option for him. I went home that day, upset and angry, and cried for a boy who was so damaged, he had difficulty speaking, thinking, interacting with his peers, fine motor movements, and couldn’t even allow himself to dream.

\*Connor is a pseudonym

**Trauma Response.** While a complete investigation into the effects of trauma and emotion regulation is somewhat outside the scope of this study, it nevertheless must be addressed. Connor was the first student I had come across in my teaching career whose ability to speak was dramatically impaired, his neural pathways severely dysregulated and unintegrated because of the early trauma. I often wondered what he might be thinking about throughout his school day – was he as discombobulated on the inside as he was on the outside? He rarely seemed to know what the lesson was about, or how to start or complete assignments. According to Perry and Szalavitz (2017), his earlier traumas likely led to a hyper-aroused nervous system and dysregulated thought processes, meaning he would likely “pay close attention to the faces of people like teachers and classmates, where threat might lurk, but not to benign things like classroom lessons” (p. 21). As well, trauma is often preverbal, with dissociation (fragmentation from the intense emotional and physical sensations of the traumas) (van der Kolk, 2014) which can manifest as depersonalization (“detachment from one’s mind, self, or body”) or derealization (“detachment from one’s surroundings”) (American Psychiatric Association, 2013, p. 291). I began to wonder – how did he feel when we were practicing heart-focused breathing? While I was not able to interview him or even spend a significant amount of time with him to try to find out, his biofeedback while connected to the sensor provided some insight. His heart rhythms, breathing patterns, and neural integration were disrupted and highly incoherent. Asking Connor what he was thinking about, how he was feeling, and what his subjective experience was really like and that “listen[ing] closely and look[ing] closely at [his] story” can help us understand the truly personal story and interpersonal social connectedness (Perry & Szalavitz, 2017, p. 326).

Mindfulness practice helps the person who feels detached from feeling, sensation, self, memories, and even a sense of time and place – feel a connection to our present bodies, in the present time, grounding in a physical reality (van der Kolk, 2014, p. 208). However, mindfulness isn’t really about trying to get somewhere, or to accomplish something necessarily, it’s really “about allowing

yourself to be exactly where you are and as you are, and for the world to be exactly as it is in this moment as well” (Kabat-Zinn, 2003, p. 61). For someone who has experienced severe trauma, the world becomes distorted, space and time are warped, and the perception of self becomes detached from the mind and the world (Hübl, 2020). Asking Connor to stay present in a body he doesn’t understand and a world he understands less could be disarming, and frankly, quite terrifying. So how does one reconcile this precarious practice with someone who is so subjectively vulnerable? For Connor, a slow and careful entry into the practice and SEL skill development, with special attention to his responses – possibly given through dialogue if possible, or even drawing or simple journaling might be a safe approach. It is also highly likely that Connor’s past traumas will take the form of an “unconscious shadow,” which, given that they “have not been integrated by the psyche or spirit...will – indeed, they must – surface again and again in new but familiar forms” (Hübl, 2020, p. 5).

Research from Carrion, Wong, and Kletter (2012) points to several deficiencies because of hippocampal damage, including impairments in verbal and visual memory and attentional deficits. Thus, this trauma processed initially by the amygdala and other unconscious neural circuits may affect the individual emotionally, however, would remain inaccessible to their conscious awareness (Ledoux, 1994). Additionally, this implicit trauma memory involves sensations, images, thoughts, and emotions, and is not time-stamped or labelled as having come from the past – thus, when it is triggered, it appears to be happening in the present (Seigel, 2020). This would explain the difficulty Connor had while dreaming, as these early traumatic events became locked in his subconscious, emerging later in his dreams. Discovering what students like Connor think and feel from their own perspective (as opposed to subjecting him to a battery of psychoeducational assessments) is the focus of Zone 1 in the UL quadrant.

### *The Upper Left Quadrant: Zone 2 (Student Development)*

**Table 5**

*Wilber's IMP: A Literature Review map UL, Zone 2 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)		
<b>Husserl's Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)		
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)		
<b>Trauma Response</b>	Maté (2011) Perry & Szalavitz (2017) Van der Kolk (2014) Hübl (2020)		
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)		
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)		
<b>Consciousness Development</b>	Kegan (1994)		
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)		
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	

Adapted from Bohac Clarke (2019).

**Physiological Development.** Zone 2 looks at features within individual personality related to their stages of development and interior structures within each person's psyche (Wilber, 2007). Logically then, individuals do have differing levels of emotion perception and regulation (Thompson, 1994). Factors such as genetics, physiology, social environment, culture, exposure to trauma, and a host of other interacting events affect emotion regulation, mean that strategies to help students manage

emotions also need to be individually assessed and indexed accordingly (Thompson, 1994). From a developmental perspective, perception of stress and emotion regulation will be strongly influenced by the student's worldview.

**Cognitive Development.** As children move into adolescence, they typically show profound changes in cognitive development. Emotionally challenging situations become more frequent and intense, personal identity is being formed through individual and interpersonal experiences, and influences shift from parent to peer (Riediger & Klipker, 2013; as cited in Gross, 2013).

Piaget described cognitive development not as an unrelated add-on to previously completed developmental stages, but as “a group of syntheses or structurations which, although new, are a direct and natural extension of the preceding ones and fill in some of the gaps left by them” (Piaget & Inhelder, 1969, p. 131). As the individual moves from childhood to adolescence, they begin to expand their thinking from concrete operations (static objects observed and examined) to formal thought (temporality and abstract thinking – that is, imagined or hypothesized concepts) (Piaget & Inhelder, 1969). This stage of development not only affects *what* the teen is thinking about, but also *how* they are feeling – thus, interpersonal and social relations enter the picture (Piaget & Inhelder, 1969). Piaget described a developmental model that may vary between individuals however the unfolding stages of cognitive and affective development arise according to a consistent structure, integrating previous structures while allowing new ones to emerge and take hold (Piaget & Inhelder, 1969). Understanding these patterns of development helps researchers, teachers, and ultimately anyone who is currently interacting with children and adolescents. As Piaget stated, “these overall structures are integrative and non-interchangeable...[where] each results from the preceding one, integrating it as a subordinate structure, and prepares for the subsequent one, into which it is sooner or later itself integrated” (Piaget & Inhelder, 1969, p. 153). This “transcend and include” model of development lays the foundation for Wilber's developmental levels theory (Wilber, 2000a, p. 93). While Wilber (2000a) did note that “Piaget's

contributions remain a stunning accomplishment,” his narrowly focused cognitive development model excluded other areas of development such as ego, moral, affective, consciousness, interpersonal, and others (p. 22).

**Consciousness Development.** Robert Kegan (1994) described adolescent cognitive development according to evolving orders of consciousness. As individuals move from childhood through adolescence, there is a transformation of consciousness from understanding the self as first-order (one who can sense and perceive their world) to second-order (a concrete categorical understanding of self and others as distinct entities) to third-order (a “cross-categorical knowing” of thinking abstractly, across timelines, reflexively, and of the perspectives’ of others) (p. 29). Kegan (1994) stated that this final transformation is occurring during adolescence, however the continual disappointment that adults perceive when teens are inconsiderate, uncompassionate, or non-remorseful may be in fact an “erroneous attribution to that adolescent of this third order, cross-categorical way of knowing” (p. 38). In other words, the teen is not fully capable of understanding the view of others’ or examining a situation across multiple domains.

Kegan (1994) also stated that curriculum serves students best when there is sufficient challenge to their ways of thinking with proper support and scaffolding. He argues that contrary to a fundamentalist or “back to basics” approach to pedagogy where facts and content are emphasized, a humanistic or “whole child” approach that focuses on developing the minds of students and recognizes the evolving orders of consciousness might serve them better overall (p. 53). For example, instead of delivering a lesson of facts to be memorized and later regurgitated, a teacher might engage the class in a whole group conversation with a challenging or even controversial topic, where each must present the previous speaker’s argument to the best of their understanding followed by their added ideas or critiques (steelman approach) (Kegan, 1994). This teaching technique helps students take another’s perspective, allowing them to hold multiple viewpoints simultaneously while examining and integrating them as their



understanding of the concept takes a new shape. By exercising the mind in this way, adolescents can move from a concrete, fixed category of self or “subject” and others or “object,” and interact between them, allowing for more abstract metathought (Bache, 2008). Kegan (1994) described the third order of consciousness culminating with adolescence, “mak[ing] one both capable of, and vulnerable to, socialization” (p. 288). Thus, teens reach this level through discourse and perspective taking.

As Kegan (1994) stated, “*differentiation always precedes integration*” (p. 326, emphasis in original), meaning we must separate ourselves from something we were fused to, and then examine ourselves as a result of the fusion. But what about the a priori experience that individuals come into the situation with? How are they addressed in this metatheory of wholeness? Wilber (2000b) reminded us that “nothing fundamental is lost; rather, something new is added,” transcending *and* including earlier consciousnesses (p. 29). In other words, all the consciousness journeys taken cannot be replaced or subsumed but must be acknowledged and considered. As with Jasmine and Connor, “a traumatized person – no matter how far he or she may have developed before the time of the trauma – will experience regressions to previous states and stages of development when triggered by stressors” (Hübl, 2020, p. 27). To sum up Kegan’s (1994) work and return to the Zone 2 research question, recognizing the developmental level (and order of consciousness) that each student has attained or is progressing through helps educators meet them where they are, but also “not too far out of reach” (p. 42).

**Levels of Development.** Building from the work of Piaget and Baldwin, developmental structuralism was constructed by Jean Gebser to be a more simplistic serial stage model including archaic, magic, mythic, rational, and integral (Wilber, 2007). Psychologist Clare Graves, frustrated with his own university students’ (mis)understanding of his teachings, began conducting experiments to learn more about cognitive developmental levels and stages of consciousness. He paved the way for a model (later expanded upon by Don Beck to become Spiral Dynamics) to understand an individual’s ego development (Wilber, 2000a). Appendix A highlights several models of consciousness development.

Graves (1974) proposed that “the psychology of the mature human being is an unfolding, emergent, oscillating spiralling process marked by progressive subordination of older, lower-order behavior systems to newer, higher-order systems as man’s existence is a state through which people pass on their way to other states of being” (as cited in Wilber, 2000a, p. 40). Beck and Cowan used this research to develop their model of Spiral Dynamics, which describes each developmental level as a <sup>v</sup>MEME, or value system (Wilber, 2000a). <sup>v</sup>MEMEs in this model use names and colours to represent developmental levels of consciousness or holons (see Appendix B), transcending and including the previous one in a type of envelopment (Wilber, 2000a).

The levels are often designated by colour and refer to how individuals and social groupings organize together, ranging from an individualistic ideology to an egalitarian and consensus-based society (Esbjörn-Hargens, 2009). The red level represents an egocentric perspective where people organize within hegemonic hierarchies with powerful people exerting their dominance over others (Bowie, 2020). When societies are operating within the red developmental level, people are at the mercy of the stories told by authoritarian leaders who often do not have the best interests of the community in mind. Stories in this scenario typically become propaganda, often deliberately misleading many of the people such that they follow a leader with narcissistic tendencies and power agendas. A student in the red/amber level is likely heavily influenced by their peers and will even put aside their own values (or family values) to conform with the peer group or norms that they deem relevant.

The orange level is based on science and reason where hypotheses are tested through rigorous empirical methods, resulting in more rational and evidence-based decisions (Bowie, 2020). Generally, right-leaning governments and colonial-style institutions (including most public schools) operate within these constructs. Knowledge and information are considered only acceptable if verified objectively through the scientific method, thus there is little room in this system for folklore and storytelling. In schools, this worldview squeezes out important cultural stories, as they do not adhere to the same type of

vetting and are thus scrapped from curricula. Through this neoliberal framework, the students receive the message that these are “just” stories and not as important as “real” subjects like science and math. A student in the orange level will base thoughts, ideas, and decisions on empirical evidence, drawing on positivistic ideologies (derived mainly from EuroWestern, privileged, colonizer institutions like churches and schools) and will be encouraged to conform to societal “norms.”

The green level is described as egalitarian and relativistic with multiple ways of perceiving reality, where diversity and inclusion are promoted and decision-making is consensus-based (Bowie, 2020). Post-modernist philosophy has poked holes into the positivist orange ideology through schools of thought like Critical Theory and anti-racist pedagogies. Multiple ways of knowing including Indigenous, feminist, and ecopsychology worldviews are regarded as knowledge worthy of investigation, however the pluralistic nature of this “mean-green-meme” can become “post-truth” and even pathological (Wilber, 2017, p. 123), thus still evolving. A student in the green level will also align with Kegan’s third level of consciousness, able to see and appreciate alternative perspectives besides their own – even challenging their own beliefs. They will begin to push back against conformity – with peers and society.

According to Wilber (2020), less than two percent of the population currently operates within a yellow/turquoise or “second tier” consciousness (para. 24), indicating most people (and societies) prefer to exist within a modern or post-modern structure, with some even regressing back into red (totalitarian) worldviews. He does, however, make the important point that individuals within a society may be operating in differing developmental levels – for example, there are often Tier 2 (yellow/turquoise) individuals who have achieved this higher level of development through an enlightened practice, but are living in magic or mystical societies (Wilber, 2007). Likewise, individuals can be operating within the red egocentric level, but living in a progressive, socialist country like Canada. These individuals often find themselves at odds with a green-leaning government who they believe are taking away their rights and freedoms to prioritize marginalized groups. Narratives from red egocentric individuals often become

contorted lores funneling through social media, providing a forum for clashing worldviews. While it would probably be somewhat unlikely to find a Grade-9 student in the yellow/turquoise level, they may have reached this stage through previous spiritual or transcendental practice and be able to think of themselves, including their consciousness, in relation to all other beings and life forces. In fact, if one is considering healing from earlier trauma, “[achieving] health rests on three pillars: the body, the psyche, and the spiritual connection. To ignore any one of them is to invite imbalance and dis-ease” (Maté, 2011, p. 281). In my classroom, I am trying to support my students’ development along these three pillars by giving them a supportive environment, as opposed to a highly competitive one where anyone who stands out against the norm is quickly redirected back to the status quo.

### ***Conclusion UL***

The upper left (UL) quadrant focuses on the individual subjective experience – in this case, the student’s own belief and understanding of their emotions and internal regulation. An interior view requires a phenomenological study to examine the thoughts, emotions, and inner experience of each student, while the exterior view looks at each student from a structural development perspective. Cognitive and ego development affect how a student understands the self and their world around them, impacting their response to stress.

## Lower Left Quadrant (Collective Experiences)

“Nature seems to have programmed us to participate in a fluid give and take that blends our edges and generates collective patterns of behavior” (Bache, 2008, p. 73)

### **Vignette 4: Jasmine’s Dys-Integration**

Jasmine did not graduate but ended up leaving school after many absences from her classes. She simply could not keep up with the stresses of school, holding down a part-time job, and stay in therapy. Her world and brain had never become properly integrated, and everything was just so difficult for her. Things that should be straightforward and routine – such as making friends, going to class, completing assignments and studying for tests – were insurmountable for Jasmine. She had no idea how to go about doing these things. She was also very alone in this world, without caring people who were on her team, going to bat for her. Once she left school, I was no longer able to help her in the way that I wanted to. I often thought about her and wondered how she was doing, and whether she was managing.

### ***Lower Left (LL) Quadrant: Zone 4 (Collective Experiences)***

The lower left (LL) quadrant provides an intersubjective perspective, such that individuals come together in groups to intra-act and engage with each other, producing transformational shared meanings. The knowledge and perspective obtained from the collective is different and unique to each individual’s own thoughts and ideas (which were explored in the UL quadrant). Here, the blurred edges of each person as they co-mingle into a larger group are examined for additional themes and interpretations. Hübl (2020) eloquently compares our interconnectedness to our distant ancestors with an ancient tree, whose roots extend from past to present, connecting us all within a “collective nervous system” (p. 85). In this way, trauma to one of us (past, present, or future) means trauma to us all – with “karmic suffering repeat[ing], and trauma transmitted from one generation to the next – until it finds space and presence and clarity; until it is owned so that it may be healed” (Hübl, 2020, p. 86). Simone Weil (1952) describes this collectivity as having roots in the past “the sole agency for preserving the spiritual treasures accumulated by the dead,” present, and roots in the future “souls of beings yet unborn” (p. 8).

**Shared Meanings.** Intersubjectivity occurs when students (and their teacher) come together as a collective to share learnings and meanings (Renert & Davis, 2010; as cited in Esbjörn-Hargens et al.,

Eds., 2010). The relationships formed within the classroom affect how information is accessed, distributed, and shared. Table 6 highlights the LL literature explored in this study.

**Table 6**

*Wilber's IMP: A Literature Review map LL, Zone 4 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	Wallace (1999) James (1892)		
<b>Husserl's Phenomenology</b>	Chalmers (1995) Packer (2011) Husserl (1931; 2002) Crotty (1998)		
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)		
<b>Trauma Response</b>	Maté (2011) Van der Kolk (2014) Hübl (2020)		
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)		
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)		
<b>Consciousness Development</b>	Kegan (1994)		
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)		
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	
<b>Shared Meanings</b>	Nathan et al. (2007) Kilner & Lemon (2013)		
<b>Intersubjectivity Through Social Interactions</b>	Barad (2007) Bache (2008) Siegel (2017)		
<b>Morphic Fields in the Classroom</b>	Bache (2008)		
<b>Collective Trauma</b>	Hübl (2020) Maté (2022)		

Adapted from Bohac Clarke (2019).

Rommetveit (1985) described “states of partial intersubjectivity” allowing individuals to temporarily connect their “private worlds” (as cited in Nathan, Eilam, & Kim, 2007, p. 526). Thomas

Hübl (2020) calls this collective integration a “conscious we-space” (p. 86). The study of mirror neurons, or brain pathways that are activated whether actually performing a task, or simply by watching someone else perform that task, has shown that observation and execution are closely related, and that we are inherently socially connected to each other (Kilner & Lemon, 2013). In a study on the role of intersubjectivity on discourse in a math class, Nathan and colleagues (2007) concluded that the teacher played a significant role in directing, guiding, and scaffolding the student discourse. They described *productive discourse* as communication that was genuine between the students, recursive, constructive, and accepting of divergent or differing viewpoints (Nathan et al., 2007, p. 553, emphasis in original). Students found opportunities to rephrase difficult problems to help each other understand the tasks presented to them. They were encouraged to engage in critical dialogue in a mature, nonjudgmental, and respectful manner (Nathan et al., 2007). In this way, many ideas were generated and considered, as in a traditional brainstorming session. Teaching students to listen, appreciate, and understand the thoughts and ideas of others, helped them develop empathy and collectively develop new meanings and shared understandings (Nathan et al., 2007). In the Grade-9 Positive Psychology (PP9) classroom, students come together to share their experiences with mindfulness, focussed attention, and other SEL activities. Their collective understanding brings together multiple experiences to coalesce together in a newly generated meaning, embodied by the whole group.

**Intersubjectivity Through Social Interactions.** As Siegel’s (2017) work has shown, self-regulation of our mind arises as the neural circuits wire together through our embodied and relational experiences, creating an integrated subjectivity. Once internally connected and integrated, the individual mind reaches across its own consciousness to another mind – to connect, share, and integrate (Siegel, 2017). This allows true intersubjectivity and shared meanings to ensue. Siegel (2017) relates the intersubjectivity to the Gestalt principle of the whole being greater than the sum of its parts – essentially, the meaning that arises from the interconnectivity of the shared minds is thicker than each of the

individual minds generating their own thoughts and ideas. According to the social brain hypothesis, humans evolved larger brains to allow for the higher cognitive demands of forming large, cooperating communities built on mutual respect, intimacy, and trust (Dunbar, 2009).

Fredrickson's (2004) "broaden and build" theory of positive emotions suggests that positive emotions such as joy, love, happiness, and gratitude allow individuals to "broaden" their neural networks to include play, curiosity, exploration, and savouring of loved ones and "build" new ways of thinking and interacting (p. 1369). While we appear to be wired to bias negative events and emotions – protecting our species in the past from threats and dangers, Fredrickson (2004) stated that "positive emotions broaden the scopes of attention, cognition and action, and that they build physical, intellectual and social resources" (p. 1369). The field of positive psychology, developed in the late nineties in part by Martin Seligman (2018) has moved away from the focus on human deficits and illness, and turned instead toward "positive experience, positive traits, and positive institutions," the three pillars that would form the foundation (p. 237). As Siegel (2017) stated:

[W]hen we examine the field of positive psychology through the lens of integration, we come to the following notion: positive emotions, like joy, love, awe, and happiness, can be seen as increases in the level of integration...[whereas] [n]egative emotions, like anger, sadness, fear, disgust, and shame, can be viewed as decreases in integration...[and when] prolonged and intense, we become prone to states of rigidity or chaos. (p. 114)

Prolonged negative emotions can lead to isolation from others, leaving us vulnerable and disconnected. We are social beings, and our brains integrate internally as well as relationally as we interact mentally, emotionally, and physically with others (Siegel, 2017). In fact, "two separate entities, two individuals, become linked as one connected system when subjective experience is attended to, respected, and shared" (Siegel, 2017, p. 111). I witness this process daily in my classroom, as my students work through concepts and problems in psychology and science, expressing their thoughts and ideas out loud,



connecting to each other's subjective consciousness as they discuss and build their ideas from singular thoughts to collective and connected ones, through dynamic intra-actions. Additionally, when my Grade-9s are collectively practicing mindfulness using heart-focused breathing and gratitude practice, their collective and coherent energy can be felt within the room, as we move together through newly organized and shared energies. When students achieve these collective and coherent states, their inter-subjective experience is "in complexity science terms, a higher state of integration than either person alone could achieve" (Siegel, 2017, p. 112).

Bache (2008) stated that "when a course mind is activated by a class mind, the two congeal to form something like a *collective lens* that focuses a flow of energy and insight between those present in the room and deeper fields of transpersonal intelligence" (p. 137, emphasis in original). What he means is, the "course mind" is the full, complete, collected experiences from all who have taken the course (like a tree in its entirety), whereas the "class mind" is the current class, adding a ring of cambium to the outside – intra-acting with the previous layers and integrating itself into the larger whole (Bache, 2008, p. 54). In this way, growth is always taking place at the leading edge, and the more layers added, "the larger and stronger it is" (Bache, 2008, p. 54). From a quantum theory perspective, our understanding of Schrödinger's entanglement blurs the edges between physical entities, such that the particles of one may or may not be entangled with the other (Bache, 2008). If solid objects can intermesh, then it stands to reason that our consciousness that we have believed to be strictly internal, may extend outside of our physical bodies to entangle and intra-act with others' around us. Barad (2007) describes this intra-action as an agentic process where the resulting phenomena (in this case, collective meanings) arise within the relationship and because of it, becoming something else as a result. This fully embodied, entanglement of human consciousnesses allows for a more diverse but integrated experience. As Barad (2007) cleverly points out, if one is looking at the edge of a razor blade, it might appear to have an "edge" that separates it from everything else (in fact, we would probably consider that it has a sharp edge), however,

if one zooms in far enough – to quantum levels – we can no longer distinguish its edge, nor whether we are examining particles (which also have probabilities of position) or waves (which can overlap with each other, thus disrupting an edge through superposition). If a razor blade no longer has an edge, then surely our elusive consciousness must also be able to leak out! Bache (2008) describes this collective blurring as “nature program[ing] us to participate in a fluid give and take that blends our edges and generates collective patterns of behaviour. We quickly pick up each other’s accents and mannerisms, absorb each other’s ideas, convictions, and speech patterns. We even move in unconscious rhythm with each other” (p. 73).

**Morphic Fields in the Classroom.** Bache (2008) begins with Rupert Sheldrake’s morphic fields (described as a “general category that includes several different types of fields, including morphogenetic fields, behavioural fields, social and cultural fields, and mental fields”) (p. 47). Sheldrake describes an integrated system of learning, involving individuals and groups, resulting in an individual level and collective level (Bache, 2008). The morphic fields that Bache (2008) describes in his classroom involve a sustained and emotionally connected learning practice that is repeated such that the group develops deep “learning that reaches into their hearts as well as their minds, that lifts their vision to a new horizon and gives them insights they will draw on for years to come” (p. 63). Thus, these autopoietic (self-organizing) and integrated morphic fields that arise within the class becomes a “new integral model of consciousness as it applies to education” (Bache, 2008, p. 66). McCraty and colleagues (2017) investigated HRV metrics for a group of individuals over a 31-day period and found that their daily HRV coherence scores (a metric indicating Autonomic Nervous System (ANS) flexibility) responded not only to changes in solar and geomagnetic activity, but also synchronized to specific geomagnetic field lines and Schumann resonances (global electromagnetic resonances). Another study by Timofejeva and colleagues (2017) showed that high HRV (high amplitude, regular sine waves) can synchronize with local magnetic fields and that “the degree of synchronization” can be quantified using either surveys or

HRV measures, and “is [significantly] affected by the quality of interpersonal relationships”. (p. 20). Using an integral approach, Edwards (2019) collected data from six Global Coherence magnetometers (provide electromagnetic frequency data), meditation HRV metrics, and phenomenological subjective experiences revealing evidence for collective coherence and energy healing within the group. McCraty and colleagues (1998) found that when people are in close proximity to each other, there is a “transference of electromagnetic energy produced by the heart,” extending outwards to approximately three feet (p. 9). We can literally sense each other’s hearts when we are close to one another, allowing us to synchronize our heart rhythms to generate collective coherence. When my students finish their five-minute heart-focused breathing practice each day, we can feel the resonant change in frequency. I say “we,” because I often ask them if they can detect a shift in energy and the responses are always the same. Many will tell me that the room feels different, *they* feel different. An energy shift has occurred. Emile Durkheim described this as a “collective effervescence” whereby energy is often felt as being transmitted through and amongst groups of people gathering for a common purpose (Rimé & Páez, 2023, p.11). Durkheim (1912/15) indicated that when people gather together, “The very fact of the concentration acts as an exceptionally powerful stimulant. When they at once come together, a sort of electricity is formed by their collecting which quickly transports them to an extraordinary degree of exaltation” (p. 212; as cited in Rimé & Páez, 2023, p.11). When I discuss energy shifts or spirituality, I must tread carefully within a public classroom space, gently allowing the experience to radiate through our collective consciousness and providing them this safe and nonjudgmental space to explore their own thoughts, feelings, and experiences.

**Collective Trauma.** Hübl (2020) describes collective trauma as “cultural trauma manifest[ing] epidemics of hyperarousal or numbing, reconstituting tendencies of social denial, dissociation, and suppression [of which each] is a distinct wave pattern undulating through the social field, like ripples across water” (p. 94). Additionally, the trauma can arise from past, present, or even future worry of

“systemic problems or existential crises” (Hübl, 2020, p. 96). Our collective shadow, essentially imbalances in our social relationships with each other, our world, and our spirituality, is continually reinforced when we pathologize our emotions instead of processing and moving through them (Hübl, 2020). We are now fully immersed in a toxic culture of chronic mental, emotional, physical, and spiritual illness, which is no longer a “glitch” or “mysterious aberration,” but instead “a consequence of how we live,” something Gabor Maté (2022) calls the “myth of normal” (p. 2). In this way, we must consider the environment that our students are operating in – including the classroom itself, family, community, ethnic and/or religious group, and nature itself. When the darker aspects of earlier developmental stages (red – tribal and other power hierarchies) continue to pop up in the dark arenas of social media and the internet, we must “attune to the collective trauma field” (Hübl, 2020, p. 117). According to Hübl (2020): “As we create coherence in our collective fields, our societies begin to engage in healthy conflict resolution, and new systems of health care, education, and law arise” (p. 117).

### ***Conclusion LL***

The lower left (LL) quadrant focuses on the collective inter-subjective experience. When students come together in the classroom to share thoughts and feelings, new ideas (with combined cognition and affect) emerge through this transformative process. Consciousnesses extend beyond bodies, while at the same time embodying each other in their collective intra-action, producing a new awareness not seen, heard, or felt by any of the individuals previously.

### **Upper Right Quadrant (Student Attitudes/Behaviours)**

As a science teacher trying to help students manage increasing levels of stress, it was this quadrant that led me into this work initially. I came to this research from a scientific worldview, not unlike the Baconian world of white swans (where it was assumed that all swans were white, until a black swan was discovered in Australia in 1667, causing the previously “sound” inductive scientific method to be called into question) (Hakan, 2022). I initially observed my students from a scientific perspective, wondering why they were having more difficulty regulating emotions and navigating through school. I already had a broad and deep background of physiology and the science of stress and was curious as to how practices such as mindfulness and SEL might be infused into the present curriculum to help students develop these essential skills and competencies. My science brain latched on immediately, as there seemed to be a clear connection between dysregulation, neural activity, and heart rate variability (HRV) which could be quantified understand the physiological response to stress. Zone 5 was used to study the interior-objective individual perspective of attitude and behavioural changes pre- and post-program, along with comparison to a control group in regular programming. Zone 6 was used to bring about knowledge from the exterior-objective, by examining the individual physiology of each student through measurements of HRV using the HeartMath sensor and Inner Balance app.

#### ***Upper Right Quadrant: Zone 5 (Student Attitudes and Behaviours)***

“[W]hen it comes to shaping our decisions and our actions, feeling counts every bit as much – and often more – than thought.” (Goleman, 1995, p. 4).

**Table 7***Wilber's IMP: A Literature Review map UR, Zone 5 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)	<b>The Science of Emotion, Feelings, and Affect</b>	Lazarus (1966; 1991) Ekman (1999) Damasio (2019)
<b>Husserl's Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)	<b>Emotional Intelligence and Regulation</b>	Goleman (1995) Davidson (2008)
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)	<b>Social Emotional Learning (SEL)</b>	Durlak et al.(2011) Ross & Tolan (2018) CASEL (2021)
<b>Trauma Response</b>	Maté (2011) Perry & Szalavitz (2017) Van der Kolk (2014) Hübl (2020)	<b>Self-efficacy and Coping</b>	Bandura (1982) Pannebakker et al. (2019) McLeod & Boyes (2021)
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)		
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)		
<b>Consciousness Development</b>	Kegan (1994)		
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)		
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	
<b>Shared Meanings</b>	Nathan et al. (2007) Kilner & Lemon (2013)		
<b>Intersubjectivity Through Social Interactions</b>	Barad (2007) Bache (2008) Siegel (2017)		
<b>Morphic Fields in the Classroom</b>	Bache (2008)		
<b>Collective Trauma</b>	Hübl (2020) Maté (2022)		

Adapted from Bohac Clarke (2019).

**The Science of Emotion, Feelings, and Affect.** Our understanding of emotions, feelings, and affect has a long, convoluted history. Socrates believed that emotions had a cognitive origin and likely interfered with rational thought (Brickhouse & Smith, 2015). His student, Plato, envisioned a tripartite

soul composed of an appetitive part (made up of basic emotions and desires), a rational part (responsible for reason), and a spirited part (higher emotions like anger and courage) (Gerson, 1987). He believed that reason was in the head or mind, spirited in the heart, and the appetitive part was in the belly – which we might now consider our gut feelings (Harrington, 2016). Aristotle believed the soul was more of a bipartite, categorizing emotions into positive and negative like happiness and fear (Harrington, 2016). Like his teacher, Plato, he also believed that emotions were experienced by the body and mind as separate entities. He also thought that the heart (and not the brain), was the seat of intelligence, motion, and sensation (Gross, 1995).

By the 1800s, positivist empiricism was in full swing, with biologists like Charles Darwin describing traits that evolved through the process of natural selection and environmental pressures. Darwin (1872) studied animals (including humans) to understand the origin and purpose of facial expressions. He determined that they serve first as communication between mother and infant, but also to “give vividness and energy to our spoken words” (p. 333) as well as cultivate empathy and bonding between humans, concluding that “the language of emotions, is certainly of importance for the welfare of mankind” (Darwin, 1872, p. 333). William James (1922) believed that emotions originated from the physical body and would be experienced only *after* the body expressed outward signs of happiness or fear (emphasis added). You are afraid *because* your heart rate and breathing are erratic and you are running from the bear, not running away because you are *afraid* of the bear. In other words, the physiological response precedes the psychological reaction.

In 1970s, American psychologist Paul Ekman used a behavioural psychology approach to quantify and compare human emotions. He and his team observed and quantified seven basic emotions (happiness, sadness, fear, anger, surprise, disgust, and contempt) and declared them to be “universal” across many diverse cultures. Until more recently, however, emotions have been viewed as more nuanced and varied across cultures (Ekman, 1999). Regardless, Ekman (1999) considered emotional

expressions as “crucial to the development and regulation of interpersonal relationships (p. 47). Lazarus (1991) differentiated reflexive physiological states (responding to stimuli) from the “capacity and scope” of the complex array of possibilities, including anger, fear, compassion, sadness, guilt, joy, and empathy (p. 821). He also believed that despite some cultures not having language or custom for expressing certain emotions (his example – Tahitians who have limited expression of sadness, loneliness, or guilt – which he described as emotions that are “hypocognized”), do still have the “neurological capacity to experience all of the emotions” (Lazarus, 1991, p. 826).

American physiologist Walter Cannon (1929) coined the term “homeostasis” to mean automatic adjustments (internal temperature, hormones, ion balance, etc.) that an organism makes to keep its internal environment within a narrow range to avoid extreme oscillations and maintain equilibrium. According to Damasio (2019), nervous systems allowed organisms to sense, interpret, and perceive our external and internal environments. From there, complex integration centres (brains) were able to organize incoming and outgoing messages in such a way that an organism could make sense of their world and themselves in it. Soon organisms were able to regulate, control, and eventually understand their inner state, and even determine whether it was favourable or unfavourable, producing a coordinated response to return to internal homeostasis (Damasio, 2019).

Damasio (2019) called this understanding of the state of the individual’s interior “feelings”, which come with a sense of good or bad, something Lazarus (1991) called “valence” (as cited in Charland, 2005). Valence is thought to be the positive or negative meaning that the individual assigns each emotion, providing the capacity to care and respond (Charland, 2005). To clarify, “emotions” originate in various parts of the brain in response to stimuli detected by our various sensory receptors (eyes, ears, touch, smell, taste, proprioception, enteroception (gut sense), etc.); whereas “feelings” are embodied responses, gathering information from brain and body to evaluate the internal physiological state (Damasio, 2019). Emotions are triggered automatically and without our conscious control, while



feelings arise after interpretation and processing, with the accompanying evaluation of good/bad, pleasant/unpleasant (valence) (Damasio, 2019). The term “affect” is the collective term for states, duration, intensity, valence, specificity, temporality and other features of emotions and feelings (Niven, 2013). As Boler (2018) stated, “emotion is generally understood as individual expression of feelings, affect refers more broadly to subjective ‘experience,’ ‘feeling,’ or ‘intensity’” (p. 192). Varela (1999) provided a temporal explanation of consciousness and emotions. He described a brief integration of synapses (which he calls the “1/10” scale, lasting only a few hundred milliseconds) with an experience of *emotion*; a relaxation time for the integration of neural circuitry (the “1” scale) such that a “coherent sequence of embodied actions,” or *affect* could be experienced; and a longer duration for descriptive-narrative assessments (the “10” scale), corresponding with one’s *mood* (Varela, 1999, p. 116, 132, emphasis original). In other words, emotions are experienced spontaneously, as a result of incoming sensory information and neural firing, whereas affect (feelings and mood) take longer to emerge, requiring the integration of many neural pathways.

Given the natural tendency towards homeostasis, feelings that are unpleasant can be registered and become an important piece in the construction of consciousness and subjectivity (Damasio, 2021). Thus, feelings have been a part of our genetic make-up as long as organisms have had nervous systems, with humans further developing a mind with the ability to contemplate, reframe, and regulate our complex constellation of feelings. Feelings, therefore, have become inextricably linked to our consciousness, mental imaging, reasoning, and cognition and “in fact, complex organisms such as our world would not survive in the absence of feelings” (Damasio, 2019, p. 161). As mentioned, feelings are not just neural events but are experienced throughout the body. The enteric nervous system (gut–brain) comprised of several hundred million unmyelinated neurons, connected eventually to the wandering vagus nerve, which brings afferent sensing messages up to the brain for further processing, as has been recently referred to as “the second brain” (Damasio, 2019, p. 134). Evidence for this embodied feeling

state is found in bodily sensations such as nausea, stomach “butterflies,” and other feelings of general malaise (Damasio, 2019). Valence means that the individual evaluates the incoming emotions using past memories and previously travelled neural pathways and circuits to come up with an “appraisal” of the emotion experience (Lazarus, 1991; as cited in Charland, 2005). While our ancestors and current evolutionary relatives may indeed only experience binary valence (either positive or negative), eliciting either an approach or avoidant behaviour, is it not possible that our current experience is far more nuanced? This previous notion also assumes that all of us experience the world in the same way, and that “positive” and “negative” feelings are universal. Additionally, are there cases where a “negative” emotion such as sadness and despair might bring people together, as in family and friends while grieving the loss of one of their own? Could so-called “positive” emotions such as joy and pleasure be exhibited at the expense of someone else? Feelings are complex, and understanding what they mean, and whether they should be expressed, suppressed, or redirected is the first step towards mind wellness.

**Emotional Intelligence and Regulation.** While the notion of emotional intelligence had been circulating for several years, it was operationalized by Daniel Goleman (1995), who described EI as model using brain circuitry and resulting competencies (self-awareness, self-management, social awareness, and relationship management) that could be taught and learned. Motivated by research such as Carol Dweck’s growth mindset theory along with resilience and grit studies, Goleman went on to cofound The Collaborative for Academic, Social, and Emotional Learning (CASEL) in 1994 (CASEL, 2022). One early, large-scale study with over 233,000 US students, showed that explicit teaching of SEL improved prosocial behaviours such as relationships with friends and family, decreased anti-social behaviours such as bullying, fights, and substance abuse, decreases in depressive and anxiety symptoms, and increased academic achievement (Goleman, 2008). Currently, there are thousands of schools offering SEL programs, with a vision to provide “programs in focusing attention and kindness one day being part of the standard offerings for all children” (Goleman & Davidson, 2018, p. 281).

Emotion regulation involves the internal and external processes that notice, monitor, evaluate, and respond to emotional reactions such that one can move towards and ultimately accomplish one's goals (Thompson, 1994). Often emotion regulation implies only dampening down negative emotions such as fear, sadness, or worry; however, it is equally important to consider maintaining heightened emotions such as happiness and joy, when thinking about pleasurable experiences (Thompson, 1994). Allowing adolescents to experience the full suite of emotions without placing judgement on "good/positive" or "bad/negative" emotions is essential to balanced mental and emotional health. Managing one's emotions often relies on self-management (intrinsic) as well as management from others (extrinsic), for example when feeling compassion and listening to a friend struggling through a difficult situation (Thompson, 1994). Earlier work by Dodge and colleagues (1991) showed that overly aggressive children often had difficulty recognizing and attuning to social cues, and thus had more difficulty attaining social relationships. These relationships have a bidirectional effect on the child's emotion regulation, in that if the child is somewhat emotionally dysregulated, they will struggle to make friends, however it is the close social connection from the friends that also seems to help children regulate their emotions (Thompson, 1994).

Neuroscientist and close colleague of Goleman's, Richard Davidson has pointed out that when higher cognitive centres are stressed and/or taxed, areas needed for memory, attention, and learning become functionally impaired (Goleman, 2008). Given the expansive evidence in neural plasticity, Davidson explained that children who have practiced focused attention, empathy, and self-regulation can literally rewire brain circuits to respond to stress in prosocial and less maladaptive ways (Goleman, 2008).

**Social Emotional Learning (SEL).** The SEL framework focussed on positive development of the child and sought to teach students the *non-cognitive* skills gaining traction as skills *essential* to future careers and success in life (Ross & Tolan, 2018). Durlak and colleagues (2011) used a wide-scale meta-

analysis to study 213 school-based SEL programs finding that the students in the SEL programs showed significant increases in prosocial behaviours (such as decision making, emotional regulation, and problem solving), decreased externalizing (conflict and aggression) and internalizing (emotional distress) behaviours, and increased academic achievement. Interestingly, the highest effect size ( $ES = .69$ ) occurred for social emotional skill competencies (Durlak et al., 2011). The study also noted that many schools did not utilize SEL evidence-based programming or used them with poor fidelity, and that more research is needed to explore the effects of targeted SEL programs to inform policy and practice (Durlak et al., 2011). Ross and Tolan (2018) used a longitudinal study to determine that “overall, SEL is positively related to school engagement and grades, and negatively related to risky behaviors, delinquency, and depressive symptoms” (p. 1192). The researchers then speculated as to whether improving decision-making skills early in adolescence might lead to resistance to peer pressure or risky behaviours that might come along later (Ross & Tolan, 2018).

Goleman (as cited in Durlak, 2015) stressed the importance of role modelling social and emotional competencies – both for students, and teachers. Knowing how to teach SEL strategies may not necessarily be intuitive for all teachers and thus developing these competencies before entering the teaching profession is incredibly important. According to Goleman, the future of SEL teaching and learning lies in the areas of “cultivating mindfulness, empathic concern, and systems learning” (as cited in Durlak, 2015, p. 594). Mindfulness means learning to focus attention and regulate impulses, while building empathy indicates cognitive processes such as “theory of mind” and perspective taking (Goleman, 2015; as cited in Durlak, 2015, p. 595). Finally, using an inter-connecting systems approach to understanding the wide-reaching effects on building SEL capacity can enable educators to effect change in larger systems (Goleman, 2015; as cited in Durlak, 2015).

**Self-efficacy and Coping Strategies.** According to Bandura (1982), self-efficacy describes an individual’s belief of their ability to enact specific behaviours to effectively manage the situation that

they find themselves in. For students in stressful situations, it means what they think of their own ability to manage and regulate their emotions and behaviours in an adaptive way. A study by Ouwenel and colleagues (2013) revealed that a positive psychology course (using principles of goal setting, gratitude exercises, and coping strategies) resulted in a significant increase in positive affect and self-efficacy compared with a control group.

Pannebakker and colleagues (2019) studied the effects of a SEL program called “Skills 4 Life” which offered program components focussing on self-esteem, self-efficacy, and social interaction to help mitigate adolescent depression. The results showed a significant increase in self-efficacy, particularly amongst students from lower socio-economic backgrounds (who were also correlated with lower educational levels and poorer mental health initially) (Pannebakker et al., 2019). A study by McLeod and Boyes (2021) found that students in a positive psychology class (focused on mindfulness using HeartMath sensors for biofeedback, test-taking and study skills strategies, stress management, and coping strategies) showed significant increases in self-efficacy, positive affect, and academic achievement. One student who was interviewed described their learning experience as “When I’m drawing a blank, it’s helped me realize that it’s more within my power to change how I take tests and it’s not all purely about the subject matter of the test, I can also relate to how I’m taking the test” (‘Nancy’; as cited in McLeod & Boyes, 2021, p. 835). Many students commented on feeling confident that the tools and techniques they learned in class helped them focus and calm down, leading to improved cognitive and emotional competencies (McLeod & Boyes, 2021).

Keye and Pidgeon (2013) used mindfulness practice to help students refocus their attention such that they were able to abandon negative circular thoughts and decrease rumination. After refocusing their attention, the students showed improvements in the “interpretation [they] gave to their own performance and achievement,” which then led to a correlation between self-efficacy and resilience (ability to handle stressors), thus positively impacting their mental health (Keye & Pidgeon, 2013).

### *UR Quadrant: Zone 6 (Student Physiological Changes)*

“If the human mind were so simple that we could understand it, we would be so simple that we couldn’t” (Pugh, 1971, p. 17).

**Table 8**

*Wilber’s IMP: A Literature Review map UR, Zone 6 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)	<b>The Science of Emotion, Feelings, and Affect</b>	Lazarus (1966; 1991) Ekman (1999) Damasio (2019)
<b>Husserl’s Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)	<b>Emotional Intelligence and Regulation</b>	Goleman (1995) Davidson (2008)
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)	<b>Social Emotional Learning (SEL)</b>	Durlak et al.(2011) Ross & Tolan (2018) CASEL (2021)
<b>Trauma Response</b>	Maté (2011), Hübl (2020) Perry & Szalavitz (2017) Van der Kolk (2014)	<b>Self-efficacy and Coping</b>	Bandura (1982) Pannebakker et al. (2019) McLeod & Boyes (2021)
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student’s physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)	<b>Physiology of the Stress Response</b>	Selye (1950; 1956) LeDoux (1994) Van der Kolk (2014)
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)	<b>Integration theory</b>	LeDoux (1994) Menon, 2013 Siegel (2017; 2020)
<b>Consciousness Development</b>	Kegan (1994)	<b>Polyvagal Theory</b>	Porges (2011) Rediger (2020)
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)	<b>HRV and Mindfulness</b>	Kabat-Zinn (2003) Brewer (2022) HMI (2021)
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	
<b>Shared Meanings</b>	Nathan et al. (2007) Kilner & Lemon (2013)		
<b>Intersubjectivity Through Social Interactions</b>	Barad (2007) Bache (2008) Siegel (2017)		
<b>Morphic Fields in the Classroom</b>	Bache (2008)		
<b>Collective Trauma</b>	Hübl (2020) Maté (2022)		

Adapted from Bohac Clarke (2019).

**Physiology of the Stress Response.** The neuroanatomy and physiology of stress has been studied extensively over the past several decades, providing a detailed and complex view of the interacting systems and integration taking place. I will take a moment here to summarize the major physiological structures and systems involved.

Physiologist Walter Cannon (1915) studied the effects of intense stress on laboratory rats and found that they exhibited an automatic bodily response he called “fight or flight” (Godoy et al., 2018). He found that the animals mobilized energy and resources quickly when under threat, but then conserved them while at rest. Later, Hans Selye (1950), described a rather uniform stress response that involved an alarm phase to the initial stress, followed by resistance to the stress, and eventually exhaustion if the stressor persisted too long. Selye (1956) believed that our emotional response to external stressors had a direct effect on our tissues and organs – specifically our hormonal, adrenal, and gastrointestinal systems.

The neurological response to stress involves incoming sensory information from the eyes, ears, touch, smell, and many other receptors which funnel through a midbrain structure called the thalamus on their way to the two almond-shaped amygdalae, or “smoke detectors” (Van der Kolk, 2014, p. 60). If a threat is detected, further neural signals are sent to the hypothalamus, activating the hypothalamic-pituitary axis (HPA), which releases further hormones such as epinephrine, cortisol, and aldosterone, sent all over the body to initiate a fight or flight response (see Appendix C). Cortisol, released from the adrenal glands, can become quite elevated under times of significant stress, and can even shut down and impair the functioning of the hippocampus (Siegel, 2017). This lightning-fast response is already underway while a slower, more intricate pathway sends its message from the thalamus via the hippocampus and anterior cingulate (located in the limbic area), eventually ending up in the prefrontal cortex (PFC) for in-depth processing (LeDoux, 1995). This issue, however, is that if the initial threat is too intense, the body has already reacted through the HPA, essentially blocking further signals to the

PFC where higher brain regions could better analyze the external situation (Van der Kolk, 2014). While the amygdalae might act as the smoke detectors, they simply alert and trigger a cascade of neural pathways – but do not judge or analyze how to handle the situation (see Appendix D for brain anatomy). For that, we rely on our medial prefrontal cortex (mPFC) to be our “watchtower,” or seat of judgement and control – as long as the threat has not already overpowered and shut down this evolved feature of our brains (Van der Kolk, 2014, p. 62).

When I watched student after student draw blanks during stressful exam situations or class presentations, I was convinced that this was indeed happening. Upon closer examination of the neural circuitry during stress, and the evolution of our species (along with others), I now better understand the larger context and complexity of this response – and to put a finer point on it – how it actually affects my students. It turns out we are not all wired up the same way – and depends on what we have experienced and our perceptions of ourselves and the world we live in.

**Integration Theory.** Throughout my academic and teaching careers, in fact up until very recently, I believed (as did many of my science colleagues) that the body was either in “fight or flight” *or* “rest and digest” systems, and that the two systems were incommensurable. In fact, as I dove deeper into anxiety management, many experts held fast to the notion that the body quite simply could not be in a state of heightened arousal (anxiety) and relaxed (calm) at the same time, thus, if an individual could figure out a way to find that calm state, anxiety would dissipate. What I have come to learn more recently, is that the body’s autonomic nervous system is much more nuanced – a consequence of hundreds of millions of years of evolution.

Dan Siegel (2017) described the mind as “the emergent, self-organizing process of the complex system of embodied and relational energy and information flow” (p. 76). His extensive work in psychotherapy and neuroscience has led to the discovery of the role of integration of neural systems and circuits in the mitigation of rigidity and chaos within the mind (Siegel, 2017). His research focuses on



integration as both a “process and structural feature” (p. 81), where healthy development allows for a complete integration within the brain itself and between the minds of others (Siegel, 2017). Further, early trauma such as childhood abuse and/or neglect prevents the brain circuitry from integrating properly, leading to disruptions between hemispheres (bilateral integration), from body to brain (vertical integration), self-narrative and identity integration, and others such as temporal and interpersonal integration (Siegel, 2017).

This certainly explains the disruptions that I witnessed watching my student Jasmine struggling to understand basic biology concepts as, likely, “trauma may impair [memory] integrative function and leave implicit encoding of bodily sensations and emotions intact but not integrated” (Siegel, 2017, p. 93). The good news here is that mindfulness meditation has been shown to increase growth in neural circuitry between hemispheres (corpus callosum), hippocampus, and default mode network (our sense of self and others) (Siegel, 2017). As Siegel (2017) summed up, we navigate our worlds using a top-down neural network which acts as a “conductor,” built over time from thoughts, ideas, stories, and memories to provide meaning and structure to our world and our place within it (p. 133). As well, we are equipped with a bottom-up conduit, made up of incoming sensory circuits from our immediate experiences in the world. These seemingly competing circuits are then assessed and processed, ultimately becoming coherently integrated, self-organizing, and relational – to regulate information and energy flow within and between the embodied mind (Siegel, 2017). Poor integration, arising from earlier trauma, dysfunctional social connections, external threats, and stressors, can lead to important neural networks in the brain (hippocampus and memory formation; corpus callosum and right/left cerebrum connectivity; prefrontal cortex (PFC) disruptions affecting internal and external perception) becoming rigid and/or chaotic (Siegel, 2017, p. 81). This inability to build integrated, coherent pathways can result in severe mental illnesses such as anxiety disorders, bipolar disorder, schizophrenia, and others (Siegel, 2017). As integration is both structural and functional, and self-organizes through experience, “a healthy mind

creates integration within and between” (Siegel, 2017, p. 81).

Richard Schwartz (2021) developed a type of therapy based around a non-monomind made up of interacting “parts” which stemmed from previous times, places, and experiences and continued to have a role in a person’s life. He described parts who are exiles (traumatized, shamed, vulnerable parts), managers (protectors and organizers of other parts), and firefighters (reactive impulsive parts that act) as parts of our psyche, but may not be fully integrated with our sense of self (Schwartz, 2021). In fact, Schwartz (2021) invited us to get curious about these parts, and follow “trailheads” (a thought, emotion, feeling, or sensation) to meet them where they are (p. 26). In this way, we can open up in a compassionate and loving kindness way to find them and ask them what their role was, or currently still is. This leads to increased embodiment of parts, self, and spiritual essence to achieve what Ken Wilber calls “peek experiences,” of our “pure self that is always there” (Wilber, 1998; as cited in Schwartz, 2021, p. 145).

Integration Theory utilizes a triple-network neurological model to explain a variety of mental and emotional states, including poor self-control and emotion regulation (Krönke et al., 2020). These interconnected networks include the central executive network (CEN), responsible for decision making, focused attention, goal-direction, and working memory; the salience emotion network (SEN) responsible for cognitive control and emotion processing and is responsive to others’ facial affect; and the default mode network (DMN), responsible for self-awareness, social referencing, and is activated during mindwandering (Brewer, 2011; Chand et al., 2017; Dunlop et al., 2019). The CEN and DMN operate antagonistically, meaning when one is activated, the other is silenced (Chand et al., 2017). This means that during mindwandering or inattention, focused attention and working memory are compromised. Over-activation of the DMN alongside continual threat detection from the amygdala indicates a neural circular pattern of negative self-and social referencing, leading to anxiety, depression, and general negative affect (Siegel, 2020). (See Appendix E for detailed neurocircuitry). On an interesting side note,

one would assume that given the self-oriented, meta-cognitive function of the DMN that it would be uniquely human, however, correlates of the DMN have been observed in other animals such as rodents and non-human primates (Smucny et al., 2014). Thus, there is evidently an evolutionary component to this network, however the human pathway extends further into the anterior regions of the PFC, indicating further complex processing (as opposed to reactive processes) (Smucny et al., 2014). Also of interest, is that the DMN appears to be the more primitive pathway, while SEN and CEN “are substantially reduced...or are absent in non-human primate and rodent brains” (p. 399). It seems we are hardwired for mindwandering and self-referencing – which does explain the name given to this pathway.

As Siegel (2020) stated, “the DMN is not good or bad by itself; it is simply that without integration... it can lead to states of rigid or chaotic internal mental activities and external behaviours” (p. 138). When the midline circuitry is in overdrive (such as during rumination, self-obsession, or comparison to others), the lateral circuits connecting the other areas of the cerebral cortex and beyond into the limbic area (hippocampus) are temporarily inhibited, creating a disconnect between one’s self and the outside world. This means sensory inputs and other bottom-up sensations are disregarded, creating a very narrow, recirculating neural pathway unable to perceive beyond the self-occupation (see Appendix F). Mindfulness practice, with the “three pillars of focused attention, open awareness, and kind attention – has been shown in research studies to loosen this tightly bound DMN activity and may help with the cultivation of a more integrated sense of self and more receptive way of finding connection in the community” (Siegel, 2020, p. 145). By simply redirecting our focus away from our internal rumination – to our breath – we are disrupting the midline DMN circuit to reactivate the SEN and CEN, allowing for greater neural integration and connectivity. In this way, our “sense of self becomes connected, extended, expanded, a part of something beyond the interiority of the skin-encased inner mind” (Siegel, 2020, p. 149).

Brewer and colleagues (2011) found that meditation using focused attention and loving kindness decreased neural activity in the DMN, allowing for increased activation in the CEN (remember, they work antagonistically). Cortical mapping in individuals with ADHD has revealed increased activation in the DMN, leading to attentional lapses. While mindfulness has shown early efficacy in reducing the inattention and mindwandering characteristics of ADHD, there is little research in this area currently (Cairncross & Miller, 2020).

During adolescence, the brain undergoes synaptic pruning (removal of certain neuron connections), particularly in areas involved in mood regulation (Siegel, 2020). As children develop and mature into adolescence, the small, interconnected subsystems extend out to integrate and expand into other networks, essentially forming a hierarchical, top-down system capable of processing multimodal information (Menon, 2013). These major brain changes indicate a self-organizing system, and as Siegel (2020) stated, “where attention goes, neural firing flows, and neural connection grows” (p. 161). Some of the large-scale interactions include systems for attention, language, memory, emotion control, sensory, and motivation (Menon, 2013). When the teen is under constant stress, the amygdala becomes involved in the DMN pathway, setting up a continual loop of self-preoccupation and negative rumination, as the individual fears for themselves and their poorly integrated sense of self (Siegel, 2020). Add to this a teenage obsession with social media, mindless scrolling, fear of missing out, and negative social comparisons, and the DMN becomes tightly bound and disconnected, creating an isolated and dysregulated sense of self (Siegel, 2020).

Children who have experienced excess stress and trauma often have interruptions in connectivity between intrinsic brain networks (CEN, SEN, DMN), leading to ADHD, anxiety, and mood disorders (Menon, 2013). Compared with adults, children and adolescents show significantly weaker connectivity between the anterior cingulate cortex (ACC) and insula, which are components of the SEN, indicating more difficulty with attention to salient information and emotion regulation (Menon, 2013).

Additionally, weaker connections in these areas mean decreased focused attention, decision making, and goal-directed behaviours, which are somewhat common characteristics of young children. Building these pathways through adolescence through focused attention activities such as mindfulness can help to strengthen these circuits and increase connectivity with other areas of the brain (Siegel, 2020). Children with autism show hyperconnectivity in the SEN, DMN, and other sensory input areas of the brain, essentially limiting their ability to focus their attention and redirect thoughts and behaviours (Menon, 2013). In fact, the aberrant connectivity in the SEN prohibits the child's ability to focus attention on incoming stimuli, and are instead overwhelmed with inputs, scattering throughout brain pathways (thus, many individuals with autism spectrum disorder (ASD) have high sensitivity to lights, sounds, touch, smells, and tastes, as their SEN is unable to downregulate the amount of sensory information coming into the brain) (Menon, 2013). A corollary to this is that mindfulness and other SEL skills can help students with ASD to calm down, regulate, and engage socially with the world around them – something I have witnessed in my SEL program intervention (McLeod, 2021).

**Polyvagal Theory.** Charles Darwin (1872) discussed the bidirectional neural communication between the heart and brain via the “pneumogastric” nerve, now known as the tenth cranial nerve, or vagus nerve. Darwin also believed that the neural messages sent from the “sensorium” to the brain and spinal cord would stimulate involuntary motor messages back to the face, glottis, vocal cords, and other muscles, eliciting a response from the organism to their external world (Darwin, 1872). Evolutionary theory and phylogeny tell us that the vagus (Latin for *wandering*) nerve originates in the medulla oblongata, evolved from the primitive gill arches and in mammals controls facial expressions, sucking, swallowing, breathing, and talking (Porges, 2011, p. 151; Rediger, 2020). The vagal fibres originate in several places in the medulla oblongata, with 80% of the branches entering through afferent or sensory pathways (from the heart, lungs, gut, larynx, pharynx, face, and ear) and 20% branching out through efferent or motor pathways to the periphery to affect heart and breathing rates, digestion in the

gastrointestinal tract, face, eyes, and ears (Porges, 2011), meaning more messages are directed to our brain than leave it.

The polyvagal theory (coined by Porges in reference to the three branches of the vagus nerve) challenges the antiquated “mind-body dualism” by providing a direct mind-body bidirectional link via the vagus nerve, with organs such as the heart and gut comprised of tens of thousands of neurons, functioning essentially as a “heart-brain” and “gut-brain” (Siegel, 2017, p. 153). Polyvagal theory provides an explanation of our current autonomic nervous system through the lens of evolution, particularly focused on the changes that occurred from the evolution of the reptiles (approximately 350 million years ago), to the early mammals (or “proto-mammals” which had evolved warm-bloodedness and placental reproductive strategies, 200 million years ago), to recent modern mammals, including the development of monkeys (40 MYA), great apes (25 MYA), and eventually hominids (human precursor species) (4–5 MYA) (Marshall, 2009).

This phylogenic development is significant as it parallels the development of the autonomic nervous system (ANS), with primitive remnants still wired into human neurological systems (Porges, 2011). The ANS evolved initially to regulate basic bodily functions while concurrently providing a circuit breaker to deal with sudden, unexpected threats to the organism (Porges, 2011). Our most primitive response is shared with one of our past ancestors, the reptiles. When threatened, reptiles do not have the capacity to engage in fight or flight behaviours, instead they respond by immobilizing or freezing, thus dramatically reducing the high metabolic demands for oxygen and glucose, allowing the organisms to withstand the stressor (Porges, 2011). In our bodies, our immobilization “switch” is activation by the oldest branch of the vagus nerve, originating from the medulla oblongata in the brainstem to become the dorsal vagal complex (DVC) (Porges, 2011, p. 16). This is our last resort, after our resources have been mobilized for fight or flight, including glucose and oxygen delivered to the large muscles and in turn, diverted away from the gut and other growth areas that typically pull in high

levels of resources. Our bodies are taxed, typically from a too intense or unsustainable prolonged threat, activating this involuntary and dramatic response, resulting in decreased heart rate and breathing, a drop in blood pressure, dizziness, followed by fainting or collapse (Porges, 2011).

Around 200 MYA, early mammals evolved another, myelinated branch of the vagus nerve called the ventral vagal complex (VVC) (Porges, 2011). This important nervous system update helped create social bonds through highly organized communication and social engagement – but only when the environment was perceived as safe (Porges, 2011) (See Appendix F). This newly evolved branch acts as a “vagal brake,” to inhibit the sympathetic system’s effect on the heart, slowing down the resting beat even more than it would be without this vagal innervation (Porges, 2011). This is our “rest and digest” parasympathetic state, allowing us to engage in prosocial behaviours that require co-regulation, cooperation, and social connection, with this myelinated VVC, which is influenced by facial expressions and human vocalizations (Porges, 2011). When voices are warm, calm, and of higher frequency (that is, mimicking the range of the human voice in conversation) signals travel through the ventral complex to enhance growth and restoration (Porges, 2011).

The sympathetic nervous system (SNS) (which innervates various structures to mobilize resources to fight or flee an imminent threat), along with a removal of the vagal brake, allows the body to respond by elevating heartbeat, blood pressure, and breathing, and coordinates efforts to shunt blood away from the gut and towards the large muscles of the skeleton, allowing for an increase in glucose production for mobilization of the mammal (Porges, 2011). This system engages during states of fear, threat, stress, but also sexual arousal, exercise, and play – and whether physiological effects are seen as either positive or negative is generally dependent on the perception of the individual (Porges, 2011). (See Appendix G).

More precisely, neuroception is the process of understanding the external environment through processing cues regarding safety and familiarity (Porges, 2011). For humans, this is done through

observation of facial expressions, nonverbal behaviours, auditory processing of voice, tone, and pitch, and an internal cross-referencing of previous memories, encounters, traumas, and experiences (Porges, 2011). An interpretation of threat or uncertainty can stimulate the removal of the vagal brake which offers a quick increase in heart rate and breathing, *without* activating the SNS, thus allowing it to happen instantaneously before the SNS gets involved (Porges, 2011, p. 269). If the threat or stressor is either too large or persistent, the sympathetic-adrenal system activates the adrenal glands to release additional hormones such as epinephrine, cortisol, and aldosterone, to further increase heartrate, blood pressure, breathing, and glucose release into the bloodstream for uptake from the skeletal muscles (Colbourne et al., 2007). The vagal brake is highest during unchallenged situations such as sleep and relaxation and is withdrawn during exercise, play, stress, and information processing. Thus, this easing up and down of this regulatory system challenges the earlier notion of a binary autonomic system of *either* rest/digest *or* fight/flight. This nuanced system provides us with a way to increase arousal for prosocial activities such as play, exercise, sexual activity, or physical work. These are typically considered positive and enjoyable activities, however, do require an increase in heartrate, blood pressure, breathing, and mobilization of resources to larger skeletal muscles. The ability of our ANS to activate a system that allows us to increase social connection and engagement is pivotal to our human evolution story, and unlike the path that reptiles took.

If the threat/stressor continues beyond the individual's resource stores, then the DVC is stimulated, activating our most primitive response – to shut down and conserve resources and energy (Porges, 2011). In this situation, the individual slows breathing and heartrate, oxygen levels drop, leading to an inability to access higher centres in the brain for processing (such as the prefrontal cortex or hippocampus). The individual will exhibit flat or blunted affect (low emotional/facial expression) and have limited speech and ability to act or make decisions (Porges, 2011). In extreme cases, the individual will collapse or faint, thus reducing all resources to a bare minimum, in similar fashion to our ancient



reptilian ancestors. This final, primitive system is activated without any control from the individual and has evolved to self-regulate and protect from harm, as this final solution is often ineffective in keeping the individual alive (Hübl, 2020). An individual who has experienced long-term stress or previous trauma will perceive the external world as a place of threat and unsafe (Maté, 2022). Neuroception becomes wired to look for danger as opposed to finding other humans to connect and communicate with. In times of threat, the ears will perceive more low-pitched tones (resembling predators and other dangerous things in the environment) and will be less attuned to the pitch and range of the human voice, thus missing cues and signals for attachment and engagement (Porges, 2011). (See Appendix H).

**Heart Rate Variability (HRV).** Now that we understand what each neural pathway does individually, it is important to examine how they interact, and the overall significance to our regulation and control. While only operating along the VVC pathway might seem ideal, it is more important to have neural flexibility to move between autonomic states with ease (Dana, 2021). Experiencing heightened emotions and behaviours such as exercise, awe, play, and positive arousal (arising from removal of the vagal brake and adding SNS activation) are important to our well-being and resilience, whereas a diminished ability to fluctuate back and forth between states leading to more distress and dysregulation (Dana, 2021). Dana's (2021) Polyvagal ladder (see Appendix I) illustrates the levels of nervous system engagement – with the VVC pathway activated during social connection, the SNS engaged in the event of a novel or threatening stimulus, and the DVC activated as a last resort, in times of over or sustained arousal.

During inhalation, the heartrate speeds up slightly, and slows during exhalation resulting in a fluctuation of heartbeat called heart rate variability (HRV) (Van der Kolk, 2014). HRV is a component of the continual fluctuations between SNS and PNS, with higher variability indicating better regulation and control. Low HRV has been associated with anxiety and depression, as well as a heightened risk or cardiovascular disease due to an inability to adapt to fluctuations, or internal rigidity

(Rediger, 2020). High HRV is an indication of vagal tone, meaning higher activation of the PNS (Christodoulou, Salami & Black, 2020), and thus more resources mobilized for basic bodily functions such as growth, repair, and immune functions – not to mention, resources for socialization and bonding (Rediger, 2020). Additionally, when one is experiencing high HRV, increases in cognitive and behavioural self-regulatory capacities are also present (Christodoulou et al., 2020). HRV has not been observed in reptiles, thus variability of heart rate with ventilation appears to be an evolved feature, requiring the two new myelinated branches of the vagus nerve (Porges, 2011).

When an individual experiences heightened stress, their breathing becomes erratic and shallow, with greater numbers of inhalations (compared to exhalations), with dysregulated breath patterns further activating the sympathetic system, further increasing ventilation and heart rate (Porges, 2011) in a positive feedback loop (continues to build upon itself). Appendix J is a reading from the EmWave sensor showing a change in HRV (and blood pressure) during stress and then after mindful breathing and activation of appreciation feelings. A disrupted and high frequency sine wave indicates physiological dysregulation (incoherence) within the individual, typically resulting from negative emotions such as anger, frustration, and anxiety (Goelitz & Lloyd, 2012).

#### **Vignette 5: Connor's HRV**

Given that Connor had been placed in my Positive Psychology course, and that we engaged in Heart-focused breathing with the sensors before each class, it soon became time to have him try this practice. I was nervous as I gently helped him attach the ear clip and plug the sensor into a school iPad. I held my breath as I looked down at the biofeedback monitor. I made sure he was in an isolated area, away from other students who might be curious as to what his readings might look like. I had a feeling – but was completely unprepared for what I saw once the sensor began recording his inner physiology. Straight red. I had never seen anything like it. I asked him to close his eyes and tried to lead him through some mindful breathing – which he tried to do – but no change in the sensor reading. I tried for several minutes but was unable to bring him out of the red zone. It reminded me of the Branch Davidian children from Waco who had heartrates over 100 BPM when Bruce Perry (2017) began working with them having “essentially been marinated in fear” throughout their lives as hostages (p. 67)

**Effects of Mindfulness on Heart Rate Variability (HRV).** Jon Kabat-Zinn (2003) described mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 145). Originating from Buddhist traditions, the practice of mindfulness seeks to “strengthen focal attention, open awareness, and cultivate kind attention” (Siegel, 2020, p. 57) – in other words, exercising our minds to control our wandering thoughts and inattention to focus on the here and now to ground us in the present. Additionally, adding a feeling of compassion or appreciation for someone (or something) translates into increased activation in our brain’s reward centres, further increasing feelings of positivity and joy (Shapiro, 2020). The mindfulness technique that I use with my students is adopted from the HeartMath “Quick Coherence Technique (QCT)” method of starting with heart-focussed breathing followed by activating a feeling of appreciation for someone or something in your life (HeartMath Institute, 2021a). The opposite of mindfulness is mindwandering, which shows up in the DMN, an area of the brain in the medial PFC seemingly designed to continually scan, imagine, and basically wander from thought to thought, providing the space to be on the lookout for new incoming information (Teasdale, 2022).

To study how mindwandering affects our physiology, Killingsworth and Gilbert (2010) studied 2,250 individuals by contacting them throughout the day to find out what they were thinking about. It turns out these participants mindwandered 47% of the time and were less happy when their minds were wandering. In fact, even when they mindwandered about pleasant topics, they still felt unhappy and disengaged from their present activity (Killingsworth & Gilbert, 2010). Thus, if mindwandering appears to be the “default” mode, practicing focussed and targeted attention on the present moment may help to strengthen brain circuits and lessen activity within the DMN (Brewer, 2022; Goleman & Davison, 2018). Siegel (2017) described “reawakening our beginner’s mind,” or our capacity to pay attention to incoming information from our senses (bottom-up processing) such that our top-down “overzealous constructor” tends to put up obstacles towards healthy and coherent integration (p. 138). While

mindfulness can involve paying attention to just about anything, my approach for my students is to have them focus their attention on their breath, creating an embodied experience which keeps them grounded in the present and out of their wandering unbounded minds. This allows for a direct, immediate, experience – as opposed to an out-of-body escape through the mind (Brewer, 2022).

Given that an increase in inhalation directly leads to an increase in heart rate and SNS stimulation, it makes sense that downregulating this system starts with the breath. A slower breathing pattern switches from a previous overemphasis on inhalation to more exhalation, thus increasing HRV, allowing for more VVC control, which (by its very structure), fans out and affects all other systems and organs innervated by this complex. Therefore, starting with the breath can kickstart the VVC to calm the nervous system and return to a state of rest, growth, repair, and socialization. In fact, a recent study with students identified as emotionally disturbed revealed regular mindfulness with biofeedback (measuring HRV) showed significantly lower rates of off-task behaviour and improved emotional regulation (Rush et al., 2017). While HRV can be used as a dynamic measurement of stress (it decreases during SNS activation), it is also a measure of cumulative wear and tear and decreases with age, likely due to a reduction in function of the vagal complex and adrenal responsiveness to neural and hormonal stimulation (Renée, 2008). However, as a measure of the internal state of an individual, “heart rate variability is said to be a powerful, objective, and non-invasive tool that provides a window in which to view autonomic nervous system activity” (Nolan, 2006; as cited in Renée, 2008, p.13).

A US study involving 905 high school students indicated that when participants practiced the Quick Coherence Technique (QCT), they were able to significantly improve their HRV, while reducing feelings of stress, anger, depression, and test anxiety (Bradley et al., 2010). Bottom-up instructions to slow down the breath and synchronize heart and brain patterns, combined with top-down instructions to add a feeling of appreciation in effect, also reinforce positive emotions (McCraty & Zayas, 2014). This bidirectional self-regulating system acts as a positive feedback loop, continually

regenerating feelings of calm and positivity. Thus, we are working *with* our nervous systems to enhance a coherent inner state, and not *opposed* to it – where our racing thoughts tend to stir up trouble down below, reactivating subcortical circuits designed to respond to threats. A meta-analysis conducted by Christodoulou and colleagues (2020), found HRV to be an effective marker of physiological changes after mindfulness-based (MSB) intervention programs, but that a minimum five-minute recording session was needed to obtain accurate measurements.

### ***Conclusion UR***

The upper right (UR) quadrant focuses on the individual objective experience. Specifically, an examination of the interior physiological state of each student (using HRV biofeedback metrics) and an exterior analysis of possible changes in attitudes and behaviours as a result of mindfulness and SEL program completion addresses empirical epistemologies.

### **Lower Right Quadrant (Educational Systems)**

Self-healing, contemplative and relational practices are taught, and learners become skilled very early in the power of presence. Schools become places where wisdom, not just information, is acquired and where courage, bravery, and compassion are empowered. (Hübl, 2020, p. 209)

Systems are generally made up of integrated parts, which, when combined, allow for an emergence of new characteristics, with “new, transcendent properties and behaviours that are not manifest in parts or agents on their own” (Davis, 2019, p. 6).

### ***Lower Right Quadrant: Zone 8 (Educational Systems)***

This section will examine the current state of our hierarchical systems – from classroom, school, division, and province – and the relationship of this work within them. As we have learned, our minds are fully embodied, and the ways in which we intra-act with the world around us determines our neural integration. Our current education system fails to recognize the need to address emotion regulation, particularly for students who have experienced trauma, and instead focus on “recruiting cognitive capacities of the mind,” where “the last things that should be cut from school schedules are chorus, physical education, recess, and anything else involving movement, play, and joyful engagement” (Van der Kolk, 2014, p. 86). As indicated in the opening quote from Thomas Hübl (2020) indicates in the opening quote, schools need to be more than just a vehicle for delivery of facts and figures – instead a vehicle to take students for an embodied ride of their life, complete with thrills, chills, and spills (within safety guidelines, of course!).

**Table 9***Wilber's IMP: A Literature Review map LR, Zone 8 Focus*

<b>Upper Left (UL)</b> (individual student experience)		<b>Upper Right (UR)</b> (student attitudes/behaviours)	
<b>Zone 1:</b> student beliefs, understandings about their own experience		<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours	
What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?		How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	
<b>What is Consciousness?</b>	James (1892) Wallace (1999) Chalmers (1995)	<b>The Science of Emotion, Feelings, and Affect</b>	Lazarus (1966; 1991) Ekman (1999) Damasio (2019)
<b>Husserl's Phenomenology</b>	Husserl (1931; 2002) Packer (2011) Crotty (1998)	<b>Emotional Intelligence and Regulation</b>	Goleman (1995) Davidson (2008)
<b>First and Second Person Perspective</b>	Nagel (1974) Shear & Varela (1999)	<b>Social Emotional Learning (SEL)</b>	Durlak et al.(2011) Ross & Tolan (2018) CASEL (2021)
<b>Trauma Response</b>	Maté (2011) Perry & Szalavitz (2017) Van der Kolk (2014) Hübl (2020)	<b>Self-efficacy and Coping</b>	Bandura (1982) Pannebakker et al. (2019) McLeod & Boyes (2021)
<b>Zone 2:</b> transcribed and analyzed student reflections, along with developmental level analysis		<b>Zone 6:</b> student physiological changes through observation of HRV and other biometrics	
How do student developmental levels affect each individual worldview?		What changes are observed in the student's physiology after this program?	
<b>Physiological Development</b>	Thompson (1994) Wilber (2000a)	<b>Physiology of the Stress Response</b>	Selye (1950; 1956) LeDoux (1994) Van der Kolk (2014)
<b>Cognitive Development</b>	Piaget & Inhelder (1969) Thompson (1994)	<b>Integration theory</b>	LeDoux (1994) Menon, 2013 Siegel (2017; 2020)
<b>Consciousness Development</b>	Kegan (1994)	<b>Polyvagal Theory</b>	Porges (2011) Rediger (2020)
<b>Levels of development</b>	Graves (1974) Kegan (1994) Wilber (2000a/b, 2007)	<b>HRV and Mindfulness</b>	Kabat-Zinn (2003) Brewer (2022) HMI (2021)
<b>Lower Left (LL)</b> (collective experiences)		<b>Lower Right (LR)</b> (influence of educational systems)	
<b>Zone 4:</b> student experience within group settings; shared meanings		<b>Zone 8:</b> position of course within larger system (school/division/curriculum)	
How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?		How is this type of program affected and/or supported by school, division, and provincial systems?	
<b>Shared Meanings</b>	Nathan et al. (2007) Kilner & Lemon (2013)	<b>Current/Deficit Model of Education</b>	Eisner (2004) Alberta Government (2017) Youdell et al. (2018)
<b>Intersubjectivity Through Social Interactions</b>	Barad (2007) Bache (2008) Siegel (2017)	<b>A Reframing of Education</b>	Van Heertum (2006) Kent den Heyer (2018)
<b>Morphic Fields in the Classroom</b>	Bache (2008)	<b>SEL in the School System</b>	Lawlor (2014) Feuerborn & Gueldner 2019)
<b>Collective Trauma</b>	Hübl (2020) Maté (2022)	<b>Polyvagal Theory/ Safety in the Classroom</b>	Porges (2015; 2022)

Adapted from Bohac Clarke (2019).

**Current Educational System.** The traditional EuroWestern public education system – established soon after the Enlightenment period, produced students educated within the industrialized system who would be ready to enter the work world. The Tyler Rationale (Tyler, 2004) became the operationalized pedagogy for this system, focusing on educational objectives, organization, and assessments claiming to be objective, scientific, and unbiased (Giroux, 2020). Before long, we were immersed into a neoliberal Western educational system, churning out isolated individuals, competing against each other to achieve the highest rank in order to win the educational game. A static and standardized pedagogical model often without cultural context has been (and continues to be) used to inform a deficit model of cognitive and behavioural outcomes (Eisner, 2004). A curriculum of checked boxes and one-size-fits-all learning for developmentally mismatched students created teachers as technocrats, simply following curricular outcomes while simultaneously creating a mechanistic classroom space to measure achievement deficiencies. Aoki (2004) described the tension that teachers often encounter when trying to navigate between the “curriculum-as-plan” (the prescribed sets of outcomes that are intended to be delivered to the student) and the “curriculum-as-lived” (the actual real-time, real-world experience that the teacher and student experience together) (p. 163).

Adding to the mechanistic, industrial approach to education, the neoliberal focus of hierarchical areas of study, math and science continue to dominate the top tier while art, music, drama, and dance find their places on the bottom rungs, if at all (Eisner, 2004). In this system, competition is encouraged, both explicitly (competitive averages for postsecondary entry) and implicitly (focus on marks as achievement), matching the ever-present power hierarchies in the “real world.” Parker Palmer (2017) noted that while schools might endorse teaching collaborative practice by measuring and comparing students, they are essentially competing against one another and “competition is the antithesis of community, an acid that can dissolve the fabric of relationships” (p. 106). This feature of the implicit curriculum, along with other social values and norms such as punctuality, delayed gratification, respect



for authority, and others generally contribute towards the education of the child in a negative way (Eisner, 2004). By focussing on work-oriented subjects such as math and science, schools are not even fully engaging both hemispheres of the students' brains – with the right hemisphere of visualization, poetic and artistic endeavours noticeably missing from the curriculum (Eisner, 2004). As Damasio (2019) explained, “the arts [have] played important roles in the structure and coherence of groups...[with] music making...effectively cancel[ing] suffering and offer[ing] consolation” (p. 179). When considering why the human love for arts, music, and dance, Damasio (2019) expressed a belief that they helped groups of people come together to share feelings, reduce stress, and generate collective meanings. If these affective subjects are so important to the human condition and culture, why then, are we not prioritizing them for our students? Why are they called “options” and chosen only *after* all of the “core” subjects are slotted into their timetables?

**Deficit Model of Education.** The 20<sup>th</sup> century brought about a new focus on the individual – with the growing popularity of psychology and from that, psychopathology. This pedagogical turn revealed the importance of human developmental stages, using the seminal work of Freud, Piaget, Erikson, Kohlberg, Kegan, and others (connecting back to the UL quadrant of the inner individual experience). This in turn put the spotlight on the individual, using developmental milestones to analyze and map a child onto a normative bell curve model. Of course, once standards are established, those who fall below the “norm” become deficient in this system, and the onus is now on the student to catch up or somehow get fixed to fit in. Additionally, the continual revision and expansion of the Diagnostic and Statistical Manual of Mental Disorders (DSM) revealed a host of other potential issues that a child may have to contend with – including an ever-expanding list of mental and emotional disturbances and illnesses, developmental delays and deficiencies, and intellectual disabilities (First, 2013). It seems that many students are struggling developmentally and have difficulty with the prescribed age-cohort curriculum, with others dealing with mental and emotional turmoil – again considered something within

*them* and distinct from the actual school practices. Given this reality, teachers must now scramble to try to “fix” the individual or adapt their surroundings to help them connect to the standardized curriculum.

Youdell and colleagues (2018) asserted that stress should not be a problem with the child, but instead the schools *themselves* are often the problem. Some of the research looked at functional Magnetic Resonance Imaging (fMRI) scans of students who had experienced stressors such as high-stakes testing, and perception of low-ranking status from teachers and peers, a function of the “sorting and selecting processes embroiled within [the education system] (Youdell et al., 2018, p. 11). The students showed higher activation of the SMS, including heightened amygdala response, greater dorsal-medial PFC (mentalizing), and increased HPA axis activity (Youdell et al., 2018). Thus, student stress may be more about what the system does to *them*, than how they arrive in school. This is where I come in with my insertion of SEL strategies, including mindfulness with biofeedback, and other classroom additions to help the students manage their mental and emotional health. But where are these programs in the current system? Do they already exist, or are they now essential to our students’ well-being, given this model of deficiency?

Pedagogical models of student support include the pyramid-shaped Response to Intervention, with most students needing very little intervention (Tier I – universal supports), the next group needing additional mental health support (Tier 2 – targeted support), and a small percentage of the student population requiring outside counselling and sometimes hospital or group home setting interventions (Tier 3 – specialized support) (Inclusive Education, 2021). Again, deficiencies, failure to conform, and irregular behaviours are first flagged, and then addressed as needing fixing. In the broader context, the issue is declining adolescent mental health. While pre-pandemic rates of adolescent depression and anxiety are creeping upwards, recent meta-analysis reveals a significant increase in these symptoms resulting mainly from social isolation, loss of important milestones, school disruptions and the stress of falling behind, and other related stressors (Alberta Government, 2017). New COVID-19 data are

indicating a significant, substantial increase in symptoms such as loneliness, stress, anger, fear, and irritability as a direct result of social isolation and school disruptions (Panchal et al., 2021). Further, research from the University of Calgary has revealed an alarming increase in youth anxiety, including social anxiety and general anxiety (Racine et al., 2021).

**Reframing of Curriculum.** The Theory of Action developed by CASEL (2022) is now a blueprint for a system-wide SEL implementation in US schools, promoting the adoption of classroom-based SEL strategies with a school-wide or even division-wide approach taken, as is currently underway in the UK and Australia (Oberle et al., 2016). Specific teaching and learning involving mindfulness, social emotional learning, and study skills strategies helps students handle stressful school assessments and improve school functioning. Previous research has shown improved self-efficacy for test taking and emotional regulation, increased positive affect, decreased worry about future social stress, and increased academic achievement in high school students (McLeod & Boyes, 2021). While these SEL strategies appear to be having positive impacts, they are still operating within an old frame based on neoliberal hegemonic narratives, firmly placing the source of the problem on the individual. In fact, in this “student-centered” educational model, the student becomes surrounded by common narratives, submersing them in a culture of capitalism and commodification to the point that they become desensitized and conditioned to accept it all as normal (Marcuse, 1972; as cited in Van Heertum, 2006, p. 49). Through a movement at the time called *The Great Refusal*, Marcuse called for a new sensibility, where we open our senses to new information and reconnecting with our emotions and hearts to allow for the entry of a new aesthetic pedagogy to replace the capitalistic and consumerism that currently enfolds us. Scholars such as Marcuse, Greene, Rousseau, Giroux, and others have recommended that we leave behind the Cartesian dualism of mind and body/subject and object and embrace the arts, poetry, nature, music, and theatre in a more holistic way (Van Heertum, 2006). This new aesthetic pedagogy serves to awaken the rest of society to “step outside the dominant discourse and rationality and both

deconstruct society and offer alternative dreams for children” (Marcuse, 1972; as cited in Van Heertum, 2006, p. 49). Education systems should be looking not at how many boxes can be checked, but what each student can become, through an immersive experience and embodiment of learning. Kent den Heyer (2018) described this shift as moving from a “curriculum-as-thing” where students acquire knowledge and facts to a “curriculum-as-encounter” where students are transformed through action and becoming and the shared historical and cultural context contributes to a collective sense-making, allowing for student production rather than a more superficial formation (p. 20). Students in this study experienced SEL and mindfulness as a transformation and integration of consciousness and physiology. Engaging in practices that strengthen brain and body pathways for attention, social engagement, memory, and emotion regulation, whereby students emerge from the program with self-confidence, self-efficacy, and self-control.

**SEL/mindfulness in the School System.** A SEL and mindfulness program added to Canadian elementary students’ regular curriculum over a period of four months showed significant improvements in executive functioning, well-being, prosocial behaviour, and math performance (Schonert-Reichl et al., 2015). Lawlor (2014) described key ingredients for successful SEL programming as teacher training, high quality implementation, and regular program evaluations. Along with a focus on specific teacher skills with regards to program implementation, “positive student-teacher relationships are indeed critical for student well-being and learning outcomes” (Lawlor, 2014, p. 89). Our “relational” minds form by self-organizing within and between the entanglement with others, where we ourselves become changed by the interaction, from which emerges a state of connection and trust (Siegel, 2017). This transformative relationship is essential to student engagement and embodiment of deep learning. Palmer (1998) argued that “the capacity for connectedness [is] at the heart of authentic education... [and] it is hard to imagine a healthy school that lacks any trace of love for learning or for learners” (p. 92, 93). As Christopher Bache (2008) stated, “we must engage each other in an integrated manner for this more

potent mode of knowing to emerge...the discovery of *the enhanced capacity of the integrated group mind itself*' (p. 68, emphasis in original).

Feuerborn and Gueldner (2019) evaluated several SEL programs to determine what competencies were being taught and assessed. Interestingly, while they expected to find programs evaluating the five SEL core competencies, the majority of the programs only measured self-management, leaving out self-awareness, relationship skills, responsible decision making, and relationship skills (Feuerborn & Gueldner, 2019). One of the features of SEL competencies and assessment is the focus on strengths/assets, as opposed to the pathological deficit model (Feuerborn & Gueldner, 2019). However, recommendations from this research team include providing SEL programming addressing all five competencies, where these “active ingredients” are delineated to determine which parts produce the greatest student outcomes (Feuerborn & Gueldner, 2019, p. 1717). While tighter adherence to SEL delivery, dosage, and assessment may help bolster effective components, thus providing further validation for infusion into regular curricula, the one-size-fits-all method may be difficult to generalize across diverse populations and situations. While a full-scale integration of SEL instruction alongside math, science, humanities, and physical education may appear to be moving in the right direction, a careful examination of how these components are being utilized is certainly prudent. Treating it as a must-do, or “one-off” would result in a disassociation from its true purpose. Teaching students through an embodiment of mindfulness practice results in a deeper, intra-active experience for everyone. Vivek Murthy (2023), who is currently serving as the US Surgeon General, asserted that we as (currently) lonely, deregulated beings need to give people permission to cultivate love, kindness, and compassion in our schools. This means a pedagogy of praxis delivered in our schools that help our children, and particularly our young boys, equate love with strength and wellness, and not weakness (Murthy, 2023).

**Polyvagal Theory and Safety in the Classroom.** Presently, we lack specific vocabulary on what *safety* means, particularly when it comes to emotions and moods (Porges, 2015). We focus on things like “exclusion from risk and injury” but fail to include emotional dangers that can disrupt developing nervous systems and “optimal social behaviour” (Porges, 2015, p. 115). Polyvagal theory informs us that safe and positive face-heart connection allows our VVC to inhibit the sympathetic pathways, dampening down our threat response and increasing social engagement (Porges, 2015). In other words, when we feel that we are safe – from physical and emotional threats – our nervous system responds by seeking out connection to others. Conversely, when we feel threatened (physically and/or psychologically), our SNS kicks in, essentially unleashing the full spectrum of fight/flight responses, distancing us from others (who are perceived as threats) and the environment they are in (toxic classroom or school). Clearly, this state is not ideal for social interaction within the classroom and establishing trust, accessibility, and co-regulation (Porges, 2022). Porges (2022) recommends that this “science of safety, when implemented into institutions, ranging from healthcare to education, would enhance health, sociality, and lead to greater productivity, creativity, and a sense of well-being” (p. 13). Porges (2019) suggests that teachers who are authentic, co-regulate with their students, and foster strong relationships will provide a sense of safety and trust with their students.

### ***Conclusion LR***

This quadrant investigates the collective inter-objective, or systems perspective on SEL and mindfulness programming within the classroom, school, division, province, and beyond. Research has shown that rigid, traditionally-rooted industrialized practices, policies, and pedagogy have prioritized certain curricular concepts (“core” subjects) over others (“option”). Within this framework, teaching and learning SEL competencies is often left out, ignored, or considered unnecessary for regular curricular programming. Additionally, a deficit model of education teaches to the masses, waits for students to become broken, and then attempts to put them back together to rejoin the masses. A reworlding of this

educational frame might involve holistic, SEL skills that incorporate more than just core subjects, but balance mind, body, spirit – a little like the teachings of Plato 2500 years ago.

### **Tetra-meshing of Quadrants**

The elegance of IMP is that while each quadrant represents a mutually exclusive and irreducible ontological perspective, the knowledge and experiences gained from each will then co-arise, or “tetra-mesh” simultaneously (Esbjörn-Hargens & Foucaultii, 2007; Wilber, 2007, p. 149). Each quadrant (with each zone within it) will inform others, as themes are pulled out and applied across the quadrants. Table 10 represents the tetra-meshing of themes that have co-arisen from this extensive literature review.

### ***Individual Experience***

The individual student’s subjective experience is the one that has been most neglected in educational research. Finding out what it feels like to be that student in that system is paramount to understanding the issue of mental and emotional health and what each student needs. How *do* students feel about mindfulness and SEL strategies in the classroom? (UL – Consciousness Development; LL – Shared Meanings; UL – Mindfulness and HRV; LR – Deficit Model).

### ***Safety/Relationships***

When adolescents move from second to third order consciousness, they extend beyond their isolated self and integrate with others, forming trusting relationships (Consciousness Development – UL). Intrinsic Brain Networks (IBNs) reorient from the ruminating, self-obsessing DMN, to the empathic and compassion-building SEN, enabling the teen to form connections with others, enabling their voice and presence within the group to emerge (Integration Theory/IBNs – UR; Social Interactions – LL). Feeling safe in a classroom, school, and community and trusting relationships within the system are essential components to student wellness and ability to learn (Reframing of Education, Polyvagal Theory/SEL in Schools – LR).

**Table 10***Simplified Tetra-mesh Themes with 4 Illustrative Relationships Across Quadrants*

<b>INTERIOR</b>	<b>EXTERIOR</b>
<b>Upper Left (UL)</b> (individual student experience)	<b>Upper Right (UR)</b> (student attitudes/behaviours)
<b>Zone 1:</b> student beliefs, understandings about their own experience	<b>Zone 5:</b> student opinion surveys to compare pre/post attitudes/behaviours; statistical analysis
What does a student believe/understand about their ability to regulate emotions using SEL/mindfulness with biofeedback	What changes are observed in the student's physiology after this program?
<b>What is Consciousness?</b> Each student has a unique, subjective experience of stress, emotions, feelings, affect, and regulation Consciousness comprises thoughts, feelings, memories, sensations which are intentional and actionable	<b>The History of Emotion and Affect</b> Early thinkers believed emotion was experienced in the mind, heart, and gut (embodied affect) Incoming sensory info triggers emotions which are perceived as feelings with valence (+/-) attached
<b>Using Phenomenology to study Consciousness</b> Accessing each student's subjective experience through their consciousness involves bracketing one's own prior beliefs and presuppositions, and determining the essence of the consciousness being studied	<b>Emotional Intelligence</b> Competencies such as self-awareness, self-management, social awareness, and relationship management can be taught and learned by students in schools
<b>First and Second Person Perspective</b> First person perspective is the student's own experience, with access through the second person perspective of a teacher in a trusting relationship – shared language and understanding	<b>Social Emotional Learning (SEL)</b> SEL programs (as outlined by CASEL, 2021) focus on 5 competencies (self-awareness, self-management, social awareness, relationship skills, and decision-making)
<b>Trauma Response</b> How does the student's previous trauma history affect their perspective and perception of the world around them?	<b>Self-efficacy and Coping</b> Student's belief in their ability to regulate their emotions and adapt to their environment in a positive and efficacious way
<b>Zone 2:</b> transcribed and analyzed student reflections; developmental level analysis	<b>Zone 6:</b> Examination of student physiological changes through observation of HRV and biometrics
How do student developmental levels affect each individual worldview?	How do stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Cognitive Development</b> Students develop cognitive networks by transcending and including earlier stages of development	<b>Physiology of Stress</b> Stress response is not just fight/flight, but nuanced Stimuli activate senses which sends messages to amygdala releasing a cascade of messages to stimulate the SAN
<b>Consciousness Development</b> Adolescents are in 2 <sup>nd</sup> (focus on self) and 3 <sup>rd</sup> (focus on others) levels of consciousness Students' developmental level affects view of self and world	<b>Integration theory</b> Poor integration (due to stress/trauma) results in rigidity and chaos in thinking, perceiving, feeling Integration of bottom-up/top-down processing builds neural circuitry; increased through SEL/mindfulness
<b>Levels of development</b> Based on Spiral Dynamics, Wilber's IT, levels indicate emerging ego development, with each new level transcending and including previous ones	<b>Polyvagal Theory</b> 3 levels of evolutionary response to stress – social connection in safety; arousal, play, fight, flight under stress; immobilization under long-term stress
<b>Trauma Response</b> Earlier traumas interfere with a student's perception of themselves in their world	<b>Mindfulness and HRV</b> Practicing focused attention on the breath increases connectivity between breath, heart, mind (coherence) Students who practice mindfulness can increase HRV, coherence
<b>Lower Left (LL)</b> (collective experiences)	<b>Lower Right (LR)</b> (influence of educational systems)
<b>Zone 4:</b> student experience within group setting shared meanings	<b>Zone 8:</b> position of course within larger system (school/division/curriculum)
How do the students collectively understand SEL/mindfulness with biofeedback within classroom culture	How is this type of program affected and/or supported by school, division, and provincial systems?
<b>Shared Meanings</b> Students come together collectively, co-create meanings	<b>Current/Deficit Model of Education</b> One-size-fits-all, outcome-based, students are disordered, faulty
<b>Intersubjectivity Through Social Interactions</b> Internally connected and integrated, the individual mind extends beyond their own consciousness to another mind	<b>A Reframing of Education</b> Using SEL/mindfulness to become embodied learners Teach SEL competencies for intra/interpersonal development
<b>Morphic Fields in the Classroom</b> Co-regulation, intra-acting consciousnesses of students and teacher in the classroom	<b>SEL in the School System</b> Evidence-based SEL programs to increase students' prosocial behaviours, positive affect, emotion regulation, focus
<b>Collective Trauma</b> Students immersed in toxic culture, environmental disease, dark nature of the internet and social media	<b>Polyvagal Theory and Safety in the Classroom</b> Safety is not just absence of physical threat – it includes emotional safety from trusting, co-regulated relationships



### *Integration/Regulation*

Neurologically, we wire up bilaterally (R-brain/L-brain), bottom-up (sensory processing), top-down (executive control), and bidirectionally (CEN, SEN, DMN) – integrating pathways through our experiences and interactions with the world (Internal Stress Response – UL; Integration/Polyvagal Theories, IBNs – UR). Once internally regulated, we can integrate with other individuals, forming groups, intra-acting with each other to regulate and modulate our feelings and behaviours (Social Interactions/ Feelings and Development of Culture – LL). Integration and regulation are enhanced and developed through the addition of SEL and mindfulness in schools, helping students understand and modulate emotions and behaviours using evidence-based programs (IBNs/Mindfulness – UR; Reframing of Education; SEL in the School System – LR).

### *SEL Programming in Schools*

Learning and practicing strategies to help students calm down, focus, and disrupt internal ruminations leads to better integration of neural circuitry from the breath, to heart, to mind, culminating in high coherence and a regulated nervous system (Emotion Regulation, Trauma Response – UL; Integration/Polyvagal Theories, Self-Efficacy and Coping – UR). When students engage in mindfulness practices together, global coherence is achieved, creating a feeling of collective, intra-acting energy emanating from within, throughout, and extending out from the group (Shared Meanings, Feelings and the Development of Culture – LL). Research shows SEL programming within schools increase prosocial behaviours, increase positive affect, help students regulate emotions, decrease maladaptive behaviours, and improve cognitive focus and attention, and thus should be considered in curricular planning and pedagogy (Reframing of Education, SEL in the School System – LR).

### **Conclusion**

Up to 75% of mental illnesses (such as depression and anxiety) can arise in childhood or adolescence, manifesting in dysregulated self-awareness, relationship disruptions, neurological

development, and other negative downstream effects, often continuing well into adulthood (CMHA, 2022; Yeager, 2017). Early childhood trauma, bullying, poverty, substance misuse, and family disruptions can lead to mental and emotional challenges, with further perceived and real barriers to mental health support exacerbating the situation for these youth (CMHA, 2022). Often, teens do not realize they are struggling or know how to reach out for help, but when programs (SEL and mindfulness) are available and attainable, and trusting relationships are in place, they are more likely to access supports. Robin Wall Kimmerer (2013) described the bizarre symbiotic relationship between algae and fungus, which, only when stressed do they come together to intra-act as a new, deeply connected organism called a lichen. “In a world of scarcity, interconnection and mutual aid become critical for survival. So say the lichens” (Kimmerer, 2013, p. 272). So, like the algae and fungi, when our children are stressed, anxious, confused, terrified, traumatized, and feeling hopeless, they need all of us to help transform them into an integrated, regulated, and flourishing being – filled with life and hope for their precious future.

## Chapter 3: Methodology

### Introduction

This study examined the current difficulties that Grade-9 students have in their transition into high school and the outcomes of a tailored option course with SEL strategies and mindfulness practice using biofeedback. To fully understand the good, the true, and the beautiful aspects of this research, I examined each area using a pluradisciplinary approach whereby the subjective individual and inter-subjective collective perspectives were gathered alongside objective measures from students, schools, and larger systemic structures. This chapter will explain in detail the research paradigm used and rationale for its use, the theoretical model informing the methodologies employed, researcher, participant, and study ethics and ethical protocols.

### The Research Paradigm

When considering the dimensions of reality, philosophers (for example, Plato) often refer to the “good,” “true,” and “beautiful.” According to Wilber (2007), the “good” or “goodness” refers to the phenomena from the second person – in other words, how a group collectively experiences it together. The “true” means an objective truth from a third person, or *it/its* perspective – something that can be observed and measured, and thus possesses a scientific “truth.” The “beautiful” describes a phenomenon from the first-person perspective, or one’s own subjective experience (Wilber, 2007). Ontologically, the first-person perspective addresses a subjectivist understanding of reality, while the second person is relativistic, and third person is objectivist, viewing reality as phenomena that can be observed and measured.

Wilber’s (2003) Integral Theory (IT) provides a conceptual framework allowing the research questions to be investigated from four ontological dimensions, informing subjective, inter-subjective, objective, and inter-objective epistemologies. As previously mentioned, Wilber adopted Kuhn’s (1970) notion of “paradigms” to describe a type of transdisciplinary paradigm of gathered partial truths to

generate an overall understanding of the phenomena being investigated. Wilber has described a type of meta-map, or collection of paradigms that help bring together potentially incommensurable types of knowledge in an integrated manner.

Wilber starts with what Schopenhauer called “the world-knot,” or the dualistic mind-body problem (Wilber, 2000a). The seemingly incommensurable integration of these two phenomena has been considered by history’s greatest thinkers, without any solid consensus. From the “mind” side of the world-knot, the individual person constructs their own reality within their inner consciousness, which is unique to themselves and is considered their truth. The “body” perspective sees the world as being composed of physical objects or matter, which can be observed, measured, quantified, and compared with an exterior universal truth. While positivism tipped the balance towards this objective, universal reality, many wondered what value or meaning the subjective individual (and collective) experience had in the interpretation of phenomena, and how might this fit into the “dust and dirt, shadows and surfaces, scientific facts and valueless veneers” (p. 72) of the “soundless, scentless, colorless” flatland (Wilber, 2000). Wilber’s “flatland” speaks specifically of the empirically tested and objectively measured scientific world from which positivism arose. According to Wilber, solving the “world-knot” involves embracing all four quadrants such that the inner consciousness, organic brain and body, intersubjective communities and culture, and overarching ecosystems such that they “tetra-mesh” (Esbjörn-Hargens & Foucaultii, 2007, p.79). Wilber often describes this approach as the “1-2-3 of Consciousness,” meaning that phenomena can be studied from the first-person (individual subjective upper left quadrant), second person (collective inter-subjective lower left quadrant), or third “it/its” perspective (objective upper and lower right quadrants) (Wilber, 2000a). While he does acknowledge that this presents a “impossibly tall order” in terms of research, it is needed to draw together the partial truths that arise from each perspective (Wilber, 2000a, p. 184). Additionally, researchers within the Integral community have adopted the maxim of “the map is not the territory” (Murray, 2010, p. 356), meaning that even with the

comprehensive integral framework to study phenomena, the vast expanse of knowledge is bigger still. Murray (2010) attributed inability to fully understand the whole truth as an acknowledgment of ontological humility (as cited in Esbjörn-Hargens, 2010). That said, the meta-paradigm comprised of all four quadrants uses the framework of Integral Methodological Pluralism (IMP) to situate each dimension of knowledge generation.

### **Ontology and Epistemology**

There is really no way to observe or measure phenomena (participants) without also becoming a part of their existence. There is no object without a subject, thus an interview between the researcher and participant is more than a transference of words from one human to another – it is a materialization or *mark* (Butler, 1990; Merleau-Ponty, 1962) on each body in the intra-action (as cited in Barad, 2007). Axiologically, a paradigm shift must occur to redefine what “objectivity” means and the value it holds. Barad (2007) describes objectivity as “an intra-actively enacted agential separability, a relation of exteriority within phenomenon” (p. 340).

Thus, objectivity has been deconstructed, and now reconstructed to include object and subject together, in a complex dynamic entanglement or “exteriority-within” (Barad, 2007, p. 140) as opposed to two discrete and physically separate, static entities. For me, this changed everything. I realized that I alone had to interview my students (after they finished their course to avoid dual role issues) in order to access their experience through the trusted relationship that we had together. For my students, the feeling of safety and security within an established relationship (or possibly lack thereof) likely influenced decisions about what/when/how information was disclosed about their experiences.

This “ethico-onto-epistem-ology” – or an entanglement of ethics, being, and knowing through intra-actions – has allowed me to reflect on what knowledge I was seeking, and how best and authentically I might acquire it (Barad, 2007, p. 185). I am both a teacher in the classroom and researcher of my students, intra-acting through an embodied experience. This agential cut now falling

*within* subject and object (unlike the Cartesian separation) muddies the waters of the four irreducible ontological quadrants informing my methodology. This second-person approach closes the gap between first- and third-person and provides the interface, where phenomena are experienced through a knowing intra-acting researcher (Shear & Varela, 1999), transforming both herself and her participants in the entanglement. However, in keeping with the four-quadrant (ontological perspectives) paradigm, I was also able to examine objective individual and collective data from a third-person approach.

### **Methodology Overview**

The IMP framework provides a glimpse into four very different, and non-reducible dimensions of reality, each of which discloses a truth about the studied phenomena that the others cannot (Esbjörn-Hargens, 2006; Wilber, 2007). By collecting data from the interior, exterior, individual, and collective, four distinctive facets of reality can be held up against each other in a comprehensive bigger picture. In this way, IMP can be richer and more nuanced than a typical mixed-methods research methodology, where qualitative and quantitative measures are used as complementary knowledge of the same ontological reality. IMP does not use one quadrant to validate another, as Wilber (2007) stressed, they are irreducible and non-competing ontologically separate dimensions of reality. Table 11 outlines the methodological paradigm used in this study.

**Table 11***The Four Quadrants and Six Zones of IMP: Methodologies and Methods*

<b>Upper Left (UL)</b> (Individual subjective perspective)	<b>Upper Right (UR)</b> (Individual objective perspective)
<b>RQ 1:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>RQ 4:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Zone 1:</b> student beliefs, understandings about their own experience (interior view of student's experience)	<b>Zone 5:</b> neurophenomenology; student attitudes/behaviours (interior measure of student's attitude/behavior changes)
<b>Methodology:</b> phenomenology <b>Methods:</b> semi-structured interviews	<b>Methodology:</b> autopoiesis; cognitive science <b>Methods:</b> student opinion survey (SOS) Mindfulness survey (MAAS-A)
<b>RQ 2:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>RQ 5:</b> What changes are observed in the student's HRV measures after this program?
<b>Zone 2:</b> student psychosocial development (exterior view of student's experience)	<b>Zone 6:</b> neurophysiology; biological features (exterior measure of student's physiology)
<b>Methodology:</b> structuralism <b>Methods:</b> Perspectives survey	<b>Methodology:</b> observational science <b>Methods:</b> HRV physiology measures
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)
<b>RQ 3:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?	<b>RQ 6:</b> How is this type of program affected and/or supported by school, division, and provincial systems?
<b>Zone 4:</b> student experience within group setting; collective meaning (exterior view of students' worldview)	<b>Zone 8:</b> examination of systemic structures (exterior view of educational systems)
<b>Methodology:</b> ethnography <b>Methods:</b> student focus groups	<b>Methodology:</b> document analysis <b>Methods:</b> administrator interviews, text and document/policy analysis

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al. (2010); Wilber (2000a)

***Upper Left (UL) Quadrant***

The UL quadrant represents an ontological relativism whereby the individual subjective experience is trusted and true. Epistemologically, access to the individual subjective experience provides knowledge about each student perspective. This subjective paradigm informs a methodology from either the inside (Zone 1) using phenomenology or outside (Zone 2) which accesses information through developmental structuralism. Phenomenology is used to investigate individual lived experiences as described and then interpreted through our own consciousness (Crotty, 1998). It was formulated by Husserl in the nineteenth century as an examination of human consciousness and was advanced and extended through Heidegger, Merleau-Ponty and others to include consciousness as beings-in-the-world

with lived, inter-related collective experiences (Packer, 2011). Knowledge that arises through phenomenology is constructivist, focusing on the “meaning-making activity of the individual mind” while “engag[ing] with phenomena in our world and mak[ing] sense of them directly and immediately (Crotty, 1998, p. 58, 79). It requires us to engage directly with the objects of study (students) to bring about their subjective “inside” experience. Phenomenological data can be gathered using semi-structured interviews with each student; however, as the researcher/interviewer, it is important to try to “bracket” pre-existing ideas, beliefs, and biases that may sway questioning or interpretation of the subject’s personal experience. While complete bracketing is not possible, engaging in a mindfulness practice to clear thoughts, feelings, and previous notions can help the interviewer begin with a fresh slate.

### ***Lower Left (LL) Quadrant***

The LL quadrant serves to investigate the inter-subjective perspective from the students as they interact with each other in the class, and from their interactions with their family members at home. Ontologically, meaning comes from the relativistic interaction of individuals in groups whereby meanings are socially constructed and continually evolving. Knowledge from this approach is inter-subjective and gathered using methodologies from within the group (including the researcher) (Zone 3 – hermeneutics), or by observing the group from the outside (Zone 4 – ethnography). A focus on the shared meanings from the students lends itself to an ethnographic approach. Producing “thick descriptions” within a real-world context (classroom focus groups) to bring about ideas, feedback, observations, and conclusions is a priority within this quadrant (Geertz, 1973, as cited in Cohen et al., 2018, p. 289). Direct engagement with the participants while respecting their perspectives and points of view “offers them a platform for them to contribute to the research question, its methodology, and the analysis” (Kirby, Greaves, & Reid, 2017, p. 19).

Ethnography involves observing a group or culture from within, whereby the researcher becomes a participant in the interior culture, while observing the collective interactions as an outsider to collect



webs of meaning and cultural experiences (Hoey, 2014). Early ethnographical work arose from the field of anthropology, where the researcher was generally detached from the objects and culture of study, whereas more recent ethnography becomes a “mutual product born of the intertwining of the lives of the ethnographer and his or her subjects” (Hoey, 2014, p.3). The LL quadrant will investigate the collective ideas and shared meanings as students come together in small focus groups to ask and answer questions. This quadrant will provide me with an insight into how the collective culture of the classroom affects and transforms student thinking and beliefs about their mindfulness and SEL experiences.

### ***Upper Right (UR) Quadrant***

The UR quadrant looks at the world from a positivist ontology, whereby truth is observable, quantifiable, and can be empirically tested (Wilber, 2000a). Knowledge of student neurophenomenology can be measured from an interior perspective (Zone 5), using surveys to show possible changes in student attitudes and behaviours. Student attitudes and behaviours measured before and after an intervention, compared to other groups who did not receive the intervention, can be used to determine causality from independent and dependent variables. Statistical significance and effect size can quantify the amount of change, providing an objective, scientific result to justify the use of the intervention in question. According to Hattie (2018), educational interventions with an average effect size of .40 have positive effects for students. Strategies to build self-efficacy have an effect size of .92, while self-regulation strategies are .52 (Hattie, 2018). In comparison to Zone 1, where the student’s thoughts and attitudes were accessed from within using a subjective approach, Zone 5 seeks to access further interior thoughts and attitudes, but from an objective, measured approach. Zone 6 provides an exterior, objective view inside the individual, with measures such as Heart Rate Variability (HRV) and other biofeedback data from each student’s data collection. Individual biofeedback data, as well as aggregated class data was used to observe any significant changes taking place from beginning to end of the program.

### ***Lower Right (LR) Quadrant***

The LR quadrant provides an exterior, inter-objective view of how the study fits into larger nested systems and subsystems around it. An investigation of the overarching systems determining student grouping, classroom structure and organization, curriculum, and other system influences allows for an understanding of the significance of this knowledge within a larger and more complex context. An examination of underlying systems of oppression or inequality within the system can bring to light barriers for students whose needs are not being met because of their class, race, gender expression, mental illness, or disability. Research in education should not just be about gathering data or observing and collecting information – it should be focused on challenging, changing, and investigating strategies that are responsible to the students real, lived worlds (Kincheloe, 2003). A post-positivist approach allows the researcher to balance both positivist and interpretivist perspectives, utilizing multiple methodologies to address the research problem(s) (Panhwar et al., 2017), which is the approach I am choosing to take.

The LR quadrant provides the opportunity to view the system, both from within and from the outside looking in. Interestingly, when examining learning ecosystems – made up of nested systems of expanding worlds beginning with the interior of each human, to the entire biosphere and all its interconnecting pieces – one can immediately see a parallel to Wilber’s developmental levels. Systems of complexity emerge and follow a natural path, with each new system including and then transcending the previous one. Individual learners follow a developmental path where they typically become aware of their own physiology, their sense of ego or self, their place and functionality within the school system, their local community, the global community, and finally all entities interacting on this planet (Davis, 2021a). An examination of pedagogical policies and practices from the school level to division to province was examined to determine how this SEL program may be positioned within the learning ecosystem. Given that the LR quadrant is concerned with “material, economic, and social factors” and

the “collective social factors that evolve,” it is important to discuss materials (documents) that inform pedagogy, policy, and practice in the educational setting (Wilber, 2005, pp. 33, 30).

## **Ethics**

I have received approval from both the Valley School Division (available by request) and the University of Calgary’s Conjoint Faculties Research Ethics Board (CFREB) (Appendix Z). I have received verbal permission from my principal and the administration team, as well as the teachers who I will work with to access my control group participants. Some areas of consideration for the ethical treatment of student participants are outlined as follows.

### ***Student Welfare***

It is extremely important to consider the welfare of a student who might not wish to be a participant in the study, however, is still present in the class. As per CFREB recommendations, a student must be protected from any peer pressure influencing that individual’s decision to participate or not, as well as mitigating additional discomfort from not participating, and the provision of other, related materials for that student during a data collection (such as a survey, for example) process. The level of precaution and anticipated care for the participants are examined from different angles, such that they are protected from any unintended consequences. Cohen and colleagues (2018) recommend interviews with children be “positive, enjoyable experiences ... [leaving them] feeling positive about themselves and the interview” (p. 136). As a researcher, maintaining a friendly, positive, and empathetic approach can help young participants feel emotionally secure and more at ease (Cohen et al., 2018).

### ***Research Ethics Board Considerations***

I have adhered tightly to the ethics requirements as laid out by the University of Calgary’s Conjoint Faculty Research Ethics Board (CFREB) throughout this study. As my data collection involved students under the age of consent, I ensured that recruitment and consent forms were signed by each student’s parent/guardian/caregiver. Additionally, I had students fill out assent forms, as their decision to

become a participant in this research was also very important to ensure their autonomy and self-determination. The consent/assent forms described in detail the conditions of the study, expectations, risks and benefits, avenues for support, confidentiality procedures, data securement, and deidentification processes (see Appendices AA-II).

Collecting data from the HeartMath (HM) sensor and app (InnerBalance), engaging in individual interviews, group interactions, and completing self-reports and inventories can occasionally be uncomfortable and even triggering for some students, thus the choice to modify or opt out was provided. Practices such as mindfulness and SEL within the classroom were also modified for students who needed further adaptations, in keeping with standard professional practice.

### **Role of the Researcher and Assumptions**

As a teacher of students in a largely upper middle class, mostly white high school, I often encounter students who are highly driven, conscientious, with some experiencing bouts of anxiety, stress, and other indications of mental and emotional difficulty. While it is impossible for me to understand all these students' experiences, hearing their stories and connecting with them on a personal level helps me build the relationship and develop empathy to deepen connections. The teacher-student relationship maintains implicit and explicit power imbalances, which must be continually monitored and navigated ethically. Additionally, within student groupings, there are socially constructed hierarchies that can affect student voice and agency. Therefore, students were interviewed individually and confidentially, in a safe school space, with the option to leave the interview at any time and delete the recorded data. Researcher reflexivity was enacted by using a field diary to document questions, observations, and biases to recognize potential ethical issues that arose throughout the study (Kirby et al., 2017). I believed from the outset that it was essential that I, as the classroom teacher who has shared these experiences with my students, be the one to conduct the phenomenological interviews with my students. According to Bruce Perry (2021), "the more positive time you spend with someone, the more

your brain categorizes that person as safe and familiar” (p. 145). He also discloses that it typically takes between ten and twenty one-on-one sessions before a client is comfortable disclosing personal information with a therapist (Winfrey & Perry, 2021). And that was for adults – children need patterned, predictable repetitions to build the “fundamental relational architecture – that allow you to grow healthy relational connections” (Winfrey & Perry, 2021, p. 164). The relationship that I had established with each student provided a safe and trusting space to engage in meaningful, honest, and fulsome discourse. Students seemed comfortable expressing their thoughts and feelings with me, whereas they may not have been as forthcoming with a third-party research assistant (RA) with no relationship from which to establish trust.

### **Context Assumptions and Potential Bias**

#### ***Dual Role Implications***

Participants were comprised of Grade-9 students who had (mostly) self-selected (in April of 2023) into a term-long option called “Positive Psychology 9” (PP9); Grade-9 students who had not taken the PP9 course (Control Group), and Grade-10 to Grade-12 students who had taken the PP9 course when they were themselves in Grade 9. With CFREB recommendations considered, I taught the class as per usual, but HRV and other physiological data, surveys, interview and focus group data were not collected until *after* the course completion and marks were submitted. This ensured that in *no way* did any of the tasks or measurements become part of classroom assessments or requirements and that there was a distinct temporal delineation between the course and the study. As per TCPS-2 (2022) guidelines, any possible dual role or conflict of interest must be disclosed up front with full transparency. Given that I acted as the teacher and researcher of my students/participants, it was essential that I respected these two distinct roles and kept the welfare of my students/participants as of utmost importance. A researcher reflection log helped guide me with questions and issues that arose throughout the duration of the study.

### ***Personal Potential Bias***

From a personal perspective, I have experience with anxiety firsthand and have used biofeedback and mindfulness techniques to help alleviate these effects. I developed five high school psychology courses from basic Alberta Education curricular guidelines and have been teaching them for almost twenty years. I have also developed and taught study skills summer school courses for junior high students. Recently, I completed three HeartMath certification courses focused on HeartMath techniques, anxiety and stress regulation, and trauma-informed practice.

As someone who has suffered from panic attacks and social anxiety and have several family members who suffer from anxiety and low moods, I understand how it feels to be both dysregulated and now have some experience in what to do to calm down and centre myself. Using the HM sensor, engaging in practices such as mindful breathing and yoga, and running regularly have helped me immensely through some of my most difficult times. When classroom teachers adopt a mindful way of being and use mindfulness activities in their everyday classroom, children can learn to develop empathy, understand and assess their emotions, and interact with others in a more positive and healthy way (Meiklejohn et al., 2012).

Based on past personal experience, I whole-heartedly believe that teaching students how to regulate emotions and learn coping strategies, particularly those making big educational and social transitions (middle school to high school, for example), can help them navigate difficult situations with other students, teachers, parents, and even school-related assignments and tests. I do, however, also acknowledge that students come to us from many backgrounds, experiences, developmental and academic levels, and not all are ready or interested in the strategies and practices taught in this course. Some may jump right in, embrace the new learning, and bring it into their everyday life, while others may need more time, or find it not to be as useful in their own lives. I am also aware that mindfulness in the classroom is uncomfortable and can be triggering for some students (for example, those who have

experienced trauma and are fearful of closing their eyes), therefore the choice to opt out was always provided. I made sure that students felt safe and comfortable while practicing mindfulness and could choose to opt out if they wished to.

## **Research Context**

### ***Research Site***

The site of research is a mid-size high school in a rural school district. The catchment area includes students who live in a town (where the school is situated) and students who live on acreages. Approximately 30% of the teachers and staff reside within the town, while the rest live in a large city nearby. Data from 2019 revealed that Northside High School had 1.2% English Language Learners and 15.1% Special Needs (Fraser Institute, 2019). The current population of the school is 1013 students, an increase of over 200 students in the last two years, and is at 105% capacity (Valley School Division, 2023). The school went to one-to-one learning eight years ago, meaning each student would come to school with a personal device (computer/laptop or tablet) to do their work. Those who did not have a device had access to a tablet (signed out to them for the duration of the course). The school itself shares a large section of land with its feeder schools (middle school grades 5–8; and elementary school K–4).

**Setting.** The classroom where this course took place in is at the north end of the school facing West onto the football field, has large tables for 3–4 students, plants, a fish tank, two “lounge” chairs, a kettle for tea, toasters and a daily supply of bread, buns, and scones (compliments of a local bakery). My desk is at the front of the room (closest to the door) and there is a Promethean Board (digital whiteboard) where I project videos, mindfulness scenery, and can play soft music during heart-focussed breathing sessions. Figure 2 depicts the classroom where the PP9 course took place for the 2023–2024 school year.

**Figure 2***Classroom for PP9 course***Participants*****Inclusion criteria***

Students were recruited for this study if they were in Grade 9 or have taken the PP9 course (Grades 10–12) while in their Grade-9 year. There were two students (Grade 11) who were not in regular programming, however, were still able to participate in this class while in Grade 9. Both students had autism spectrum disorder (ASD) diagnoses, and both required an aide while in class. One of these students volunteered to be a part of this study. All students in the PP9 participant group were in regular programming.

***Participant Recruitment***

The recruitment of adolescents for any research process must take into consideration the balance between protecting vulnerable minors and the importance of learning more about the mental and emotional health of this population group through research studies (Crane & Broome, 2017). According to Bartlett and colleagues (2017), recruitment in schools can be advantageous as the students are typically trusting of their schools and are more likely to volunteer for the research project. As well, when a staff member facilitates the recruitment, there is even greater success, given the additional level



of trust (Bartlett et al., 2017). As a teacher/researcher, it is important that I state my positionality in both capacities, such that students (and parents) are aware that I am facilitating the recruitment process (however, remaining arms-length with the help of my RA), processing the consent/assent forms, deidentifying student data, and analyzing results. Full transparency means that students and parents have all the information needed to make an informed choice with regards to volunteering for this study.

Students who were registered in the 3 PP9 classes (N=72), as well as any students (in other grades) who had completed the course in the past were invited to participate in this study. Additionally, students who were in Grade 9, but *not* taking PP9 were invited into the control group (they were recruited from Grade-9 Leadership, Outdoor Education, and Foods classes).

Students taking the PP9 course were recruited to the study during the first week of class. The RA provided them with a letter of invitation, student assent form, and parent consent form (all paper copies). They were asked to bring the forms back (signed) to the office where they were stored in a locked filing cabinet, with access given only to the researcher. The forms were developed as per CFREB templates and requirements, including information regarding the purpose of the study, any risks and benefits associated with participating, how data was to be accessed, managed, and displayed, confidentiality and security of data procedures, and processes for withdrawal. Participants were assured that their data would be kept in complete confidentiality, meaning the researcher (I) did not disseminate digital or paper data, nor talk about participants' data contributions beyond myself or my supervisor.

### ***Participant Demographics***

**EG.** There were 46 students who agreed to be participants in this study. Figure 3 illustrates the numbers of participants who completed each phase of the study. Of the 46 students, all but two are White. There are 31 students who identify as female, 14 as male, and one identifying as non-binary. Fourteen students have Individualized Program Plans (IPPs) for a variety of issues, including 10 with

anxiety diagnoses and 7 with ADHD (including 5 with both). There are 11 students who live in rural areas, and 36 students who live in urban areas.

**CG.** There were 49 students who agreed to be participants in the control group. Figure 3 illustrates the numbers of participants who completed each phase of the study. Of the 49 participants, all but 4 are White. There are 25 students who identify as female, 22 as male, and 2 as non-binary.

**AG.** There were 25 students who agreed to be participants in the alumni group. All but three are White. There are 20 students who identify as female, four as male, and one as non-binary.

### ***Communication and Consent Processes***

Children under the age of eighteen can give assent (a demonstration of some form of understanding of participation without necessarily comprehending fully the significance of the research) to participate in the study but must also obtain parental or guardian consent (Goodwin & Goodwin, 2014). The participants in this study ranged in age from 13 to 18, and thus were treated as autonomous individuals with utmost respect for the intrinsic value of each person TCPS-2 (2022). As recommended by the TCPS-2 (2022), consent must be voluntary, informed, and ongoing. Flewitt (2005) described the notion of *provisional consent*, as it is often difficult to determine the actual route of the research study, and thus consent should be ongoing and negotiable, built on trust and collaboration. The consent and assent forms were vetted for contradictions and inconsistencies in instructions, appropriate reading level, clarity in purpose and design, and a clear understanding of participant's rights around collected data. Additionally, offering the consent/assent forms in another language is recommended, as is consistent with the ethical guideline around justice or equitability TCPS-2 (2022). A student or parent who does not have a solid grasp of the English language may have difficulty understanding an English document, but may feel compelled to sign it anyway, given that the location of the study is in a predominantly English-speaking school. While I did have one ELL participant (from the Philippines), I was unable to provide these forms in their first language. I included a diverse selection of gender options for

demographics collection, including female/male/non-binary/other to respect multiple ways of gender identification. I also allowed each participant to select their own pseudonym, either from a prepared list (Appendix Y) or one of their own creation. For those who did not specify, one was selected randomly (although somewhat gendered as per their identification) from a list.

A rule of thumb as a researcher constructing the experimental method and design would be to put yourself into the role of the participant (or parent of the participant) and try to imagine how it might feel to be in that situation. In fact, the TCPS-2 recommends that the researcher “must be mindful of the perspective of the participant ... [and] necessary to consider the various contexts (e.g., social, economic, cultural) that shape the participant’s life to properly evaluate the implications of the research in terms of the core principles” (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2014, p.10). From this vantage point, reciprocity can be examined and considered. I do believe that the participant should be benefitting from the research opportunity just as the researcher benefits from the production of data. Additionally, participants were informed that they could withdraw from the study at any time and their data would be removed. This was an important consideration, particularly with adolescents, as they could have become uncomfortable in any of the study situations and not wished to continue.

### ***Participant Data Considerations***

While it was not possible for participants to be anonymous, given the necessary linkage of pre- and post-survey data, participants were allowed to choose a pseudonym (from a list of options, with male, female, and non-binary names) and confidentiality was ensured. Student names or faces do not appear in this dissertation, instead pseudonyms have been applied, and privacy has been protected throughout the study. Digital study data is currently stored on an encrypted computer, while all hard copies of student work or contributions are stored in a locked cabinet in the school office. All data will

be destroyed after five years from the end point of data collection.

### ***Risks and Benefits to Participants***

This study is considered “minimal risk research” as the probability and magnitude of possible harms implied by participation in the research are “no greater than those encountered by participants in those aspects of their everyday life that relate to the research” (Chapter 2, Section B, TCPS-2, 2022). While there were no apparent physical risks as a direct result of being in this study, some students may have felt uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may also have felt distressed discussing feelings of anxiety in group settings such as a focus group, and because of this, students were given the option to remove themselves from the situation at any point if needed. Students were also informed of additional counselling provided through the school counsellors for those who felt overwhelmed or uncomfortable because of activities or experiences while participating in the study.

Potential benefits to participating in this study included the opportunity to discuss techniques and skills related to test anxiety management and emotional self-regulation with peers and the researcher. Opportunities for additional information and explanations of techniques and strategies were also provided to participants looking for more information or support. Potential carry-over effects may also lend themselves to other academic classes, helping to improve emotion regulation and a calmer physiological state, helping students focus and retain more information.

### ***Delimitations of Participant/Student and Researcher/Teacher Protocols***

**Participant/Student.** Many of the students in the experimental group pre-selected the PP9 course because of previous stress and anxiety issues, thus may not be completely representative of the general population. Additionally, other activities that the student was participating in outside the study might have included exercise, yoga, meditation, and other beneficial emotion regulation tools.

**Researcher/Teacher.** The effectiveness of the classroom intervention (such as mindfulness practice) can be affected by teacher buy-in and commitment to the success of the program (Schonert-Reichl et al., 2015; Auger, 2011). To be sure, mindful teaching (as opposed to simply teaching mindfulness in classroom lessons) allows teachers to fully integrate a way of being, ultimately promoting a culture of positivity and mindful awareness (Meiklejohn et al., 2012). Burke (2010) noted that the intervention fidelity of mindfulness programs is directly affected by the level of mindfulness training teachers have completed, and without the necessary experience and “embodiment of the attitudinal foundations of mindfulness,” they may not be as effective in the delivery of mindfulness elements (p. 134). Thus, the effectiveness of the program may be delimited to the level of program fidelity (or treatment integrity) and teacher buy-in and may not achieve the same results in every setting. In this study, I was the only teacher of this course, and thus my influence as a teacher was an integral part of the process. The quality of implementation matters, and program fidelity is essential in terms of producing beneficial outcomes for students (Reinke et al., 2013). Typically, fidelity evaluation in schools means adequate teacher training (dosage and relevancy), ongoing coaching consultations, evidence of teacher skill implementation, and adherence to the program (Reinke et al., 2013). Appendix K addresses fidelity to the program.

### ***Limitations of Participant Protocols***

A limitation to data collection involved using student self-report surveys to measure perceptions of anxiety which could have varied according to the student’s own self-awareness. While the validity of self-reporting has been shown to be acceptable in high school students, lower performing students often overestimate their academic achievement in comparison to higher achieving classmates (Teye & Peaslee, 2015). Younger students lack higher level cognitive skills to properly evaluate their abilities and may be more prone to wishful thinking (Teye & Peaslee, 2015). It is possible that the Grade 9s in this study were more prone to the effects of social desirability than the more senior students, and thus

evaluated their progress through the course more favourably, which could potentially be erroneous. As well, students were not awarded grades for completion of the surveys, which may have led to lower engagement and motivation, as compared with typical outcome-based assessments.

Students who completed the semi-structured interview were given a small gift bag that contained a fidget toy, ruler, coloured pens, candy treats, and Play-Doh as an acknowledgment of their “interview as a gift” (Cohen et al., 2018, p. 274). Students participating in a focus group were offered a chance to win one of five \$25-gift cards to honour their time and attention to the study requirements. The reason for the gift card draw for the focus groups (as opposed to smaller amounts given to each participant) was to ensure that if there were more students who wanted to participate than there were spots, there would be no lost incentive. Cohen and colleagues (2018) acknowledge that “[p]ayment should be commensurate with the amount of time and effort expended and should not be coercive or corrupting” (p. 137). Students who completed consent/assent forms, student opinion surveys and MAAS-A (Mindfulness surveys) over two time periods, received a \$5-Starbucks card.

### ***Participant Withdrawal***

Students were able to withdraw from the study up to one month after the survey was conducted. For the interview process, students were emailed a written copy of their interview transcript and given two weeks to edit, add, or delete as desired. Once the time period elapsed, they were no longer able to withdraw their data, as it had been collated and the analysis process had begun. (None of the students made any edits or deletions.) Students (and parents) were informed up front that focus group data could not be withdrawn due to the complexity of multiple conversations and voices on the transcripts. Of course, the interview and focus group data were not collected or analyzed until *after* students had completed the PP9 course and marks were collected and submitted. Data withdrawal procedures were explained extensively on both the student assent and parent consent forms.

### *Participant Sampling*

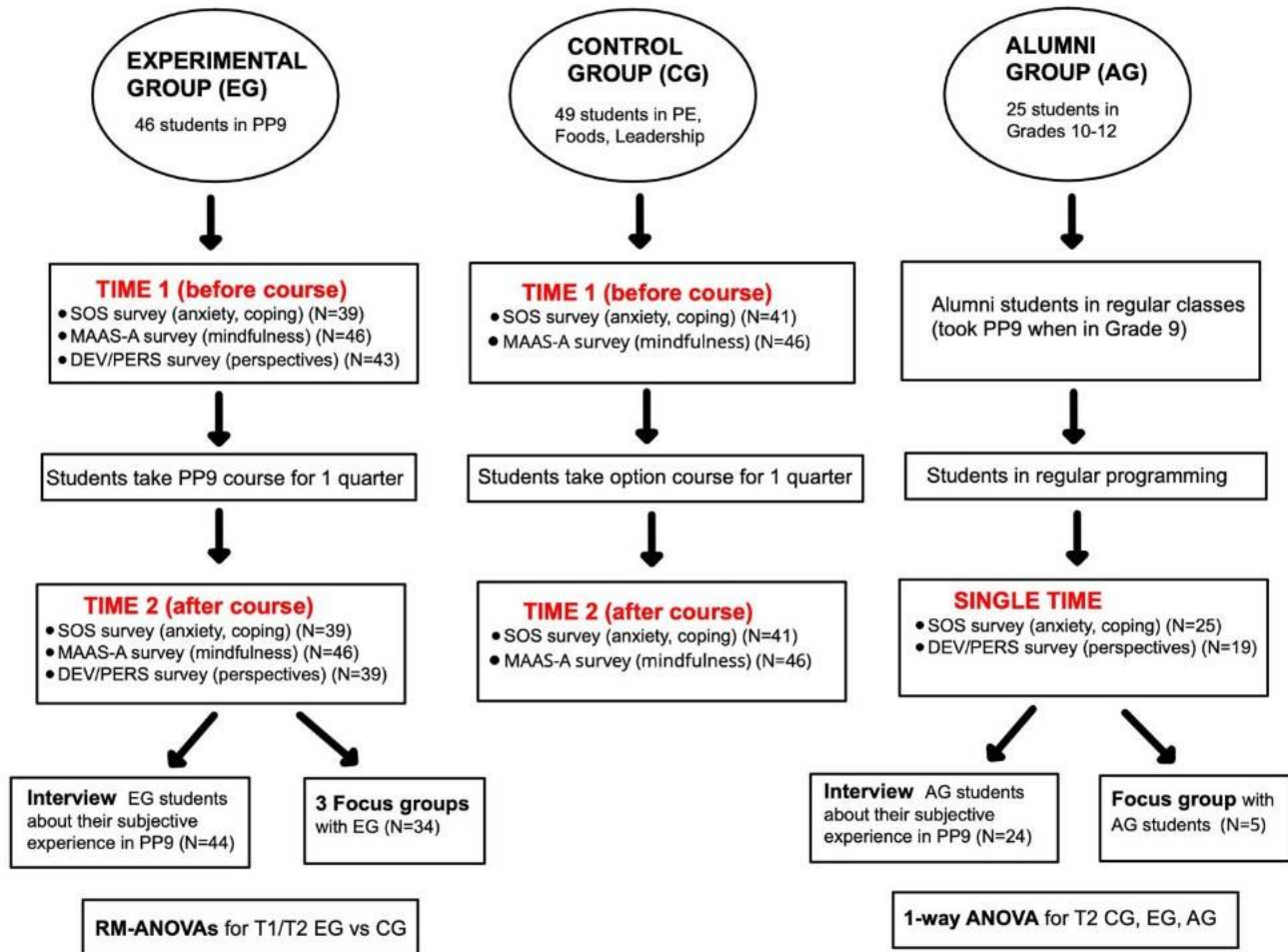
I developed this PP9 course four years ago, in response to students struggling with anxiety and stress, without adequate coping strategies to help them navigate. Students who were in the Grade-12 participant cohort were among the first Grade 9s to take this new course in the fall of 2020. My intention for this study was to focus mainly on the Grade-9 students but to also include the older students with interviews and focus groups to examine their original experiences and any residual effects of this type of programming. The structure of my participant group is mapped out in Table 12 (as well as Figure 3). Higher sample numbers were required for the Grade-9 participants, as quantitative data was collected and then analyzed using repeated-measure ANOVAs. After recruitment, I ended up with 46 experimental group (EG) students, 49 control group (CG) students, and 25 alumni group (AG) students. Given that ANOVAs were used to calculate descriptive and inferential statistics for both the SOS and DPS data,  $\eta^2$  (Eta squared) was used to calculate effect size, rather than Cohen's d. According to Cohen's (1988) guidelines, a small effect size is 0.01, medium is 0.059, and large is 0.138.

**Table 12**  
*Participant Protocols*

Student grade level	No. of students at start	UL Quadrant Perspectives Survey	UR Quadrant MAAS-A (T1, T2)	UR Quadrant SOS Survey (T1, T2)	UR Quadrant HM sensor data collection	UL Quadrant Semi-structured interview data	LL Quadrant Focus group data
Gr 9 (EG)	46	43	46	39	46	44	34
Gr 9 (CG)	49	X	46	42	X	X	X
10-12 (AG)	25	22	X	22	X	24	5

Figure 3 displays the methodological outline of data collection for the 2023–2024 school year. The AG were not accessed until the end of June when classes were complete, marks were submitted, and I was no longer in a dual role situation as their teacher and researcher.

**Figure 3**  
*Methodological Outline of Data Collection*



SOS: Student Opinion Survey  
 MAAS-A: Mindful Attention Awareness Scale for Adolescents  
 DEV/PERS: Developmental Perspectives Survey

## Quantitative Quadrants

### Validity

Validity in quantitative research is concerned with measures and instruments that are designed and accurately report data that it intends to describe or explain (Cohen et al., 2018). The link between data collected and conclusions drawn is sometimes described as “warrants,” which can be thought of as the weight or theoretical grounding of the evidence (Cohen et al., 2018). Appendix L indicates how warrants (and rival warrants) link data to evidence.



**Internal Validity.** Internal validity deals with the degree to which the methods and instrumentation are aligned to the data that the researcher is looking for. The measures used in the UR included student opinion surveys (SOS), MAAS-A survey, and the collection of HRV physiological data. The SOS survey and MAAS-A were taken before (Time 1) and after (Time 2) completion of the PP9 course. Consideration of maturation or changes that the participants exhibit due to the extended time period between measurements was needed (Cohen et al., 2018). For the SOS and MAAS-A measures, a control group was used, and thus temporal consistency was needed with respect to pre- and post-survey completion. The SOS was developed specifically for these students with reflection on attitudes, behaviours, and developmental levels corresponding with the participants in this study. The survey was initially piloted (with students taking PSYC 203 at the University of Calgary during the summer of 2023) to vet any ambiguous questions, difficult language, misleading questions, or those with low relevance to the measures needed. The HRV data was collected each day by each student using a data tracking written sheet. While there may have been some issues regarding accuracy of data recording, honesty of recordings, and consistency, there would have also been ethical issues around obtaining student phones/devices and accessing data directly from them. I was much more comfortable having the students record their own measures, reflect on them, and observe changes and patterns from their scores. At the end of their course, their sheets were collected, and names were converted to their respective pseudonym. Coherence Score data were analyzed from 3 time periods – baseline, first half (6 weeks), and second half (6 weeks). Coherence scores were selected as they included level, time, and coherence percentages within the session. Thus, this was the most comprehensive measure of each student's HRV for each session. The baseline score was the first three days of measurement, the first half included the average at the halfway point, and the second half took an average of the remaining sessions until the end of the course. There were many other factors contributing to the score – including the time of day (and day of the week) that the class was on, other personal and inter-personal factors

affecting the individual's life (which may have been addressed in the individual interview), physical/mental/emotional health, and many other day-to-day events that could have impacted students. It was for these reasons, I wanted to include a larger data set (first half, second half) to get a more accurate representation of their HRV. I used my researcher journal to document additional external events as they arose, helping to reflect on emerging issues.

**External Validity.** External validity in quantitative research refers to the degree to which the findings can be generalized to the larger population, or in this case, other students across the division or province (Cohen et al., 2018). To generalize the data from this study, it is important to consider possible contextual or cultural specificities and relatively small sample sizes being used (Cohen et al., 2018). Proper explanation and operationalization of the variables, and a relative representation of the larger population is also needed. Inferences obtained from the UR quadrant can be thought of as external statistical generalizations, as the data extracted from the sample or representative group can be externalized to a larger population of Grade 9s who could potentially experience a type of SEL program in school (Onwuegbuzie & Leech, 2007). Given that the sample is taken from a middle-class, primarily White group of participants, generalization of the results beyond this study may be somewhat limited and thus cautioned.

**Construct Validity.** Construct validity ensures that the operationalized evidence is warranted and accurately defined (Cohen et al., 2018). *Convergent techniques*, where related themes (for example, “recognizing emotions like happy, sad, or frustrated” and “knowing when I am feeling anxious”) might come together in the category (or factor when using ANOVA) of “self-awareness.” Likewise, *discriminant techniques* are meant to show how two unrelated items or measures are separated distinctly from each other (for example, “understanding when to use mindfulness” and “feeling anxious around peers” would be categorized into two factors in an ANOVA). Additionally, specific decisions made around outliers and irregular data must also be described and presented. All students who agreed to be

participants in this study had their data included. Missing data occurred if a student did not complete either Time 1 or Time 2 of the SOS survey (The EG had 7 students where this occurred, and the CG had 8 students who did not complete the surveys twice.) For the collection of HRV data, construct validity from the sensor and app to accurately measure beat-to-beat changes in heart rhythm are validated through the emerging research. According to McCraty (2022), “[n]umerous studies that have used HRV coherence feedback technology to facilitate skill acquisition of self-regulation techniques have found significantly improved key markers of health, wellness and performance in many healthcare, law enforcement, corporate, military and educational settings” (p. 308).

The HeartMath sensor is designed to measure the beat-to-beat frequencies, and a breathing rate of five to six breaths per minute is the “rate that matches the “resonant frequency of the cardiovascular system (CVS) at about 0.1 Hz” (Henriques et al., 2011, p. 102). According to the Inner Balance Instructional Sheet (HeartMath Institute, 2018), the scoring algorithm continually monitors heart rhythm data every 64 seconds and updates the score every five seconds. “A coherent heart rhythm is a stable regular repeating rhythm resembling a sine wave at a single frequency between 0.04–0.24 Hz (3–15 cycles per minute)” (HeartMath Institute, 2018), with a stable rhythm visualized as green bars, indicating high coherence. The Achievement Score is calculated by adding up all the coherence scores for each five-minute interval and providing a total at the end of the session (HeartMath Institute, 2018). Students used their Achievement score to monitor their progress and amount of practice. Students were also able to adjust their challenge level (the default is level 1), which increases the coherence threshold by 15% (meaning it is more difficult to “stay in the green zone” and requires more focused breathing and attention (HeartMath Institute, 2018). From previous classroom experience with these sensors and app, I usually recommend students stay in Level 1 until they have ten sessions at 100% coherence (all green). Many students achieved this after only a few weeks, and by the end of the course, some students were consistently using Level 2 or even Level 3. These metrics have been vetted by the scientific

community to measure HRV using tightly controlled algorithms, such that when students see their “score” (biofeedback data), they are truly capturing a snapshot of their inner physiology, which can then inform them about their mental and emotional level of coherence. According to McCraty (2022), “the rhythmic patterns of heart activity were associated with the subjective activation of distinct emotional states” and “analysis of the HRV pattern alone can be used to detect specific, discrete, emotional states with around 75% accuracy” (p. 307).

**Reliability.** Reliability means repeatability and consistency with respect to samples, time, and instruments used (Cohen et al., 2018). For HRV and other biofeedback metrics, consistency of data collection in terms of making sure HRV was always measured at the beginning of class, with similar protocols (a similar script to walk students through the heart-focused breathing and quick coherence techniques was used each time), same type of sensor, and data collection procedure. For the SOS data, reliability means stability over sample (that both the EG and CG will respond similarly to the questions) (Cohen et al., 2018). While I do recognize this as important for establishing reliability, the reality is that the EG will have self-selected into a course that is known to them to teach SEL, mindfulness, anxiety and coping strategies, and other wellness features. The CG was made up of students from several options, with no central learning theme in place. Additionally, five students from the EG were also included in the CG, as their PP9 course was not until either the second or third quarter, and they provided two time sets of data in the first quarter. It is possible that many of the students may have selected this option (and become a participant) looking for a way to manage anxiety, stress, and worry – meaning that the sample groups may not have been as closely matched as they could have been. Piloting the survey questions ahead of time with comparisons to other matched groups helped to obtain sample reliability. As such, Time 1 differences between the groups were described and disclosed, with the understanding that the initial groups were not randomly selected. Reliability over time between surveys was also important – not too long that the participants have changed due to additional environmental

factors, and not so short that the participants simply answer the questions the same way they did the first time (Cohen et al., 2018). For this study, the time lapse was approximately two months, which allowed the students to complete the entire course (each course was one term, or two and a half months).

Finally, given that I created both the SOS and Perspectives surveys such that they would be relevant to my research questions and the specific age of my participants (13–15 years), I tested the items for validity and reliability using Cronbach's alpha. This ensured that the items were internally consistent (a Cronbach alpha of at least 0.70), but not 1.00, meaning that the questions were all asking the exact same thing (Cohen et al., 2018). I structured both surveys such that there were approximately five items per themed section, while being mindful of reading level and length of survey.

### **Qualitative Quadrants**

As mentioned, I have delimited this study to six out of a possible eight zones or perspectives. According to Esbjörn-Hargens (2010), approaching the research problem from all four quadrants may not necessarily entail all eight zones, however, including data from the first-person perspective (the student voice), second-person perspective (my analysis of interview and focus group themes), and third-person perspective (the positioning of this program within the school, division, and province) are essential. It is this multi-perspective approach that allows this “metaframework [to be described] as inclusive and theoretically sound” (Esbjörn-Hargens, 2010, p. 53). However, given that each quadrant focuses on a particular aspect of reality, determining criteria for trustworthiness is often considered in relation to the quantitative-focused quadrants (UR, LR) and qualitative-focused quadrants (UL, LL) (Davis & Callihan, 2013).

### ***Trustworthiness***

In qualitative research, validity and reliability are generally viewed as the accuracy of the interpretations and analyses of the information and knowledge shared by the participants (Cohen et al., 2018). Given that I am a researcher living and working in the same world as my participants, it is

essential that I am transparent, honest, aware of the power imbalance, and will share the participant stories and beliefs as they have been told to me (Cohen et al., 2018). The qualitative nature of the left-hand quadrants (UL and LL) will mean that trustworthiness – or an evaluation of my presentation of data, theme analyses, and authentic participant representation was required (Bloomberg, 2023). Trent and Guba (1985) identified four criteria needed for qualitative rigour and trustworthiness: credibility, confirmability, dependability, and transferability (as cited in Cohen et al., 2018).

**Credibility.** Credibility refers to the accuracy between the participants' ideas, thoughts, and meanings and the researcher's interpretations (Bloomberg, 2023). This was ensured through participant checks, where each participant was given a transcript of their interview statements and given a chance to make modifications, insertions, or deletions. Asking participants for clarification of meaning when unsure also helped to maintain credibility of participant data. Additionally, my research journal helped with self-reflection and questioning when moving through the data collection and analysis phases (Bloomberg, 2023).

**Confirmability.** Confirmability means that the participant data is collected and analyzed using a described set of protocols, and that the knowledge generated is a reflection of participant thoughts/ideas, and not the subjective opinions of the researcher (Bloomberg, 2023). This involves a detailed and fully transparent method of data collection, theme and coding analysis process, and clear understanding of what the knowledge means (Bloomberg, 2023). Again, my research journal of decisions and justifications was essential in maintaining consistency and authenticity throughout the process.

**Dependability.** Dependability refers to how the data holds up over time, and essentially relates to the initial research questions (Bloomberg, 2023). Ensuring that the data from the participants addresses the research questions, problem, and purpose meant a careful examination of the semi-structured interview and focus group questions. Piloting these questions with doctoral colleagues and other students not involved in the study helped me determine which questions addressed the research

questions, and whether they were easily understood, not overly triggering, would produce fulsome responses, and were not too taxing for the participants.

**Transferability.** While externalization in quantitative methodologies typically means replication beyond this sample and data set, transferability in qualitative methodologies implies application of these findings in other settings (Bloomberg, 2023). Inferences obtained from the UL and LL quadrants are coming from student/s own experiences, and therefore are not typically externalized beyond the specific context and situation from which they were produced (Onwuegbuzie & Leech, 2007). Often, whether data are transferable beyond this context and setting depends on the thick descriptions and related analyses derived upon completion of the study (Bloomberg, 2023). Bloomberg (2023) suggested focusing on detailed descriptions of the participants and research setting, as well as obtaining thick and rich data by which other researchers can apply the findings or make comparisons within their own contexts.

**Table 13**

*Data Collection and Analysis Map*

<b>Upper Left (UL)</b> (Individual subjective perspective)	<b>Upper Right (UR)</b> (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24)	<b>Data Collection:</b> SOS surveys given to CG (N=41) and EG (N=39) through Qualtrics (2 times) MAAS-A survey for mindfulness measure (Brown et al., 2011) (EG (N=46) and CG (N=46), 2 times)
<b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	<b>Data Analysis:</b> RM-ANOVAs to compare factors between EG and CG and across 2 time periods (pre- and post-course)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?
<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app
<b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time)	<b>Data Collection:</b> Individual student daily recordings of Average Coherence (EG) (N=46)
<b>Data Analysis:</b> Quantitative R-M ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	<b>Data Analysis:</b> t-Test to determine significant changes in Average Coherence score from Baseline to Time 2 (EG) (N=46)





**Methods.** Phenomenology allows the researcher to “engage with phenomena in our world and make sense of them directly and immediately” (Crotty, 1998, p. 79). This was operationalized using Moustakas’ (1994) method, involving the four-step phenomenological reduction of Epoché, horizontalizing, imaginative variation, and textural integration. The first step, the Epoché, involved a *bracketing* process, where “Everything referring to others, their perceptions, preferences, judgments, feelings must be set aside” and becomes transparent such that we can allow whatever comes into our consciousness free and open access (Moustakas, 1994, p. 86). Moustakas (1994) describes “reflective-meditation,” allowing prejudgements, previous ideas or biases to become temporarily removed, such that the present consciousness is open and ready to accept new knowledge (p. 90). He does, however, caution the researcher that “some entities are simply not ‘bracketable,’” such as life experiences that come with deep trauma and intense memories (Moustakas, 1994, p. 90). Thus, spending some time before each interview to meditate to try to remove some of the pre-existing ideas I might have possessed was essential.

**Instruments.** After the Epoché (a brief heart-focused breathing session before each interview), I was then ready to receive the participant’s thoughts, ideas, and descriptions with a clear and open consciousness, collected via audio recording in a semi-structure interview (conducted myself) and then later transcribed into written form. Forty-four Grade-9 students agreed to participate in a 15- to 30-minute one-on-one, semi-structured interview. Interviews were *only* offered after the course was complete and marks were submitted, thus avoiding any dual-role effects. As a researcher *and* teacher of these students, it was incumbent upon me to ensure that I bracket my own perceptions of this course and its components before I engaged with my students. I offered many opportunities for member checks and edits, such that my participants (students) had as much control over their data as possible. As indicated in the ethics review (and fully described in both the consent/assent forms), they were able to withdraw at any time during the actual interview, and their data would be deleted. The interview questions are

provided in Appendix M and were generated from the Zone 1 research question. The questions were piloted with previous psychology students (Grades 10–12), to help with phrasing of the questions such that the “questions [are] very clear, uncomplicated, concrete, specific, and straightforward” (Krähenbühl & Blades, 2006; as cited in Cohen et al., 2018, p. 529).

Each student was interviewed either in my classroom or in a quiet room in the office area of the school to minimize disruptions and/or distractions. Each interview consisted of 10–12 questions (including additional possible prompts or probes when the participant was needing some help with the question/response) asked sequentially to the participant. Following the interview, the audio recording was transcribed (manually into NVivo) and then statements were collected and moved into codes (within NVivo), which were both deductive (pre-constructed according to the interview questions) and inductive (generated as a result of the information provided by the participants).

**Data Collection.** The next step of *horizontalizing* involved considering each statement given by the participant as equal and worthy of attention. From there, any statements that were repeated or irrelevant were deleted and the remaining ones (now called *horizons*) were collected and organized for the next step (Moustakas, 1994). The next task was *imaginative variation*, which involved “seek[ing] possible meanings through the utilization of imagination, varying the frames of reference, employing polarities and reversals, and approaching the phenomenon from divergent perspectives, different positions, roles, or functions” (Moustakas, 1994, p. 98). From here, the horizons were captured as codes, collected and organized based on similarities and delineated from each other by their differences. Imaginative variation is used to explore the temporality of the phenomena being uncovered, or the materiality, or relation to self and/or others (Moustakas, 1994). The final step involved a synthesis of meanings (collapsing codes into themes), or an “*intuitive integration* of fundamental textural and structural descriptions of a unified statement of the essences of the experience of the phenomenon as a whole” (Moustakas, 1994, p. 101). Once themes were constructed from the textural, thick descriptions,

they were discussed and further explained using prior theory and context to frame ideas.

**Data Analysis.** Using Bloomberg’s (2023) guide to thematic analysis involved *data reduction* (from raw data to codes), followed by *categorization of data* (grouping codes into “clusters of meaning”), and *reorganizing data* (interpretations of codes to organize by theme) (p. 333). Data reduction was accomplished by manually identifying codes from written transcripts (transcribed from audio-recorded interviews). Saldaña (2021) described a code as “most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (p. 5). From there, codes can be “divided, grouped, reorganized, and linked in order to consolidate meaning and develop explanation (Saldaña, 2021, p. 13). In keeping with Saldaña’s (and Bloomberg’s) basic model of thematic analysis, I collected interview statements and then moved them into either a pre-existing (deductive) or generated (inductive) code (in NVivo). From there, a table with themes connecting to aggregated codes, brief summaries of the participant experience, and a few salient quotes (with pseudonyms) was constructed to reduce and collate the data further. Appendices JJ and KK provide the complete codebooks used in NVivo.

### ***Zone 1 – Inner Thoughts Through Journaling***

**Methods.** Journal writing can help students reflect on what they are thinking about and have learned, how they feel, and why they might behave in the ways in which they do. Additionally, reflective journals can help individuals bring to light what they are learning and how it relates and connects to previous understandings and experiences (Boud, 2001). While the *process* of journaling would be considered a Zone 1 experience, the collection and analysis of the content of the journals would be exterior, therefore Zone 2. For this reason, I asked the students to reflect on their own writing while in the interview, thus keeping their thoughts and inner experience firmly in Zone 1.

**Instruments.** Students were given small, coiled personal journals (at the beginning of the PP9 course) to write down their thoughts, emotions, and other reflections. They were instructed to write

spontaneously when they felt like it or when there was something learned or experienced in class that they might want to further reflect on individually through their writing. Additionally, I wrote in a research journal frequently, making notes of observations, issues encountered, questions, and new information needing to be dealt with.

**Data Collection.** Students did not have to hand in their journals, but instead were asked to bring them along to the interview to help them draw on their experiences as they had previously reflected on them. This was thought to help students who felt nervous or worried about being able to answer all of the questions some personal writing to draw from. My researcher journal was carefully read through and summarized for important learning and growth throughout the process.

**Data Analysis.** The analysis was combined with the interview to provide a holistic phenomenological analysis of the student's thoughts, feelings, and inner experience through their statements and writing. My own reflections on the research process and things I learned along the way were summarized and added to the results section – providing context from my own experience as I in turn, was trying to capture and understand my students' subjective experiences.

## ***Zone 2 – Developmental Structuralism***

**Table 15**

*Data Collection and Analysis Map*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	
<b>Methods:</b> Semi-structured interviews Student journaling (process)	
<b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24)	
<b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	
<b>Methods:</b> psychosocial inventories	

<b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time)	
<b>Data Analysis:</b> Quantitative R-M ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)

RQ2: *What developmental levels are students operating at and how does this affect each individual worldview?*

**Methods.** The structures of consciousness, or developmental levels can be measured by examination from the outside looking in – as you can “feel the insides of structures... or grooves in which your thinking and feeling run, but you can’t see their actual structure, nor suspect their existing using only phenomenology, meditation, introspection, etc.” (Wilber, 2007, p. 72). This means that the examination of these structures or levels must be accessed by asking the participant about their thoughts and feelings in reference to particular contexts. My study used a perspectives survey that I (along with Dr. Bohac Clarke) constructed and piloted (for validity and reliability). I used Wilber’s developmental level terminology (see Appendix B) to describe themes in participant (Grade-9 and alumni) developmental levels of consciousness and perspective.

**Instruments.** The survey consisted of 5–7 Likert scale questions and two sentence completion statements per quadrant. Each statement corresponded with a particular developmental level (red-orange-green-turquoise) such that the participant’s rating either aligned with the identity of that level or was opposed to it (at the most extreme ends of the scale). The Developmental Perspectives survey can be found in Appendix N.

**Data Collection and Analysis.** Statements were assembled and organized by codes created in NVivo. From there, codes were aggregated into themes to get a general sense of where the students were developmentally. Themes from the EG were then compared to those from the AG, to see areas of growth and development. A quantitative analysis using the Likert scale data was also used to compare the two

groups to look for significant differences in thoughts, beliefs, and attitudes. Appendix LL provides a codebook for the DPS survey analysis completed in NVivo.

## LL Quadrant Methods and Data

### Zone 4 – Ethnography

**Table 16**

*Data Collection and Analysis Map*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback? <b>Methods:</b> Semi-structured interviews Student journaling (process) <b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24) <b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview? <b>Methods:</b> psychosocial inventories <b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time) <b>Data Analysis:</b> Quantitative RM-ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school? <b>Methods:</b> student focus groups and exit questions <b>Data Collection:</b> Student focus groups (6–10 per group) (N=34) (45–60 min) conducted at school, audio recorded; individual exit questions for added info <b>Data Analysis:</b> Transcripts (manual or NVivo) coded, followed by thematic analysis (Bloomberg) Exit questions examined for added meanings, transferred into additional themes	

Adapted from: Bohac Clarke (2019); Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

RQ3: *How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?*

**Methods.** An outside, inter-subjective perspective in Zone 4 involves an examination of shared meanings derived from interactions. As the outsider, I conducted the focus groups, allowing the students to interact and connect with each other to construct and shape new meanings that would likely be more detailed and complex compared to each individual alone. Thus, using a focus group allowed me to supply the topic and initiate the conversation, yet rely on the participants to direct and construct the meaning – and it is “from the *interaction* of the group that the data emerge, hence the dynamics of the group are important” (Cohen et al., 2013, p. 532, emphasis in original). Often, as students began to discuss ideas and concepts, they would consider their own ideas and refined or even redefined their thoughts as a direct result of the group discourse and engagement (Bloomberg, 2023). This generated a richer, fuller, more detailed conversation with new perspectives, ideas, and insight into personal experiences, that might not have necessarily emerged within an individual, isolated setting.

**Instruments.** At the end of each course, Grade-9 students in the EG were organized into focus groups of approximately 8–15 students. The group was made up of the students who agreed to participate in this phase of the study. Heterogeneity within the groups helps to diversify perspectives, however ensuring that the atmosphere is comfortable for each group is paramount (Bloomberg, 2023). Students from grades 10–12 (PP9 alumni) also participated in a single focus group which was run after class completion in June. Given the time constraint (during Exam week), it was more difficult to gather these students which is why only five students were able to participate. Grade-9 focus groups took place during the Flex block before lunch (a 40-minute block typically used for classwork and catch up). Focus group sessions ran for approximately 40 minutes, and guiding questions (see Appendix P) were given by me to get discussions started. Group etiquette rules were discussed at the beginning of each focus group session such that each member knew what was expected of them. Confidentiality of participant statements was reinforced to ensure students knew that what they heard in the focus group was not to be shared outside of the group.

**Data Collection.** Bloomberg (2023) recommends starting with the RQ and then mapping it onto the focus group questions. From there, themes will emerge which can provide additional material for probes and prompts, to generate further questions within the session (Bloomberg, 2023). An audio recording of the group discussion was used and transcribed afterwards. Students were told they could share additional information (that they were not comfortable sharing in the live focus group) through an email to me or on an anonymous exit slip if they wished to.

**Data Analysis.** Analyzing the data required data reduction in the form of code application, followed by organization into categories or themes (“clusters of meanings”) (Bloomberg, 2023, p. 333). I completed this task manually, with continual self-reflection through journaling, along with member-checks and consultation with Dr. Bohac Clarke to ensure that I was considering all perspectives and staying open to all data presented (Bloomberg, 2023). Bloomberg and Volpe (2018) recommend a six-step process of analyzing qualitative data. As with the interview transcript analysis process, focus group transcripts were analyzed and coded according to Bloomberg’s process (2023). As I ventured through the analysis phases, it was important to continue to return to the original research question guiding this zone, and even ask questions such as, “What is this about? [and] What seems to be emerging?” (Bloomberg, 2023, p. 337). I also mapped out the student voices, by displaying a picture of where each student sat (including myself) and a line from each student to the next as the conversation flowed (generated from transcripts). These conversation depiction maps can be found in Chapter 4.



## UR Quadrant Methods and Data

### Zone 5 – Changes in Attitude/Behaviours

**Table 17**

#### *Data Collection and Analysis Map*

<b>Upper Left (UL)</b> (Individual subjective perspective)	<b>Upper Right (UR)</b> (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24)	<b>Data Collection:</b> SOS surveys given to CG (N=41) and EG (N=39) through Qualtrics (2 times) MAAS-A survey for mindfulness measure (Brown et al., 2011) (EG (N=46) and CG (N=46), 2 times)
<b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	<b>Data Analysis:</b> RM-ANOVAs to compare factors between EG and CG and across 2 time periods (pre- and post-course)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	
<b>Methods:</b> psychosocial inventories	
<b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time)	
<b>Data Analysis:</b> Quantitative RM-ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?	
<b>Methods:</b> student focus groups and exit questions	
<b>Data Collection:</b> Student focus groups (6–10 per group) (N=34) (45–60 min) conducted at school, audio recorded; individual exit questions for added info	
<b>Data Analysis:</b> Transcripts (manual or NVivo) coded, followed by thematic analysis (Bloomberg) Exit questions examined for added meanings, transferred into additional themes	

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

RQ4: *How do student attitudes and behaviours about their own stress and self-efficacy change after learning SEL/mindfulness with biofeedback?*

**Methods.** Zone 5 deals with information obtained from interior of the individual using an “objective” method of access (Wilber, 2007). In this sense, it is an empirical look at a phenomenon, that potentially can be quantified and used to compare in a variety of ways (pre-/post; or experimental/control group). This study used a Student Opinion Survey (SOS) to measure thoughts, beliefs, feelings, and references to behaviours pre- and post-course with the EG and compared to the CG. A quasi-experimental (given that students self-selected into their courses, thus class cohorts were pre-determined) nonequivalent pre-test and post-test with control group design was used in this study.

Grade-9 students who had consent/assent forms signed (N = 95) were asked to take the SOS using the Internet-based Qualtrics platform. Due to missing data and incomplete surveys, the two study groups were comprised of the EG (N = 39) and the CG (N = 42). I had my RA administer the surveys and students were provided access to the survey via a link that was emailed to them. They completed the survey during class time (with permission from their teacher) and were provided any support during the survey-taking process, and afterwards if needed (as described in the CFREB recommendation).

**Instruments.** This SOS was developed previously as a test-anxiety measure used to assess students who had completed a specially designed psychology course (with a focus on test anxiety and study skills strategies) before and after the course and compared to a control group (McLeod & Boyes, 2021). A total of 35 students completed the pre-/post-surveys, with results indicating significant increases in student self-efficacy, positive affect, and academic achievement, with a significant decrease in worry about future social stress (McLeod & Boyes, 2021). This SOS was then revised and repurposed for this study, such that the test-anxiety items were removed and replaced with items regarding emotion regulation and stress management. The SOS used in this study can be found in Appendix Q. Given that this SOS has been modified, it was then piloted again by a class of Grade-9 students from the 2022/23 school year, along with other students and colleagues.

**Data Collection.** The SOS was administered at the beginning of each PP9 course (or

Leadership/Foods/OE course for the CG), however, data was not analyzed until after the course was complete and marks were submitted. The data remains in the Qualtrics site under the SOS survey tab. The information is currently secured with an encrypted computer, and password-protected Qualtrics site. Near the end of the course, the Time 2 survey (same survey) was administered to both groups (EG and CG) of students. Again, the data was not collected until both courses were complete, and marks were submitted.

**Data Analysis.** Data was accessed afterwards and analyzed using a Repeated Measures Analysis of Variance (RM-ANOVA) to determine emergent factors and possible interaction effects. The SPSS program was utilized to generate inferential statistical data. A homogeneity (equality) of variances test (the Levene Test) was applied to ensure comparability between the EG and CG (Cohen et al., 2018).

#### ***Zone 5 – Changes in Mindfulness Awareness State***

**Methods.** A mindful attention survey was also given to students in both the EG and CG over two time periods. The survey used was the Mindful Attention Awareness Scale modified for Adolescents (MAAS-A) and was delivered on paper (Appendix O, developed by Brown et al., 2011). This was the only paper survey (the SOS and Perspectives were digital through Qualtrics), which may explain the slightly higher engagement (N=46 for both groups). It was also a much shorter survey to complete.

**Instruments.** The MAAS-A survey was developed in part to operationalize the concept of mindfulness and was designed using an indirect assessment approach, meaning the emphasis is on phrasing items as they relate to an absence of mindfulness (Brown et al., 2011). The effect of this approach means that the “scale appears to be sensitive to mindfulness training, with significantly higher scores in those trained in mindfulness than in age- and gender-matched controls” (Brown & Ryan, 2003; as cited in Brown et al., 2011, p. 1024). This means that this measure should indicate changes if the EG students take the survey before learning mindfulness practice (in the course), and then afterwards, given its inherent sensitivity to mindfulness training. Higher MAAS-A scores are correlated with better

attention regulation, more adaptive behaviour regulation, better judgement and decision-making, and lower susceptibility to social stress (Brown et al., 2011, p. 1024). The MAAS-A has been shown to be appropriate for an adolescent cognitive level and reading ability (Brown et al., 2011). A study with 602 adolescents (age range of 14–18 years), found that the internal consistency measured using Cronbach's alpha was 0.86, which means the items are measuring what they intend to, which is mindfulness attention (Brown et al., 2011). A factor analysis conducted by Mohsenabadi, Shabani, and Zanjani (2019) showed that “items 2, 4, 5, 6, 7, 8, 10, 13, and 14 could be loaded on the first factor (eigenvalue = 3.15). Items 1, 3, 9, 11, and 12 were placed on the second factor (eigenvalue = 2.38)” (p. 3). Based on the content of the items and the definition of mindfulness concept, it can be said that the first factor measures the “acting with attention and mindfulness” and the second factor measures the “attention to the present moment” (p. 3). These two factors were analyzed separately, and repeated measures ANOVAs were conducted to test for interaction effects. The authors state, “since defective attention is the main sign of anxiety, strategies such as mindfulness can be effective in improving the attention of the students and alleviating anxiety” (Mohsenabadi et al., 2019, p. 4).

**Data Collection.** Grade-9 students (EG and CG) were given this survey at the beginning and then end of the course, with mean scores allowing comparison between the time periods, and groups.

**Data Analysis.** Mindfulness scores for the two separate factors were used for within-group and between-group analyses. This survey provides information about any change in thinking (attention and focus), attitudes (present-minded as compared with future worry or past rumination), and behaviours (slowed movement, careful actions) from the beginning of the course to the end and in comparison, to a control group. Repeated measures ANOVAs were conducted to determine interaction effects within groups and between groups over two time periods for each factor. A significant interaction effect would indicate that students in the EG had experienced a shift in their mindful attention and awareness, compared to the CG.

## Zone 6 – Physiological Measures

**Table 18**

### *Data Collection and Analysis Map*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24)	<b>Data Collection:</b> SOS surveys given to CG (N=41) and EG (N=39) through Qualtrics (2 times) MAAS-A survey for mindfulness measure (Brown et al., 2011) (EG (N=46) and CG (N=46), 2 times)
<b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	<b>Data Analysis:</b> RM-ANOVAs to compare factors between EG and CG and across 2 time periods (pre- and post-course)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?
<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app
<b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time)	<b>Data Collection:</b> Individual student daily recordings of Average Coherence (EG) (N=46)
<b>Data Analysis:</b> Quantitative RM-ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	<b>Data Analysis:</b> t-Test to determine significant changes in Average Coherence score from Baseline to Time 2 (EG) (N=46)
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?	
<b>Methods:</b> student focus groups and exit questions	
<b>Data Collection:</b> Student focus groups (6–10 per group) (N=34) (45–60 min) conducted at school, audio recorded; individual exit questions for added info	
<b>Data Analysis:</b> Transcripts (manual or NVivo) coded, followed by thematic analysis (Bloomberg) Exit questions examined for added meanings, transferred into additional themes	

Adapted from: Bohac Clarke (2019); Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

RQ5: *What changes are observed in the student's physiology after this program?*

**Methods.** Zone 6 brings about the individual objective experience from an exterior perspective.

The integration of the HeartMath sensor and Inner Balance app allows the user to visualize physiological metrics in real time. These devices measure HRV by “analyz[ing] the signal by means of

time domain or frequency domain (spectral) analysis, both of which quantify the amount of variability in heart rate that exists in a given recording (McCraty & Tomasino, 2004, p. 2). This is converted to a heart rhythm pattern analysis, which is then used to construct the measure of *coherence*, which essentially is a measure of the “physiological correlates of different mental and emotional states...and that positive and negative emotions can be readily distinguished by changes in heart rhythm patterns which are independent of heart rate” (McCraty & Tomasino, 2004, p. 2). Operationalized, emotions characterized by anger, frustration, and anxiety translate into the “red zone” on the Inner Balance app, whereas emotions associated with calm, peace, appreciation, and care result in a move to the “green zone.” The “blue zone” indicates some thought-wandering or worry, but at lower levels than what might trigger a red zone response (HeartMath Institute, 2018). Appendix T provides a visual of the screen the students have access to, with the various psychometrics available to them.

**Instruments.** At the beginning of the PP9 course, students downloaded a version of the Inner Balance app onto their personal device. Students who did not have a phone or tablet were provided with one, with a Bluetooth sensor paired to it. Students were taught (over the course of several classes) the relevant features of the app and sensor, and how to collect personal data. Students hand-recorded their data after each 5-minute session at the beginning of each class. Appendix R is the data table that students used to collect their data. Appendix MM is a completed data sheet. Only students who had consented/assented to this study handed in their personal data at the end of the course, which was photocopied and then the original handed back.

The sensor worked by attaching gently to the participant’s earlobe and then to their phone (either via a lightning port or through Bluetooth). Once connected, I would guide the students using some lead-in narration of mindfulness, heart-focused breathing, quick coherence, Heart Lock-in, and other techniques (see Appendix S for mindfulness script). After five minutes had elapsed, students were asked to record their data from their phone onto the data collection sheet. I completed this same task alongside

the students, to collect and analyze at the end of the course as part of my own personal reflections. I was curious as to whether I would see a change in my own average coherence scores (a measure of HRV) over the course of the three classes.

**Data Collection.** The *Coherence Over Time* (graph) metric was not formally collected, however, students were able to visualize their full session to see the proportions of green, blue, and red in a graph format. This view gave them an overall image of how coherent they were during the session. Appendix T shows the types of HRV Metrics Collected from the HeartMath Sensor and Inner Balance App.

Students also had the opportunity at the end of the course to look over all their data and personally reflect on their progression from start to finish. I provided them with some sentence starters for their journals to help guide their reflections on their personal practice, and how they felt they progressed throughout the course. This helped to merge their Zone 6 experience (exterior measurement from an objective perspective) with their Zone 5 (interior measurement of their individual attitude and behavioural changes). Bringing these two perspectives together helped students understand their own inner physiology and ability to regulate emotions.

**Data Analysis.** Average Coherence scores were collected for each student and grouped into three time periods (baseline (first 3 measurements), Time 1 (first half of course) and Time 2 (second half of course)). The average coherence score takes into account the percentages of each zone (green-blue-red) and takes an average of the HRV for that session. It is an accurate description of how regulated the student is for that 5-minute session. Higher levels will increase the sensitivity of the monitor, however, will also increase the coherence score with increased deep breathing and smooth sine waves.

Achievement scores were not included as they simply use coherence scores and then add the length of the session. Given that we used a five-minute session each time, this measure would be redundant. It might have been useful to have students decide how long to do their breathing session (for example, some students may have wanted to go longer than the allotted five-minute session practiced as

a group). Descriptive data (including tables and graphs) as well as inferential statistics utilized paired t-tests to find statistically significant changes to average coherence scores, indicating a possible benefit to the continued mindfulness with biofeedback practice throughout the course.

## LR Quadrant Methods and Data

### Zone 8 – Systems Analysis

**Table 19**

*Data Collection and Analysis Map*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Data Collection:</b> Student audio-recorded interview (EG) (15–30min) (N=44) (AG) (30–45min) (N=24)	<b>Data Collection:</b> SOS surveys given to CG (N=41) and EG (N=39) through Qualtrics (2 times) MAAS-A survey for mindfulness measure (Brown et al., 2011) (EG (N=46) and CG (N=46), 2 times)
<b>Data Analysis:</b> Epoché (Moustakas) to Transcript coding (manual or NVivo) followed by thematic analysis (Bloomberg)	<b>Data Analysis:</b> RM-ANOVAs to compare factors between EG and CG and across 2 time periods (pre- and post-course)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?
<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app
<b>Data Collection:</b> Perspectives Survey (Qualtrics) (EG, AG, 1 time)	<b>Data Collection:</b> Individual student daily recordings of Average Coherence (EG) (N=46)
<b>Data Analysis:</b> Quantitative RM-ANOVAs for Likert Scale factors (EG (N=43) vs AG (N=22)) Qualitative thematic analysis of sentence completion	<b>Data Analysis:</b> t-Test to determine significant changes in Average Coherence score from Baseline to Time 2 (EG) (N=46)
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school?	<b>Zone 8 RQ:</b> How is this type of program affected and/or supported by school, division, and provincial systems and policies?
<b>Methods:</b> student focus groups and exit questions	<b>Methods:</b> text and document/policy analysis
<b>Data Collection:</b> Student focus groups (6–10 per group) (N=34) (45–60 min) conducted at school, audio recorded; individual exit questions for added info	<b>Data Collection:</b> Access to AB Education Act, AB Ministerial Order, TQS, AB Program of Studies, Divisional and School 4YPs, CASEL curricular documents, HeartMath SBWH modules, others
<b>Data Analysis:</b> Transcripts (manual or NVivo) coded, followed by thematic analysis (Bloomberg) Exit questions examined for added meanings, transferred into additional themes	<b>Data Analysis:</b> Summary and critiques of relevant documents, interpretation and analysis of themes, policies, pedagogies, practices, systemic barriers – check for authenticity, credibility, representativeness, and meaning (Cohen et al., 2018)

Adapted from: Bohac Clarke (2019); Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)



RQ6: *How is this type of program affected and/or supported by school, division, and provincial systems?*

**Methods.** To begin with, an examination of documents is best viewed with consideration of Foucault’s work in mind – that “documents are a medium through which power is expressed” (Foucault, 1970; as cited in Cohen et al., 2018, p. 324). Thus, the makers of these documents examined (those pertaining to education systems, policies, pedagogy, and practices) did so within a neoliberal, positivistic political system. This notion provides context when examining what is in these documents, why they were produced, and who they pertain to. My focus was to look at how each document (representing an educational system) affected the SEL program that I am teaching my students, and in turn, each student’s experience. Do they support these types of programs, or continually erect barriers, making it difficult to introduce them into school systems?

**Instruments.** The documents examined included an analysis from the Alberta government (Education Act, Ministerial Order, etc.), and the division and school policies and practices. While these documents are real and authentic, to protect the privacy of the division and school studied, I have chosen to use pseudonyms for each (Valley School Division and Northside High School). Appendix U provides a comprehensive look at the documents that were reviewed.

**Data Collection.** Information collected from the review of these documents was used to uncover policies and practices that influenced (and continue to influence) the positioning of the PP9 program within the school, division, and province, providing “context within which the participant operates” (Bowen, 2009, p. 29). Documents from provincial, divisional, and school websites with ties to SEL programming were collected and analyzed. Each document examined was assessed for measures of validity and reliability using *authenticity*, *credibility*, *representativeness*, and *meaning* (Cohen et al., 2018).

**Data Analysis.** After an initial superficial reading to look for relevance and connection to the

research question, a more thorough and deeper engagement with the content was used to find emerging themes, which were then be organized into categories (Bowen, 2009). It was important to remember that documents be analyzed with a critical eye, as well as considered for its original purpose, target audience, and effectiveness (Bowen, 2009). It was also necessary to consider the absence of documents, possibly meaning policies that have not been heard or addressed. For example, the lack of documents on SEL programming, where other types of curricular areas have more coverage was used in the analysis process. As *policy* is a set of goal-directed proposals, typically developed by a governing body who has the political power to access available resources and put policy into practice (Tight, 2019). Essentially, I examined these documents to look for evidence of already-positioned SEL and/or mindfulness curricular components, future directions in programming (using the educational four-year plans and curriculum drafts), and commitment to addressing student social and emotional health. This deductive approach was combined with an inductive approach involving the development of themes that emerge through the thematic analysis process, as described by Braun and Clarke (2012). Their six-phase approach involved a deep dive into each document, examining what each described as well as what was seemingly absent. From there, I categorized documents according to intent, goals, and target audience. Each category was then analyzed, and themes were developed to encapsulate some of the more salient messages and meanings across the documents. These themes, generated from the documents, help to inform what the major focal points are and how they compare across policies.

## **Conclusion**

In summary, this study sought out to address the increasing trend in adolescent stress, worry, and anxiety, particularly in school and social situations (as they pertain to a school in rural Alberta, Canada). Currently, research in adolescent mental health is indicating increased disconnection, increased expectations, perceived uncertainty in the world, with school and social media becoming significant sources of stress for adolescents (Alvord & Halfond, 2019). In particular, the transition from middle

school to high school has “many researchers regarding the change as one of the most stressful experiences young adolescents will experience,” with fear of bullying, added workload, peer and teacher relationships, and navigating a larger school with multiple teachers (Evans, Borriello & Field, 2018), such is the case for the Grade 9s in my school presently. This study investigated the effects of a locally developed program focusing on SEL and mindfulness with biofeedback on the emotion regulation in Grade-9 students. An IMP research framework provided multiple perspectives with a strong focus on the individual student and their experience. Each participant’s subjective experience was analyzed through semi-structured interviews; student surveys to investigate mindfulness awareness, developmental perspective, and attitudes/behaviours regarding stress and emotion regulation; and HRV physiological data obtained from the sensors and app that the students practiced with daily. Additionally, students came together in focus groups to extend their thoughts, beliefs, and attitudes through discourse, bringing forth new meanings and understandings of their collective experience. Finally, policies, practices, and pedagogy affecting this type of programming were thoroughly investigated to find common themes, past procedures, future directions, and indications of motivation and investment in SEL programming.

## Chapter 4: Findings

### Introduction

This study took place over the 2023–2024 school year at Northside High School in a mid-sized rural town outside Calgary, Alberta. I was fortunate to have been given three separate Grade-9 Positive Psychology (PP9) classes over the course of the year (one in each of the first three quarters). From a total of 72 students (Quarter 1 N = 23; Quarter 2 N = 31; Quarter 3 N = 18), 46 students provided written consent and assent to be participants in the study and became the Experimental Group (EG). A total of 49 students from various other courses (Leadership, Outdoor Ed, Foods, ELA) provided signed consent and assent forms and made up the Control Group (CG), which was used for comparison to the EG for the Developmental Perspectives Survey (DPS), Student Opinion Survey (SOS), and Mindful Awareness and Attention Scale. Additionally, 25 students from a total of 160 students who had previously taken the PP9 course made up the Alumni Group (AG), who also completed the SOS and DPS (N = 25), as well as participated in individual interviews (N = 24) and a few (N = 5) in one focus group.

Students (EG and CG) completed Time 1 and Time 2 surveys while in class. A research assistant (RA) handled consent and assent forms and conducted all surveys. Data was not analyzed until after each class cohort had completed the course and marks were submitted (as per CFREB guidelines). At the end of each quarter, I was able to then access the consent/assent forms and then invite those students who had agreed to participate in the study to sign up for an interview with me, and a focus group for their cohort. Forty-four (out of the original 46) completed a semi-structured interview with me, and this data was analyzed in Zone 1 of the UL quadrant, as it provided the individual subjective perspective from the *inside* (student's thoughts and beliefs). Thirty-four of these students signed up to be a part of one of three focus groups, providing data for Zone 4 of the LL quadrant, as it allowed for an intersubjective collective perspective from the outside. The EG and CG completed the DPS, SOS, and

MAAS-A over two time periods, while the AG completed the DPS and SOS (one time only). The DPS data provided information about developmental levels and worldviews, which was used in Zone 2 of the UL quadrant, providing the individual subjective perspective from the *outside* (structuralist data). The data from the SOS and MAAS-A surveys were used to compare any changes in attitude or behaviour in students between the groups and also over the two time periods. This data was used in Zone 5 of the UR quadrant as it was an individual objective perspective from the *inside* (students' own beliefs and attitudes). The EG wrote down their HeartMath HRV (coherence) scores which were collected at the end of the course and used to compare baseline data with Time 2 data to observe any changes in coherence. This data was used in Zone 6 of the UR quadrant, as it was an individual objective perspective from the *outside* (measurement of student behavioural changes (HRV) over time). Finally, a comprehensive document analysis from school, division, province, and other educational platforms provided an inter-objective collective *outside* perspective, or Zone 8 of the LR quadrant. Figure 3 (Chapter 3) provides an overview of the data collection process. Figure 4 shows a timeline for recruitment, survey conduction, interview, and focus groups for each participant cohort.

**Figure 4**

*Timeline of Data Collection*

	SEMESTER 1				SEMESTER 2			
	TERM 1		TERM 2		TERM 3		TERM 4	
	SEPT-OCT	OCT-NOV	NOV-DEC	DEC-JAN	JAN-FEB	FEB-APR	APR-MAY	MAY-JUNE
<b>PP9</b>	1. Recruitment Consent Assent  2. T1 Surveys	3. T2 surveys  4. Interviews Focus Groups	1. Recruitment Consent Assent  2. T1 Surveys	3. T2 surveys  4. Interviews Focus Groups	1. Recruitment Consent Assent  2. T1 Surveys	3. T2 surveys  4. Interviews Focus Groups		
<b>10-12</b>							1. Recruitment Consent Assent	2. Interviews Focus Groups

Note: Recruitment of students, survey conduction, consent/assent form distribution, collection, and storage were managed by a research assistant (RA) as per CFREB ethics guidelines

Next is an overview of data collection and analysis for each of the six zones. This chapter will address each zone separately, as each has been developed from a different ontological perspective and epistemology. Thus, emerging themes have been pulled directly from the data collected and analyzed in each respective Zone. Findings for the UR quadrant (Zone 5) have been summarized and illustrated in Table 20. I will begin with the UR quadrant (Zones 5 and 6) as represents the way each student has changed as a direct result of their experience in the course (attitude/behaviour). Following these objective measurements of student change, I will move to the UL quadrant (Zones 1 and 2), to elicit the student's own perspectives (from themselves directly (inside) and their observed perspectives (outside). Next, the LL quadrant (Zone 4) will provide collective meanings from the students. This section will then conclude with the UR quadrant (Zone 8), an overview of the policies and practices that inform and influence this type of program.

**Table 20**

*Findings Map – UR Zone 5*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
	<p><b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?</p> <p><b>Methods:</b> pre/post surveys (SOS and MAAS-A)</p> <p><b>Themes:</b>  <b>Social Awareness:</b> EG slight increase in SA  <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect)  <b>Anxiety Symptoms:</b> EG slight decrease in anxiety  <b>Cognitive Interference:</b> EG slight decrease in CI  <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG)  <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)</p>
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

## UR Quadrant: Zone 5 – Individual Objective Inside Perspective

### *Student Opinion Survey – EG versus CG*

From the original 46 students who agreed to be participants in this study, 39 completed the Student Opinion Survey (SOS) at both time measures, becoming the EG. Students who did not take the PP9 course (were in other courses) and completed both time measures made up the CG (N = 41). Survey scores were compared at Time 1 (the first week of the course) and Time 2 (one week before the end of the course) to look for significant changes between groups and within groups over time.

In order to see how many areas this measure is assessing, items on this measure were submitted to a Principal Components factor analysis. If more than a single factor reflected an eigenvalue above one, the results were run through a Varimax rotation as it was expected that the resulting factors would be correlated. All items loaded on a single factor were summed (and reverse scored items were adjusted) to produce a single scale or variable for subsequent analyses. The factor analysis determined that there were 8 factors (or scales) generated from a total of 29 items. The original items were clustered into five categories (Social-Awareness (2 factors), Sources of Anxiety (1 factor), Anxiety Symptoms (1 factor), Cognitive Interference (1 factor), and Self-Awareness/Management (3 factors)). This analysis was comprised of EG (N = 39) and CG (N = 41) for all measures. Missing data (students who did not complete both of the time measures) were eliminated from the data set. (A full data set from the SPSS analysis can be made available upon request). Table 21 represents all data collected from the SOS for the EG and CG for Time 1 and Time 2. Included in the table are P values and effect-size calculations. Given that ANOVAs were used to calculate descriptive and inferential statistics for both the SOS and DPS data, effect size used  $\eta^2$  (Eta squared), rather than Cohen's d. According to Cohen's (1988) guidelines, a small effect size is 0.01, medium is 0.059, and large is 0.138. Thus, for this study, the effect sizes were mostly medium, indicating that the dependent variable (various measures) is the result of the independent variable (group X time) (Eddy, 2010).

**Table 21**  
*SOS Repeated Measures ANOVAs for EG and CG for Time 1 and Time 2*

Theme	Factor	Experimental Group ( <i>N</i> = 39)		Control Group ( <i>N</i> = 41)		<i>F</i>	<i>p</i>	$\eta^2$
		Time 1 M ( <i>SD</i> )	Time 2 M ( <i>SD</i> )	Time 1 M ( <i>SD</i> )	Time 2 M ( <i>SD</i> )			
Social Awareness	Social Awareness	5.90 (1.33)	6.13 (1.40)	5.85 (1.37)	5.85 (1.37)	.678	.412	-
	Int. Locus of Control	7.49 (2.15)	7.36 (1.84)	7.49 (1.85)	7.39 (1.97)	.008	.93	-
Anxiety Sources	Anxiety Sources	13.56 (3.68)	12.62 (3.04)	11.61 (3.83)	11.78 (3.85)	4.232	.043*	0.05
Anxiety Symptoms	Anxiety Symptoms	20.67 (5.79)	19.33 (5.23)	17.24 (5.52)	17.59 (5.32)	2.967	.089	0.04
Cognitive Interference	Cognitive Interference	11.18 (3.15)	10.79 (2.77)	9.93 (2.39)	9.66 (3.17)	0.040	.841	-
Self-awareness	Positive Affect	9.62 (2.40)	10.28 (2.56)	10.83 (2.53)	10.66 (2.27)	3.174	.079	0.04
	Negative Affect	6.67 (2.23)	6.69 (2.17)	6.02 (2.02)	6.15 (2.23)	.079	.780	-
	Coping Self-efficacy	6.03 (1.58)	6.44 (2.05)	6.61 (1.64)	6.27 (1.76)	3.231	.076	0.04

\*indicates significance ( $p < .05$ )

**Theme 1: Social Awareness.** This measure looked at students' perception or understanding of others' beliefs and emotions regarding their performance, with items loading onto two factors. Factor 1 described the level of awareness of others' perceptions and Factor 2 looked at the amount of internal control a student might possess, particularly around others.

Factor 1 (Social Awareness) loaded on Items 2 "I listen politely to other people's opinions, even when I don't agree with them," and 3 "I can tell by looking at someone and talking to them how they are feeling." A simple main effects analysis looking at only the EG indicates a slight increase in social awareness from Time 1 Time 2, however not quite significant ( $p = .230$ ). Comparatively, the CG showed essentially no difference between the two time periods. Learning how to read others' emotions and feelings was a topic of study in the PP9 course. Several students indicated (through their interviews)



that they felt their ability to read and understand others' emotions did increase after the course. As Naomi stated, "I mean I could read some emotions – but I feel like sometimes I can't so when we got to learn about it I was like – oh, yeah, this is what this looks like more!"

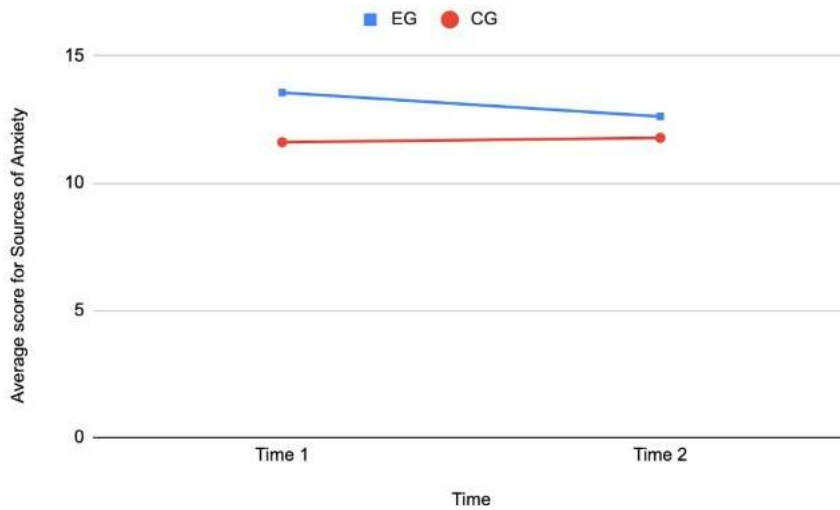
Factor 2 (Internal Locus of Control) loaded on Items 1 "I feel that people (family, friends) are counting on me to do well in school," 4 "I tend to do what my friends are doing, even if I don't agree with it," and 5 "I feel that students in my class are constantly judging my thoughts and behaviours." Internal locus of control means that the individual believes that effects and outcomes are based on their own behaviours and not due to external factors (such as chance, environment, or other people). Higher scores on these items indicate a tendency towards a lower internal locus of control (higher external locus of control, as the statements describe reliance on others for individual decisions and actions). In other words, higher scores imply less agency towards personal attitudes and behaviours and more reliance on peer attitudes and beliefs. The EG and CG were virtually identical to each other, and across time, with a very slight (but not significant) decrease for both groups. Interestingly, this result was the closest and least significant of all of the measures. This measure is likely more affected by their age and developmental level and is impacted by factors such as early stressors, relationships, school success (or failure), mental/emotional/physical health, and others. A study by Flores and colleagues (2020) found that when adolescents perceive they have little internal locus of control, they have less ability to self-regulate and control their thoughts, emotions, and behaviours. Thus, there is a negative correlation between internal locus of control and internalizing problems such as anxiety and depression (Flores et al., 2020).

**Theme 2: Anxiety Sources.** This factor looked at the types of situations and places where students experience stress and anxiety. A decrease in scores on this measure would indicate that the students have learned some strategies to manage themselves in stressful places and situations. They may have developed an increase in confidence to handle these previously fearful situations. All items in this

category loaded on a single factor, which could be described as sources of anxiety. Items include “Giving presentations in front of the class terrifies me,” “I am preoccupied with the past and this terrifies me,” “I worry about who I will work with on a group project and this causes me stress,” “I tend to procrastinate which results in me feeling even more stressed out,” and “Worrying about how well I will do interferes with my preparation and performance on exams.”) This factor resulted in a significant interaction effect  $F(1, 78) = 4.232, p = .043$  and medium effect size ( $\eta^2 = .05$ ), with the EG reporting a 6.93% decrease in their sources of anxiety from T1 to T2 and the CG reporting a very slight increase (+1.5%). This slight increase is likely due to the higher stress end-of-term higher stakes assessments that students would typically face. The EG reported significantly higher sources of anxiety at Time 1 as compared with the CG ( $p = .023$ ), however EG scores decreased at Time 2 while the CG remained at similar levels. It appears that the EG did change their beliefs in what they considered to be highly stressful or anxious environments and experiences. Strategies in the course involved practicing presentations in front of the class in a relatively safe and supportive space. When the students were in the audience, they were encouraged to engage with the presenters through positive questioning and feedback. Many students commented in their interviews that they did not feel as stressed presenting their project in this course, which helped them develop the confidence they needed for other higher stakes situations. Thus, their experience in PP9 meant that they were able to perceive these situations as less threatening and would likely be more willing and able to engage with more confidence. Figure 5 illustrates the decreases in anxiety sources for the EG and CG.

**Figure 5:**

*Repeated Measures ANOVA of EG and CG for Sources of Anxiety*

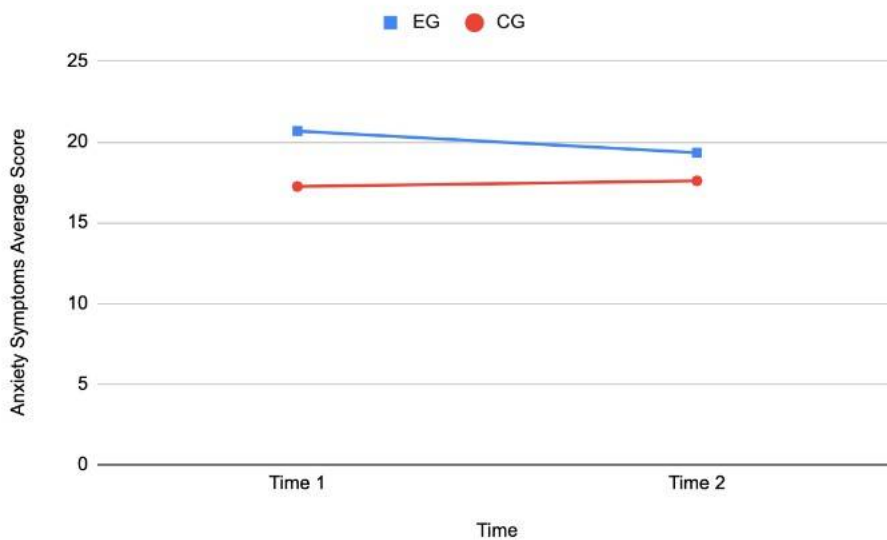


**Theme 3: Anxiety Symptoms.** This measure involved statements about physical symptoms and experiences with anxiety, worry, and stress. Decreased scores indicate a reduction in physical experiences of stress, possibly due to an improvement in stress management. All eight items loaded onto a single factor. Examples from the survey include Item 1 “I feel physically panicky when I have to take a really important exam or give a presentation in class,” Item 2 “My muscles tense up in certain areas of my body during tests or presentations,” Item 3 “My stomach becomes upset before important tests or exams,” Item 5 “Having to take an important test disturbs my sleep so I don’t feel rested before a test,” and Item 8 “I feel dizzy, sick, and shaky when I get stressed or worried.” Item 6 “I feel relaxed and ready for important tests or exams” was reverse-scored. Results showed a slight (but only marginally significant) interaction effect ( $F(1, 78) = 2.967, p = .089$ ) with a medium effect size ( $\eta^2 = .04$ ). Simple main effects do show a (marginally significant,  $p = .063$ ) decrease (–6.5%) in anxiety for the EG from Time 1 to Time 2. In comparison, the CG reported a slight increase (+2.0%) in anxiety symptoms from Time 1 to Time 2. The EG reported decreased levels of physical anxiety from Time 1 to Time 2, and while this is not significant (although very close), it does show a trend in the right direction, potentially attributed to some of the strategies learned in the course. The CG, by comparison, did not change their

thoughts about anxiety at all over the 2 time periods. A one-way ANOVA for each time period showed a significant difference at Time 1 between groups ( $p = .008$ ) but not at Time 2 ( $p = .136$ ). The EG had significantly higher anxiety symptoms at Time 1, compared to the CG but then decreased these symptoms over time. Figure 6 shows this wide margin between groups at Time 1, and then the resulting decrease in anxiety symptoms over the course of the term for the EG students.

**Figure 6**

*Repeated Measures ANOVA of EG and CG for Anxiety Symptoms*



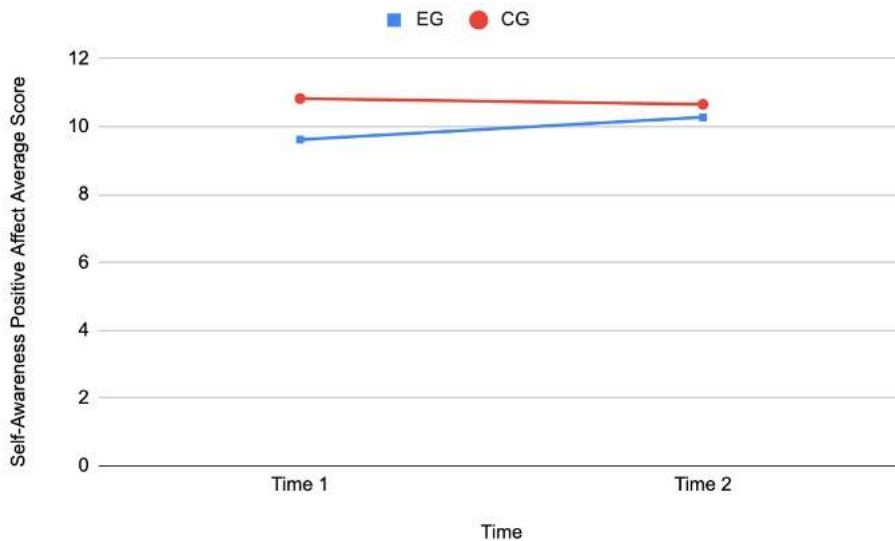
**Theme 4: Cognitive Interference.** This measure looks at the amount of cognitive impairment (disruptions in thinking and executive functioning) that is associated with stress and worry. A decrease in this measure would indicate that the student has learned and is implementing strategies to manage or even reduce the amount of disruption to their ability to think during stressful situations. All items loaded onto a single factor, with higher scores indicating high levels of impairment to thinking and reasoning. Items included, Item 1 “I mentally freeze up on important tests or exams and my mind seems to go blank,” Item 2 “After taking a test, I feel I could have done better than I actually did,” Item 3 “I am easily distracted by other students in the classroom,” and Item 4 “When I am stressed or nervous, my thoughts are racing and I have trouble focussing.” Results did not show any interaction effect, however, a simple main effect for the EG shows a slight (not significant) decrease between Time 1 and Time 2.

Again, the CG was virtually unchanged between the two time points of measurement. This slight decrease for the EG might indicate a better ability to focus and control attention, even during highly stressful situations like tests and exams. A one-way ANOVA between groups resulted in a significant difference ( $F(1, 78) = 4.288, p = .042$ ) between the EG and the CG at Time 1, indicating that the EG started with higher cognitive impairment but then decreased over time. There was no significant difference between the EG and CG at Time 2, and the CG remained virtually unchanged across the two time periods.

**Theme 5: Self-Awareness.** This measure looked at affect and coping strategies. There were items associated with positive affect (feeling happy, cheerful, calm), negative affect (sad, lonely, frustrated), and coping self-efficacy (knowing what to do to calm down and reduce stress). Factor 1 (Positive Affect) included Item 1 “In the past 2 weeks, I have felt excited, joyful, cheerful,” Item 2 “In the past 2 weeks, I have felt calm, peaceful, appreciative,” and Item 7 “When I get stressed, I know what to do to calm myself down.” An increase in this score would suggest that the student has improved their overall mood and outlook and understands how to calm down and regulate their emotions. There was a slight interaction effect (although not significant), with the EG scores increasing over time, and the CG scores decreasing marginally. A simple main effect for the EG only, showed a significant increase ( $F(1, 38) = 5.950, p = .019$ ) from Time 1 to Time 2 (+6.9%) (as compared to the CG, which decreased by 1.6%) with a medium effect size ( $\eta^2 = .04$ ). A one-way ANOVA indicated a significant difference ( $F(1, 78) = 4.836, p = .031$ ) between the EG and CG at Time 1 (with the EG reporting a significantly lower positive affect), but no significant difference at Time 2. Figure 7 illustrates the increase in positive affect (feelings of peace, calm, and joy) in EG and decrease in CG.

**Figure 7**

*Repeated Measures ANOVA of EG and CG for Self-Awareness Positive Affect*



Factor 2 (Negative Affect) included Item 3 “In the past 2 weeks, I have felt angry, frustrated, irritated” and Item 4 “In the past 2 weeks, I have felt sad, lonely, depressed.” A decrease in this measure would suggest an improved outlook and positivity. Analysis revealed almost identical scores between the EG and CG at both time measures. In other words, the extent to which students felt negatively was not different and did not change over the time period. It is interesting that students can report of feeling better overall (as in Factor 1 results), however, when they report on low mood or frustrations, they report essentially the same each time.

Factor 3 (Coping Self-Efficacy) included Item 5 “I think it’s easier to get over my negative (sad or mad) feeling by changing my thinking” and Item 6 “I think it’s easier to get over negative (sad or mad) feelings by changing my breath and heart rhythms.” An increased score would indicate the ability and awareness of being able to self-regulate and control negative emotions. Item 5 describes a top-down approach (changing thoughts to calm physical body) whereas Item 6 describes a bottom-up approach (changing the breath (physical body) to calm thoughts). This measure showed a marginally significant interaction effect ( $F(1, 78) = 3.23, p = .076$ ) and medium effect size ( $\eta^2 = .04$ ) with the EG trending

upwards (+6.8%) and the CG downwards (−5.1%). A simple main effect for the EG did not find a significant result, however the trends are important as they do show that the EG has developed some understanding about how to calm down in stressful situations or when they are feeling emotionally dysregulated.

### ***Student Opinion Survey – EG, CG, AG (Time 2)***

A one-way ANOVA was run to compare the results from each of the Grade-9 groups (EG, CG) at Time 2, and the alumni group (AG) (who only did the survey once). This analysis was done to look for significant differences between the EG and CG students' thoughts and attitudes and the AG, now one to three years older. There were significant differences in the following areas: Anxiety symptoms; Self-awareness for positive affect; Self-awareness for negative affect; and Coping self-efficacy. Table 22 shows the data collected for the EG, CG, and AG at Time 2.

**Table 22**  
*SOS One-way ANOVAs for EG, CG, and AG at Time 2*

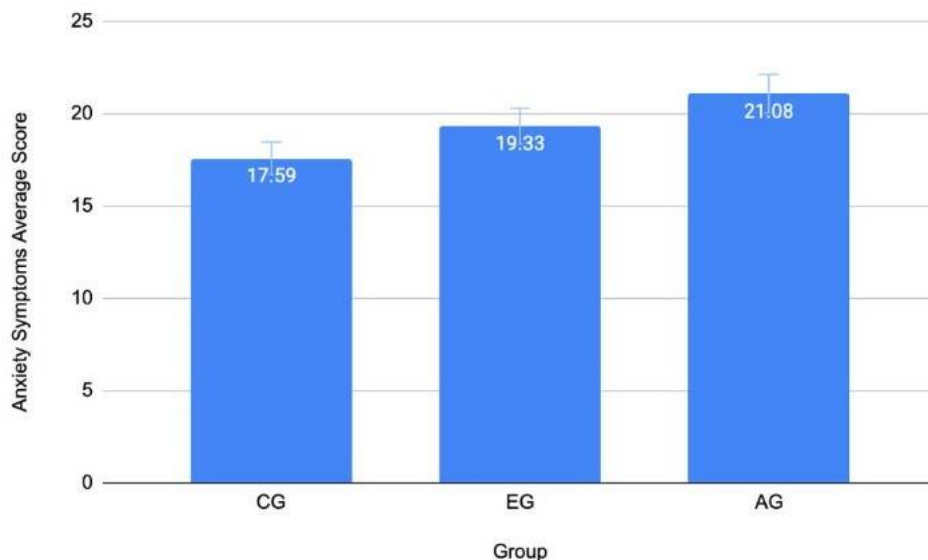
Theme	Factor	EG (N = 39)	CG (N = 41)	AG (N = 24)	F	p	$\eta^2$
		M (SD)	M (SD)	M (SD)			
Social Awareness	Social Awareness	6.13 (1.40)	5.85 (1.37)	6.72 (1.14)	3.33	.040*	.041
	Int. Locus of Control	7.36 (1.84)	7.39 (1.97)	8.24 (1.42)	2.184	.118	-
Anxiety Sources	Anxiety Sources	12.62 (3.04)	11.78 (3.85)	12.88 (3.30)	.976	.380	-
Anxiety Symptoms	Anxiety Symptoms	19.33 (5.05)	17.59 (5.32)	21.08 (5.54)	3.492	.034*	.045
Cognitive Interference	Cognitive Interference	10.79 (2.77)	9.66 (3.17)	11.20 (2.78)	2.573	.081	.029
Self-awareness	Positive Affect	10.28 (2.56)	10.66 (2.27)	11.88 (2.09)	3.684	.029*	.048
	Negative Affect	6.69 (2.17)	6.15 (2.23)	7.68 (1.60)	4.248	.017*	.058
	Coping Self-efficacy	6.44 (2.05)	6.27 (1.76)	7.64 (1.50)	4.876	.009*	.069

\*indicates significance ( $p < .05$ )

**Theme 1: Anxiety Symptoms.** Interestingly, anxiety symptoms were highest for the AG, followed by the EG, and then the CG. A post-hoc analysis using a Scheffé test indicated a significant difference between the CG and the AG ( $p = .034$ ). This is likely due to the increased stress of the Diploma exams and higher stakes testing that the older students (AG) reported during their interviews. Many students indicated elevated overall levels of stress in comparison to their Grade-9 experience. They are also likely more aware of their internal states, consequences of high stakes testing and assessments, and the looming stress of adulthood. Figure 8 illustrates the anxiety symptoms for all three groups.

**Figure 8**

*One-way ANOVA comparing the EG, CG, AG for Anxiety Symptoms at Time 2*

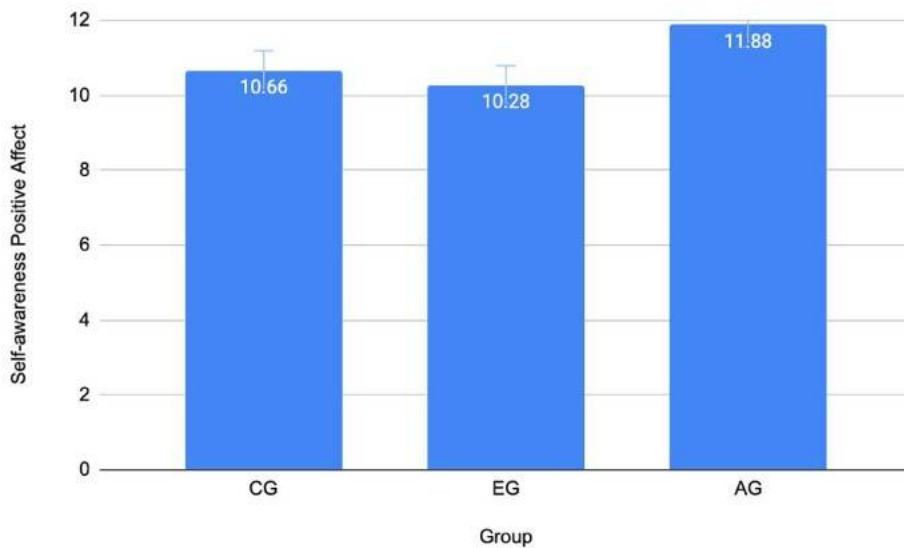


**Theme 2: Self-awareness for Positive Affect.** While the EG and CG were quite similar for their Time 2 measurement, a post-hoc Scheffé test revealed that the AG scored significantly ( $p = .029$ ) higher than the EG and not significantly ( $p = .105$ ) higher than the CG. It appears that the older students have a slightly more optimistic outlook and have some ways to manage emotions in a positive way. Figure 9 depicts positive affect for all three groups at Time 2.



**Figure 9**

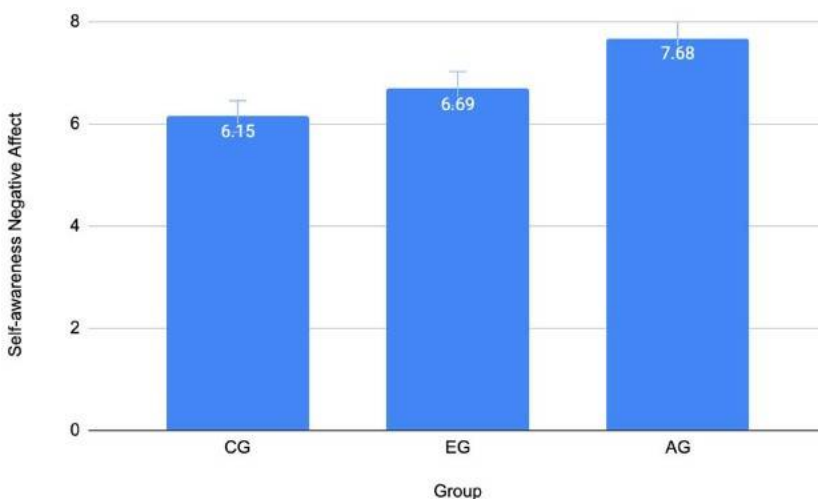
*One-way ANOVA comparing the EG, CG, AG for Self Awareness Positive Affect at Time 2*



**Theme 3: Self-awareness for Negative Affect.** Interestingly, the AG reported significantly higher scores for negative affect compared to the CG ( $p = .017$ ) and slightly higher (but not significant) scores compared to the EG ( $p = .156$ ). The AG results indicate increased feelings of sadness, frustration, loneliness, and irritation. This may also be attributed to the timing of their survey – which was during the Diploma exam period for the Grade 12s and assessment completion for the Grade-10s and Grade-11s. Figure 10 depicts negative affect for all three groups at Time 2.

**Figure 10**

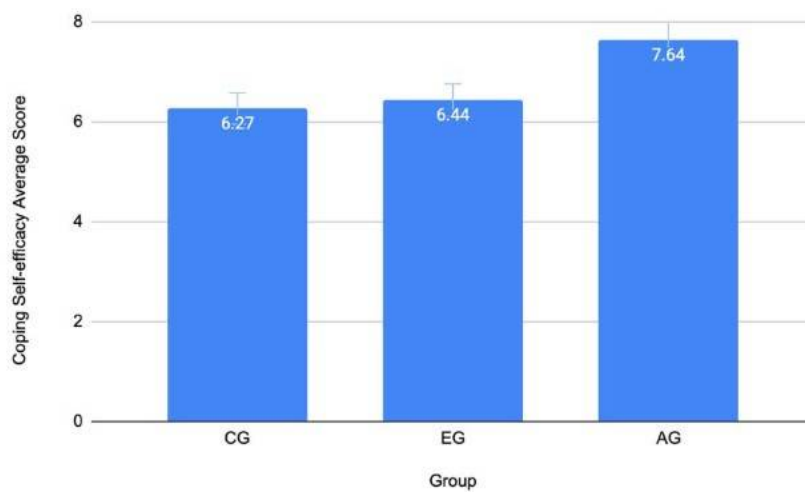
*One-way ANOVA comparing the EG, CG, AG for Self-Awareness Negative Affect at Time 2*



**Theme 4: Coping Self-Efficacy.** This measure showed a significantly higher score for the AG over both the EG ( $p = .030$ ) and the CG ( $p = .010$ ). This indicates higher confidence and belief in the ability to calm down, either by controlling racing thoughts, or calming the body and mind using a bottom-up (breathwork) strategy. The majority of the AG students commented during their interviews on their continued use of strategies for regulating emotions and calming down in stressful situations. Figure 11 depicts coping self-efficacy for all three groups at Time 2.

**Figure 11**

*One-way ANOVA comparing the EG, CG, AG for Coping Self-efficacy at Time 2*



#### ***Mindfulness Attention Awareness Survey for Adolescents (MAAS-A) (EG and CG)***

The MAAS-A survey was developed in part to operationalize the concept of mindfulness and was designed using an indirect assessment approach, meaning the emphasis is on phrasing items as they relate to an absence of mindfulness (Brown et al., 2011). A paper copy of the MAAS-A survey given to the EG (N=46) and CG (N=46) students, with higher scores indicating increased mindfulness attention and awareness (The scoring is based on a six-point Likert scale (from 1 = almost always to 6 = almost never). Higher MAAS-A scores are correlated with better attention regulation, more adaptive behaviour regulation, better judgement and decision-making, and lower susceptibility to social stress (Brown et al., 2011, p. 1024). According to Mohsenabadi and colleagues (2019), two factors are present after

conducting a factor analysis. The first factor measures the “acting with attention and mindfulness” and the second factor measures the “attention to the present moment” (p. 3). These two factors were analyzed separately, and repeated measures ANOVAs were conducted to determine interaction effects within and between groups over two time periods. A significant interaction effect would indicate that the EG students had experienced a shift in mindful attention and awareness compared to the CG across time. Table 23 shows the reported measures for the two factors identified in the MAAS-A for the EG and CG from Time 1 to Time 2.

**Table 23**  
*MAAS-A Data for the EG and CG for Time 1 and Time 2*

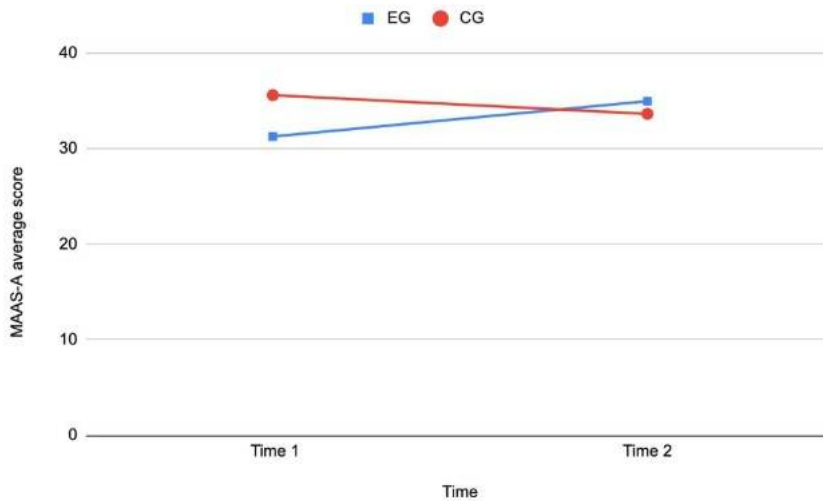
Factor	EG Time 1		EG Time 2		CG Time 1		CG Time 2		<i>F</i>	<i>p</i>	$\eta^2$
	M	(SD)	M	(SD)	M	(SD)	M	(SD)			
Acting with Attention & Mindfulness	31.26	(8.50)	34.97	(7.96)	35.54	(7.91)	33.95	(7.96)	5.773	.017*	.03
Attention to the Present Moment	15.39	(4.49)	16.96	(4.67)	18.41	(5.14)	18.46	(3.71)	1.97	.16	.01

\*indicates significance ( $p < .05$ );  $N_{EG} = 46$ ;  $N_{CG} = 46$

**Factor 1: Acting with Attention and Mindfulness.** Factor 1 included statements such as, “It seems I am ‘running on automatic’ without much awareness of what I am doing” and “I find myself doing things without paying attention” and “I tend to walk quickly to get where I am going without paying attention to what I experience along the way.” These statements indicate paying attention and being aware of what is happening around them. This measure showed a significant interaction effect ( $F(1, 92) = 5.773$ ,  $p = .017$ ) where the EG reported an increased (+11.9 %) ability to act with attention and mindfulness, whereas the CG indicated a decrease (−4.5 %) over time. There was a small/medium effect size ( $\eta^2 = .03$ ). T-tests run separately for the EG and CG showed a significant increase from Time 1 to Time 2 ( $p = .03$ ) for the EG; no significant change from Time 1 to Time 2 ( $p = .10$ ) for the CG.

**Figure 12**

*MAAS-A score on Factor 1 (Acting with Attention and Mindfulness)*



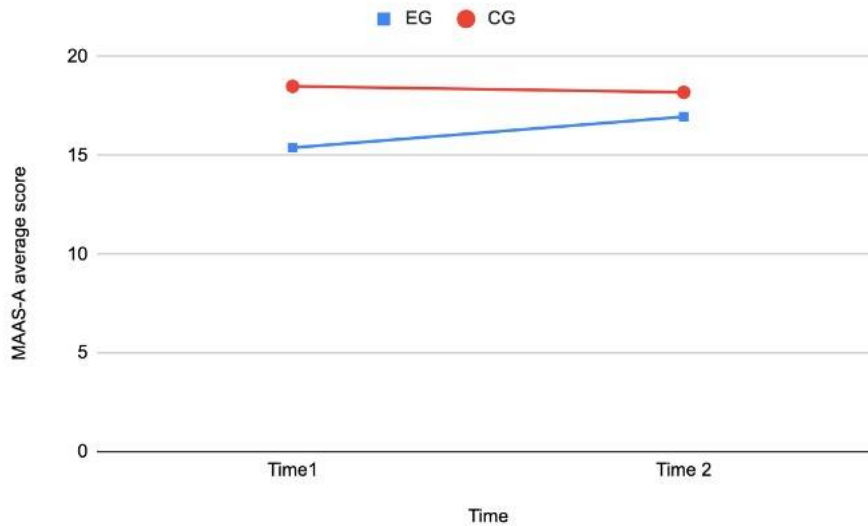
The EG showed a significant increase in their ability to act with attention and mindfulness from Time 1 to Time 2 in comparison to the CG. This interaction effect indicates that the daily mindfulness practice that the EG experienced did improve their attention and mindfulness, whereas the CG without this extra support experienced a decrease. Figure 13 shows the change in focussed attention for each group over two time periods.

**Factor 2: Attention to the Present Moment.** Factor 2 included statements such as “I find it difficult to stay focused on what is happening in the present,” “I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there,” and “I find myself preoccupied with the future or the past.” These statements involve feelings of being present-minded, as opposed to worry about future events or rumination of past ones. These traits would likely involve more time and practice to see change in thoughts and feelings, which may explain the trends in the EG (improved present-focus) and CG (slight decline in present-focus), but not statistical significance in this case. There was no significant difference between the EG and CG over the two time periods ( $p = .16$ ), however, there does appear to be a trend where the EG did improve their attention to the present moment (+10.2%) whereas the CG did not change (+.27%). T-tests run for EG and CG separately showed no significant change from Time 1 to Time 2 for EG ( $p = .37$ ) or CG ( $p = .96$ ). However, given the slight

trends (increase for EG and decrease for CG), it is likely that elements of the course (such as breathing techniques and grounding exercises) helped the EG learn to focus on the present moment whereas the CG had no direct learning and practice. Figure 13 shows the trends for paying attention to the present moment for the EG and CG over two time periods.

**Figure 13**

*MAAS-A score on Factor 2 (Attention to the present moment)*



A few limitations should be considered with respect to this measure. First, it is possible that as students learn how to pay attention to their breath and in turn, the present moment, they may start to notice more quickly when their mind wandering and getting off task. While this is generally regarded as a positive outcome, it may result in slightly lower scores on the MAAS-A as they realize they are not paying attention now that they are more attuned to what that involves. This of course, could lower the scores of the EG potentially such that their increased awareness of their ability to focus is not recognized in this survey. Also, self-report measures are subject to subjective bias, social desirability (particularly the EG, who may feel that the course “should” improve their ability to focus and be mindful), or other factors contributing to lowered validity (Goodman et al., 2017). The MAAS-A instrument is designed using an “indirect assessment approach,” meaning that it evaluates the absence (as opposed to the presence) of mindful qualities. Thus, it should show a significant increase after one has had some

mindfulness training, given that they now understand what it is like to be mindful, as in this study.

This survey has been shown to be negatively correlated with neuroticism (high negative emotionality such as worry, anxiety, moodiness) and positively correlated with agreeableness, conscientiousness, and to a lower degree, openness, on the Big Five personality measure (Goodman et al., 2017). Additionally, positive correlations have been found with positive affect, including happiness and life satisfaction; and negative correlations have been associated with negative affect including low mood and maladaptive coping strategies (Goodman et al., 2017). Thus, providing students with an introductory mindfulness practice opportunity, such as the one delivered in the PP9 program, improves their ability to focus and pay attention to the present moment, helping to improve their overall feelings of happiness and wellness.

#### **UR Quadrant: Zone 6 Individual Objective Outside Perspective**

##### ***Average Coherence Scores***

The research question in Zone 6 asks: What changes are observed in the student's physiology (heart rate variability – HRV) after this program? Students in all three cohort classes personally recorded individual HRV data after every daily session. Appendix MM is a sample data recording sheet for Jill. Only the students who signed up to participate in the study were used in the data collection and analysis processes. Baseline data (an average of the first 3 sessions) were compared against both Time 1 (average of the first half of the course (~6 weeks)) and Time 2 (average of the second half of the course (~6 weeks)). Table 24 shows a summary of the themes that emerged.

**Table 24***Findings Map – UR Zone 6*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback? <b>Methods:</b> pre/post surveys (SOS and MAAS-A) <b>Themes:</b> <b>Social Awareness:</b> EG slight increase in SA <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect) <b>Anxiety Symptoms:</b> EG slight decrease in anxiety <b>Cognitive Interference:</b> EG slight decrease in CI <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG) <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)
	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program? <b>Methods:</b> HRV measurements from sensor/app (N=47) <b>Themes:</b> <b>Significant increase in Average Coherence (AC) from Baseline to Time 2 for EG and McLeod</b>
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al. (2010); Wilber (2000a)

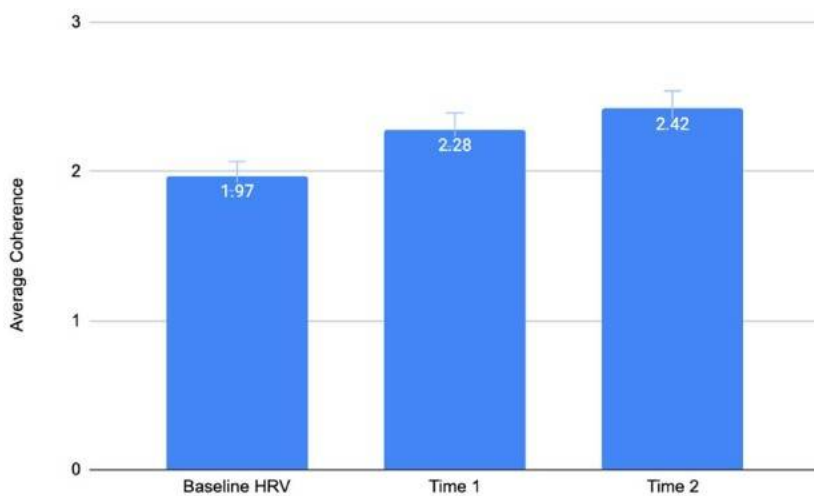
**Relationship between HRV and Coherence Scores.** Heart Rate Variability (HRV) is a measure of the timing between heart beats. High variability indicates high coherence, meaning more fluent and adaptive connection between the heart and brain. The HeartMath earlobe sensor measures the beat-to-beat rhythm, translating that information into sine waves which are displayed to the student through the Inner Balance app on their phone. Smooth, regular sine waves indicate high HRV, and thus high coherence, also visible to the student as being in the green zone. The app produces a number of different metrics – including time of session, average coherence, and achievement scores. It turns out the average coherence and achievement measure essentially the same thing (average coherence takes into account the time spent in each zone – red, blue, and green as well as factoring in the challenge level. “The scoring algorithm continuously monitors the most current 64 seconds of heart rhythm data and updates

the score every five seconds. The more stable and regular the heart rhythm frequency, the higher the coherence scores [with] scores ranging from 0 to 16” (HeartMath, 2022, p. 13).

**Average Coherence Data for EG.** Findings show a statistically significant increase in average coherence for EG students ( $N = 46$ ) from Baseline to Time 2. The average coherence score at Baseline was 1.97 and at Time 2 was 2.42. A t-test comparing the data sets indicated a p-value of 0.049. Figure 14 shows HRV coherence data for the EG over three time periods.

**Figure 14**

*Average HRV Coherence for the EG over 3 Time Periods*



\* $p = 0.049$  for Baseline compared to Time 2

\*\*Error bars set to 95% Confidence Interval.

This data reveals a relatively quick learning curve for these students – given that the Baseline to Time 2 data resulted in a 0.31 average score difference, as opposed to the very small difference (0.14) between Time 1 and Time 2. Students significantly improved their coherence score throughout the course through a repeated and sustained five-minute breathing practice every day. Additionally, many students found early success and were able to stay in the green zone 100% of the time, thus providing them with the confidence to move up to Level 2, and in a few cases, Level 3. As mentioned earlier, Level 2 is 15% more difficult than Level 1, however, each level of difficulty also increases the overall coherence score (provided the student is still able to stay within the green zone). This increase in

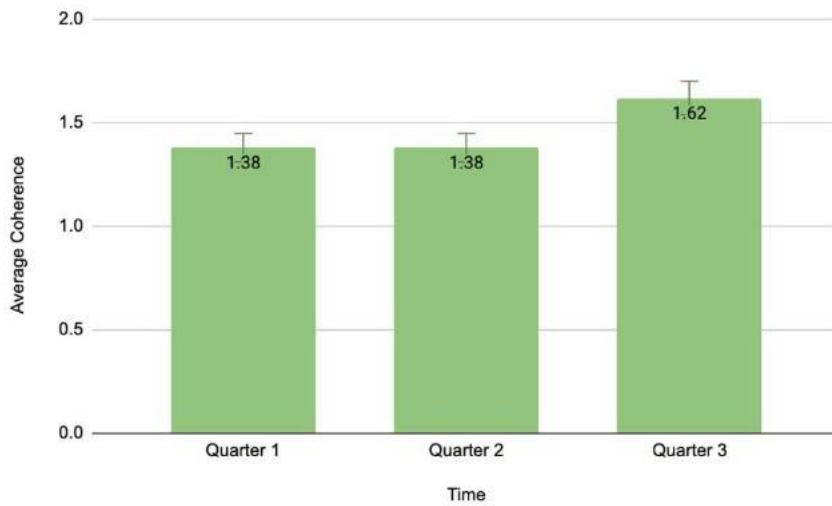


coherence score over the term (and quite quickly, as the data shows) indicates the ease of use of this biofeedback technology and evidence that the sustained practice really does work to increase students' HRV. As the students learn throughout the course, an increase in HRV translates to an increase in coherence between the breath, heart, and mind – creating a calm and integrated inner physiological state.

Many of the students told me in their interview that they found that they were quite good at it right away, taking almost no time to focus and get into the green zone. From there, while many did move up to Level 2, most seemed to maintain their scores, with a slight improvement, as indicated in the data. Additionally, the second half of each course typically meant summative exams and larger assignments for the students in their other courses – something they also discussed with me as adding to their overall stress. Given the increased stress levels as classes progressed from the first month to the second, the evidence here shows that this group of students were able to increase their coherence state significantly, demonstrating a proficiency in this practice.

The students were required to write down their scores after each session (see Appendix R). This allowed them to reflect on their session and think about what worked better for them. I asked many of them in the interview what their best focussing technique was, and most were able to pinpoint the ones that got them into the green zone the quickest and for the longest amount of time. Most mentioned matching the pace of the breathing wheel mandala as being their most successful technique.

**Teacher Average Coherence Data.** Considering I have been practicing heart-focused breathing on a (semi) regular basis since 2017, I was surprised to see this significant increase in my coherence scores. I have a few thoughts about why this might be. First of all, the fact that I practiced along with my students every day from September until the end of April, gave me a longer expanse of time to bring down my anxious thoughts and rewire my often-distracted brain to find periods of pure calm and focus. I could feel myself calm down much quicker in the third quarter as opposed to the first. Figure 15 illustrates the increase in my own average coherence scores (Level 1).

**Figure 15***McLeod Average Coherence Data Over 3 Quarters*

\*Paired t-test comparing Quarter 1 with Quarter 3 is significant ( $p = .019$ )

\*\*Error bars set to 95% Confidence Interval.

Additionally, as mentioned, the first quarter class was quite difficult – with many students who were initially not engaged, disruptive, and quite immature. I found myself coming into class stressed and anxious, and the five-minute breathing session was simply not enough to quiet my over-active nervous system. As well, I often spent much of my session with one eye open – monitoring the goings on in the classroom! This did not help my overall ability to calm down and focus inwardly. The Quarter 2 class was the largest (31 students) and therefore did require a bit more class management during the focused breathing practice. Comparatively, the quarter 3 class came in calm, quiet, excited about positive psych and had the advantage of five additional months of natural maturation under their belts! By focusing attention on the breath, my students and I were able to reach very deep levels of calm and concentration.

### **UL Quadrant: Zone 1 Individual Subjective Inside Perspective**

Of the 46 Grade-9 students who volunteered for the study (including providing consent and assent), 44 agreed to participate in a one-on-one semi-structured interview with me following the course (and after marks had been submitted, as per CFREB recommendations). Before each interview I practiced a few minutes of heart-focused breathing to try to bracket anything that was lingering in my

consciousness (for example, a previous student interview and/or my own beliefs and thoughts) to try to minimize any personal bias, as per the Epoché process described in Chapter 3. Students were interviewed in a quiet space (either a small office room or my classroom) and were audio recorded. After the interview, students were offered a gift bag filled with treats, fidget toys, Play-Doh, and a small gift card to honour their time. The recorded interview was transcribed manually (by me) using NVivo to store the written transcripts. Immediately following transcription, I emailed each participant (with the attached transcript) and gave them a two-week window to edit, add, or delete anything they wanted to their interview statements. Several students responded to the email, mainly just to thank me for the experience and gift bag, however, none wanted to edit any of their statements. At that point, I was able to carefully go through each written transcript (while listening to the audio recording for the second time) and pull statements to drop into previously determined codes (as well as emerging ones as students brought forth new and interesting ideas).

Once coded, I created a codebook to describe the essence of each code (See Appendices JJ and KK) and then went through each code with collected statements to highlight common student perspectives for each code. I colour-coded these perspectives and then organized them according to frequency to develop a Level 2 analysis (available upon request). From there, I was able to organize the students' ideas, perspectives, and experiences into categories generated. I created graphs to help visualize the frequency for each category to get a sense of what the students spoke about most often. The main themes that emerged from the student interviews are: Social Awareness; Symptoms and Sources of Anxiety; Feelings about the Course/School; Coping Strategies; HeartMath Biofeedback; and Coping Self-efficacy. I ensured that all 44 students were represented in the collected statements, thus each student appears at least once in the following analysis with pseudonyms to protect their privacy. The average interview time was 21.84 minutes, and the total amount of interview time was 960.82 minutes (16 hours). The shortest interview was 14.5 minutes (Nigel) and the longest was 63 minutes (Willow).

Table 25 shows a summary of the themes that emerged from the individual interviews.

**Table 25**

*Findings Map – UL Zone 1*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews (EG and AG) Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Themes:</b> <b>Social Awareness:</b> EI and ER increased Calm classroom and positive relationships increase coherence (EG/AG) <b>Anxiety Symptoms:</b> Cognitive impairment (EG) <b>Anxiety Situations:</b> Tests, presentations, peers (EG) <b>Course Feelings:</b> Positive, safe space, enjoyed HM biofeedback, recommend to others (EG/AG) <b>School Feelings:</b> Need teacher connections, better engagement (EG/AG) <b>Self-awareness:</b> Breathing practice contributed to increased personal growth and ER <b>Coping Strategies:</b> HeartMath sensor/app and breathing practice was very effective, still using <b>Coping Self-efficacy:</b> Increased confidence in stress management using breathing practice <b>SEL as a core:</b> EG/AG recommend	<b>Themes:</b> <b>Social Awareness:</b> EG slight increase in SA <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect) <b>Anxiety Symptoms:</b> EG slight decrease in anxiety <b>Cognitive Interference:</b> EG slight decrease in CI <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG) <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)
	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program? <b>Methods:</b> HRV measurements from sensor/app (N=47) <b>Themes:</b> Significant increase in Average Coherence score from Baseline to Time 2 for EG and McLeod
Lower Left (LL) (Collective intersubjective perspective)	Lower Right (LR) (Collective interobjective perspective)

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

### *Analysis of Semi-structured Interviews from EG*

**Theme 1: Social Awareness.** Social awareness encompasses several subthemes, focusing on emotional intelligence, emotion regulation, classroom coherence, and relationships. This overarching theme centers around how students respond to their world around them and the connections they have with themselves and others. The ability to understand their own and others' emotions as well as regulate their own emotions are important elements in terms of social awareness and connection with others.

**Emotional Intelligence.** Emotional Intelligence can be described as having self-awareness about

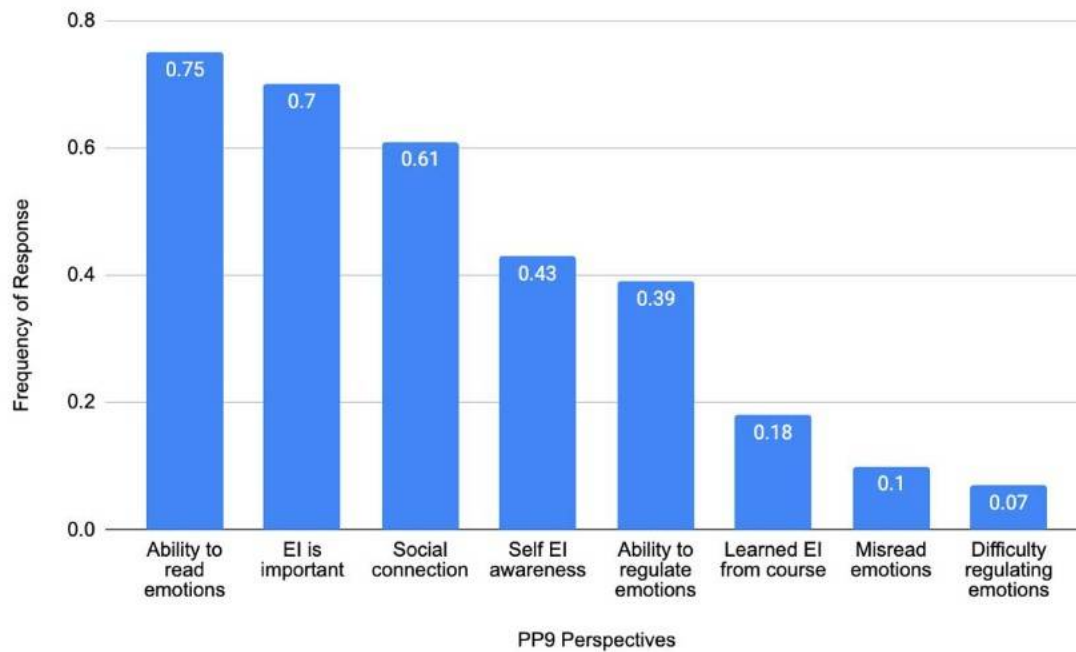
one's emotions, being able to manage those emotions, and recognizing emotions in others such that relationships and social connections are improved (Goleman, 1995). Goleman (1995) believes that "at present we leave the emotional education of our children to chance, with ever more disastrous results" and sees a day where we as educators provide "innovative classes that aim to give children a grounding in the basics of emotional intelligence" (p. xxiii). My students spoke of being quite adept at reading both their own and others' emotions, but also felt that learning about how to recognize emotions in others helped them. For example, Naomi stated, "I mean I could read some emotions – but I feel like sometimes I can't so when we got to learn about it I was like – oh, yeah, this is what this looks like more!" Other students commented on learning about the *in-between* emotions, or the nuanced ones that are not always obvious or intuitive. As Victoria said, "I think it kind of like helps me realize not what I am, but what I'm feeling more. Like, I used to just know like when I'm angry or when I'm sad or when I'm happy but there's like a lot in-between them."

Interestingly, both students diagnosed with ASD described some difficulty recognizing emotions in themselves and others and were able to benefit from the explicit instruction in class (along with everyone else, thus without being singled out or stigmatized as not knowing basic emotional expressions). When I asked Coleman, "Do you ever misread emotions in other people?" he replied, "Indeed, I do." And when I asked Patrick how he reads emotions in others, he simply replied "a red face means they're tired or really angry." In the PP9 course, we spent time matching faces with corresponding emotions, and most students did quite well and were fairly accurate. Students with ASD do struggle with these tasks and definitely benefit from this explicit emotion identification teaching and learning. Even though teaching students to match faces with emotion words seems elementary (especially for high school students) and likely intuitive, as Goleman (1995) stated, "it might serve as an antidote to surprisingly common lapses in emotional literacy. Schoolyard bullies often strike out in anger because they misinterpret neutral messages and expressions as hostile" (p. 240).

***Emotion Regulation.*** Emotion regulation involves the internal and external processes that notice, monitor, evaluate, and respond to emotional reactions to help one accomplish their goals (Thompson, 1994). When I asked my students about their ability to regulate and manage their emotions, many were very articulate about the need to be able to both feel emotions but have a sense of control over them at the same time. Kate described what emotion regulation meant to her when she said, “Emotional regulation is where you’re like regulating your emotions and you’re letting yourself go through them and like keeping them in check but also if you’re feeling really frustrated or angry, like letting that happen...and then like getting back to being calm and happy and stuff.” In class, we talked about paying attention to our emotions, noticing them, and then deciding if that is how we want to be feeling or behaving at that moment. As Hudson stated, “Sometimes yeah, I’ll catch myself doing something like with my body when I’m mad or something then I just need to like calm down and stop doing it.” Finally, learning about emotion regulation is essential for students like Coleman, who, when I asked him whether he thought it was important to control his emotions, he replied with “Yeah, so I don’t become a threat.” In the past, Coleman had had difficulty reading the expressions of others, often misinterpreting their faces as a threat, to which he would respond by fighting. He had a lot of difficulty managing social situations in middle school, however, anecdotally, his mother revealed to me later in the year that this had been Coleman’s best school year yet in terms of not getting constantly suspended for fighting. For Coleman, simply learning how to understand and read his own and others’ emotions helped him better navigate the already challenging Grade-9 social environment. Figure 16 illustrates the frequencies of responses when asked about the importance of EI and students’ abilities to recognize emotions in themselves and others.

**Figure 16**

*Frequency of Responses Regarding Emotional Intelligence and Regulation*



***Classroom Affective Experience.*** One of the things I really wanted my students to reflect on was their affective or sensory experience in this class. I asked them how the classroom and class itself made them feel, if they noticed anything around them in terms of sights or smells, and how it compared to other classes. The responses were overwhelming in terms of students noticing that this class was very different from their others, and that this classroom environment was calm, relaxing, and did not increase their stress levels. Many mentioned that they enjoyed coming to class every day, and that “It was quiet and everyone just felt like in tune, with trying to relax. And it was easier cause everyone was focussed” (Isabel). Oaklynn mentioned, “Usually like when we’d just walk in and I think people just aren’t as stressed to be walking into this classroom? So I felt like [it was] a much calmer space than when I was walking into science or math.” Some students also mentioned feeling safe in this classroom – as Raisa put it, “It was like calming and I felt safe there with people I could like talk to. ’Cause like I’m not that good with people so I was always like nervous with the other people. But I think it was a really good course just in general – just like a place where people could feel safe and where they could like just be at

peace for a bit.” Other students mentioned the sensory elements – sights (calming videos, colourful posters and plants), smells (diffuser, toast), and tastes (tea, toast, hot chocolate). Table 26 illustrates a few additional samples of what the students had to say about their sensory experience.

**Table 26**  
*Quotes from the EG Students about Classroom Affective Experience*

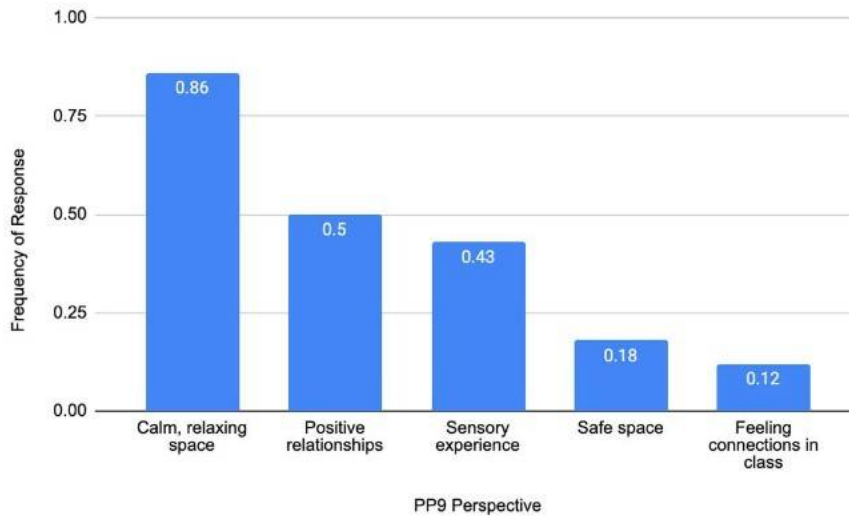
Student	Quotes
Dana	I really liked the atmosphere – I liked when the lights were like down low and when there was music playing. I <i>still</i> feel good in that space! It was like comforting going to a place where it was nice to be at, you know?
Mandy	If I’m uncomfortable or if I feel like are they looking over my shoulder or are they like talking about me I feel very, I like don’t get my work done cause I’m so worried about everything else. But then like when I was in your room, I had a bunch of my friends in your room, I felt comfortable, and like I liked <i>you</i> , I liked having you as my teacher which helps a lot. ‘Cause like, when I don’t like <i>my</i> teacher, I just like don’t really want to be there!
Janelle	In positive psych like the lights are down, it’s just so nice! There’s turtles, and a dolphin swimming around, like a bunny eating grass – I’m a sensory person. I love the diffusers! When the lights are dimmer, it calms me down.
Trent	I felt pretty relaxed cause it was kinda open and like a bigger classroom and there’s like nice pictures on the walls so I’d look at those.
Chloe	I was like how chill am I? I really liked the videos that you put up, ‘cause I like watched them and zoned into them and it made me focus better.

***Relationships and Coherence.*** Creating a warm, inviting, and safe classroom environment helped bring about an emotionally connected space where the students (and me) could feel deeply emotionally connected and coherent. Many students commented on feeling close connections to other students in the class as well as to me, their teacher. Social connections are incredibly important to these students, and when they are strong and students feel safe and respected, the deep and meaningful learning can then begin. Denise described her feelings about relationships with, “If there’s a teacher that no one respects in the room then it’s gonna make a huge difference. But if it’s a teacher that’s really nice, really cares about their students, things like that, and like actually puts effort in, then it should be like a better classroom.” Figure 17 illustrates the frequency of responses from students when asked about their experience and feeling about being in the class and with others (classmates and teacher).



**Figure 17**

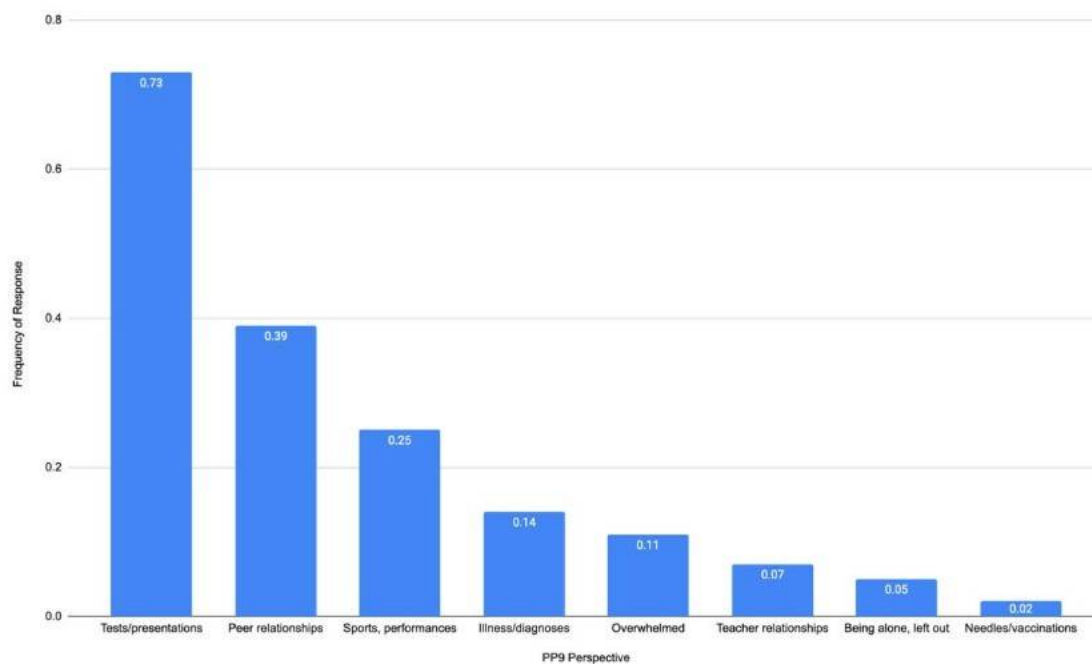
*Frequency of Responses Regarding Classroom Coherence and Relationships*



**Theme 2: Sources and Symptoms of Anxiety.** Along with how stress and worry made them feel, I also asked my students what types of situations were the most anxiety-provoking. The most common response was tests and presentations in school, with peer relationships also quite high. Figure 18 illustrates the frequency of responses for sources of stress and anxiety.

**Figure 18**

*Frequency of Responses Regarding Sources of Anxiety*



Malcolm described the stress of tests and assessments as “I had a lot of tests that term, so I noticed it a lot and it was sort of like hard to sleep just overwhelmed thinking about it and then right before whatever thing was happening I might get a little shaky and like butterflies in the stomach.” Tamara and Dana talked about peer relationships as stressful, with Tamara stating, “But then just random things will come up – like stuff with friends – like literally my whole friend group just exploded like 2 weeks ago!” and Dana describing the stress as being high “especially at a new school, with like newer people that I’ve never met before.” Alice described being a competitive gymnast and “get[ting] very nervous for certain types of skills and hav[ing] mental blocks.” Lily described her intense fear of needles (vaccinations) with, “I’m just terrified for shots every time! I get really shaky and like really, really nervous and then after it’s almost worse.” A few students mentioned having a diagnosis or being ill as stress-inducing, while others described feeling overwhelmed without enough time to finish all of their tasks as stressful. Overall, the responses were quite varied, although, as mentioned, school stress topped the list, with 32 out of 44 students mentioning it as a significant source of stress.

***Symptoms of Anxiety.*** Students were asked what it felt like when they were stressed or anxious to try to get a sense of what they were experiencing. While I understand and have experienced many symptoms of stress myself, I wanted to know what their stress felt like to *them*, and what *their* personal experience was like. The most common symptom mentioned was the feeling of brain freeze and cognitive distortion, which is interesting, because often students associate poor test grades with being “bad at math” or “poor test takers” and not due to a particular physiological state. The usual physical symptoms were also mentioned – sweaty, racing heart and breathing, shaky, nausea, and a host of others. Figure 19 illustrates the frequency of symptoms.

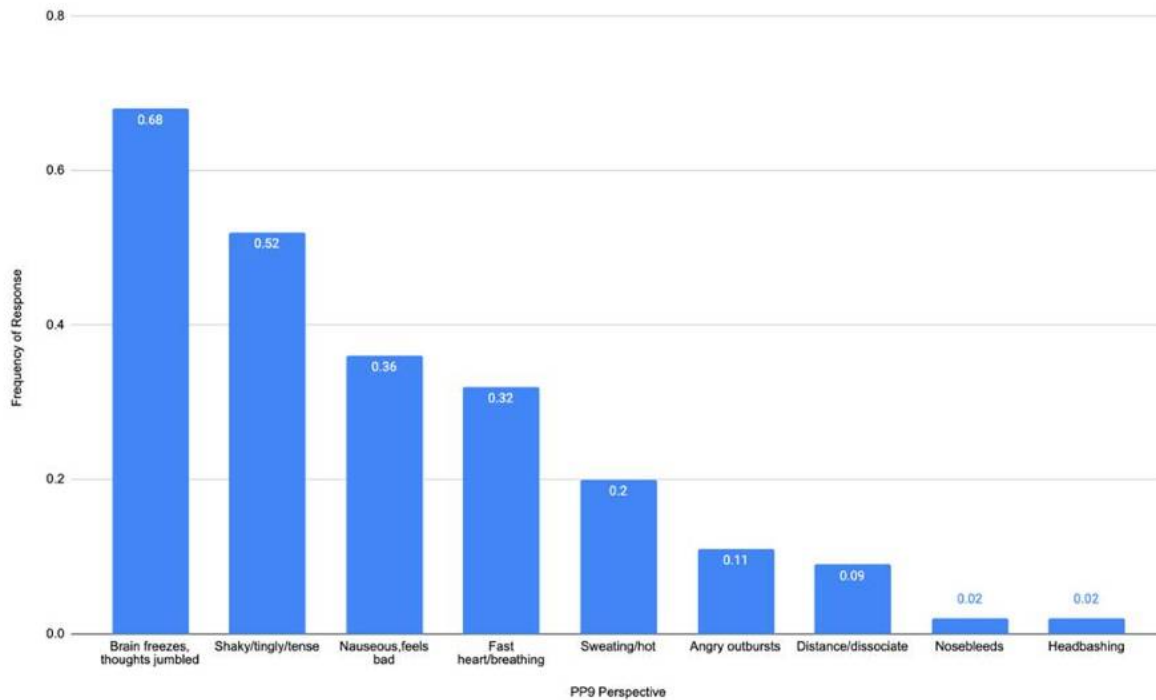
**Figure 19***Frequency of Responses Regarding Anxiety Symptoms*

Table 27 illustrates some examples of what the students had to say about their anxiety symptoms.

**Table 27***Quotes from the EG Students about Anxiety Symptoms*

Student	Quotes
Elianna	Definitely like I can't think straight – like I forget easily like if I'm trying to think of something or remember something, I can't properly remember it. I just forget it right away. Like if I'm already stressed out and I try and study at the last minute, I don't remember any of the information that I studied.
Pablo	My hands get really sweaty, I play (hockey) really bad and I would overthink it.
Janelle	Sometimes I'll feel nauseated. Or else sometimes I'll get very twitchy or I'll get really almost like sensory like – like my hair will bother me, my skin will bother me – like I just want to rip myself out of my skin.
Willow	For me, it's like I have like something in my stomach, which I feel is like – you the feeling of like butterflies? It's not a good feeling, and then I get anxious. And usually when I'm anxious I bite my lips, which doesn't really help. Um, but that's what I feel and then just mentally, I'm just stressed about like, oh, what if that happens, and then I start overthinking about that subject.
Leon	I find my heart feels like it's going to explode like when I'm under a lot of stress – I feel like when I've got a lot of things to do, even if they're relatively easy. When I've got a lot of things to do, I get overwhelmed pretty easily and I start getting a little shaky sometimes, it's just like a bad feeling.

Many of the students describe an inability to think straight or concentrate, often drawing blanks on tests or in presentations. Most were able to articulate how they felt in those stressful times without much difficulty, indicating the possibility that these feelings did come up regularly.

**Theme 3: Feelings About the Course and School.** To get a sense of what this course was like for my students, I asked them several questions about which activities they liked best, how they felt about the course overall, and any thoughts or feelings about school in general. In order to continue to develop SEL courses and meet students where they are, it is important to get their feedback and insight into what works and what does not. The best way to find this information out is to simply ask them!

***Class Activities.*** When asked about favourite class activities, students overwhelmingly mentioned having toast, tea, and hot chocolate available to them as being their favourite. While some students may in fact have needed the toast because they were hungry or skipped breakfast or lunch, many students enjoyed the comfort of making toast and eating with their friends while in class. (One student from that class continues to come to my room first thing in the morning and then last thing before he goes home – while waiting for his toast to pop, he and I often chat about his day and any other topics). This definitely contributed to the warm, safe, and calm vibe they felt and described. They were also able to engage in frequent “body breaks,” where students could pair up and go for a short walk either inside or outside, depending on the weather and their preference. As Janelle stated, “what I liked about positive psychology was like – when I’m done my work, I get to go on a walk! We would go around the school once or twice – depending on how warm or cold it was, right, ’cause it was just a brand new environment – and just being able to take a break was so nice.”

Students also enjoyed the hands-on activities, like the senses lab, where they focused on each of their senses by testing a variety of smells, tastes, tactile surfaces, and vision and hearing tests. Another very popular element was the “Wellness Fridays,” where every Friday, there was no formal lesson or homework, instead, students had the option to do puzzles, build with Lego, draw, colour, do crafts, sit

and talk to each other, listen to music, or go outside. The only thing they were *not* allowed to do was go on their phones – those were put away for the duration of the class to give the students a digital break and interact with the physical world around them. As Lily stated, “I liked the Wellness Fridays! I really liked just doing the puzzles – it was just like a time to just be in your own space, I guess, and just like focus on the now, kinda like with the breathing – like I didn’t have to worry about anything. I really, really enjoyed those times!” Trent appreciated the phone break during these classes stating, “...like cellphones now always distracting people, I think it’s like good to communicate with your friends.” Several students also mentioned that learning about the brain and its connection to emotion regulation and stress was their favourite part of the course. Jacqueline said “I learned lots in this class – and especially about the brain and emotions – and I really liked those memory techniques! (laughs) I thought they were funny and they worked well!”

***Feelings About the Course.*** The students’ reaction to the course overall was overwhelmingly positive. Most (91%) would recommend it to others and 35 students (85%) described their enjoyment of the course. Table 28 illustrates the frequencies of responses when asked about how they felt about the course, and how it might help others learn to regulate their emotions. Figure 20 depicts the frequency of responses regarding feelings about the PP9 course and school in general.

**Figure 20**  
*Frequency of Responses Regarding Feelings about the Course/School*

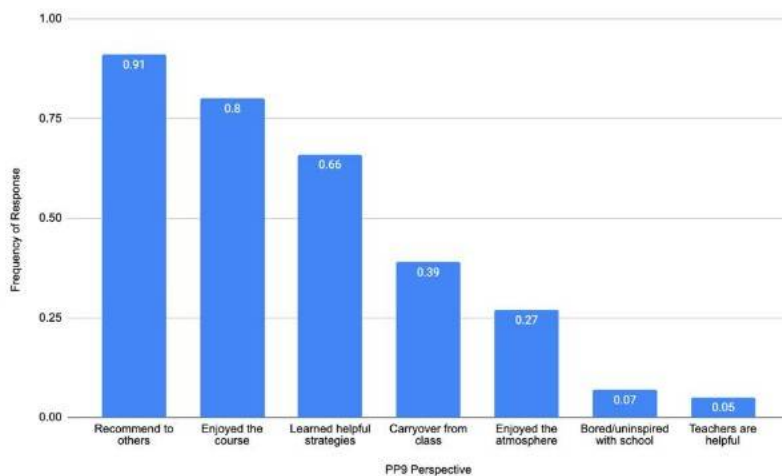


Table 28 describes some of the responses from the students regarding the course itself.

**Table 28**

*Quotes from the EG Students about the PP9 Course*

Student	Quotes
Jacqueline	Yeah, I think the breathing really helped me and I think it would be really good for younger grades to learn 'cause especially going into high school was a big change and it was hard especially might be harder on other people.
Rowan	Yeah, for sure. My friend, she has like quite a bit of issues with her anxiety and mental health and things like that, so I think that her going to a super calm class like positive psych would be really helpful for her.
Devin	I was looking forward to going to positive psych most days 'cause it's just like a time to reflect and relax.
Raisa	I think it's a really good course just in general – just like a place where people can feel safe and where they can like just be at peace for a bit. Like take a step back from like everything that's going on and like kinda like regain themselves in a way? It also helped me personally – it helped me like understand more about myself, how to make myself better and like be better like – just like emotionally.
Vincent	Yeah, so it (the breathing) did help. I actually really liked this class. Your class was fun.
Amy	Well, I liked like especially at the very end of the day, when we had the class at the end, it was nice just to relax.
Lily	Yeah, I thought it was great – I always looked forward to it – and just like every day I would learn something new about how I can help with stress and stuff like that!
Mandy	I'd recommend this course to everyone! 'Cause I mean, even the people that don't feel stressed very often, I'd still recommend it because now you know how to help others and it just, the things that you learn really just with everything. It's really just nice to have those things, I guess.
Simon	Yeah, it helped me calm down and like reset kind of, I don't know, something like that, yeah. I wasn't bouncing off the walls as much, I guess.
Alice	I think the tools we learned are like the big ones – so a lot of the anxiety tools and like grounding tools – those are ones that I like use quite often – they're very helpful and I'll hang on to those for quite awhile.
Paige	No, I never answer questions in my other classes 'cause I don't want to like get it wrong and have somebody have to correct me – it's like embarrassing. I don't know – this class was like much better – I just never really like got anxiety in this class 'cause I do have anxiety and like – I just never get anxiety in this class so it's actually better for me.

One of the other interesting things mentioned frequently was the feeling they had in the positive psych class also carried over to their next class. (In the students' timetable, positive psychology was

either right after lunch followed by another class – usually a core class like science or math, or it was at the end of the day, after their core class). Mandy stated, “And it just, it calms you down. Honestly, I wish I had it in the morning. I feel like in the morning it would be nicer, just cause then you’re kind of calm for the rest of the day, but then again, having it before a class like science, was really nice!” Malcolm found that he was better able to focus and pay attention after having the PP9 class. He said, “I noticed that after positive psychology I was a little more peaceful and less um, I don’t know how to put it – less distracted during the day. Like I could get more stuff done.” The general feeling was that the tools learned, and in particular, the breathing practice at the beginning of the class was beneficial and made for a calm, and relaxing class. When I asked Alice if practicing five minutes of breathing before *every* class might be helpful, she replied with, “Yeah, I think that’d be great – even like the beginning of every class just be like hey! If you’re feeling this, just take deep breaths and breathe and you’ve got it! I feel like that would give a bit more confidence with all the kids in their courses.”

***Feelings About School.*** A few students commented on their teachers being helpful and understanding. Leon, a new student (to both our school and to Canada) stated, “Yeah, I find like, especially like teachers, are way less strict here. It’s way more calm, there’s a lot more respect and, what’s the word –acceptance! Like in each classroom.” A few students (only 3) mentioned that they did not really enjoy school and found it mostly boring and unengaging. As Pablo said, “Yeah. I just, I don’t, not a big fan of just sitting down for like five hours and workin’,” but when asked about this course, he said “I kind of found it was sort of a calm class. And the breathing helped.” Pablo is a high-level hockey player who struggles to see the point of school and really just wants to move forward in his hockey career. He told me that the breathing helped him in both hockey and in school and that that was something he would continue to use to help keep his temper in check. When I asked Vincent about how he felt in his core classes compared to PP9, he said, “Like I did notice it (different energy) in science class. I just didn’t enjoy science – I just didn’t want to do anything.” After, when reflecting on how he

felt in PP9, he said, “I liked it – and I felt like the whole class was listening after the breathing.”

Coleman also shared a dislike of science, stating, “I personally don’t like science...I’m bored with it and I usually sleep in class and that’s about it.” He went on to say later that he did not like any of his core courses, but quite liked his options (PP9, construction, sports performance, and mechanics). I did not ask specifically about how students felt in other courses, as it was my intention to solely focus on the PP9 course. However, as indicated above, a few students wanted to comment on these aspects anyway. Most of the students commented that they enjoyed the course, which likely meant that they were able to engage more deeply with the strategies and skills presented – particularly the HF breathing.

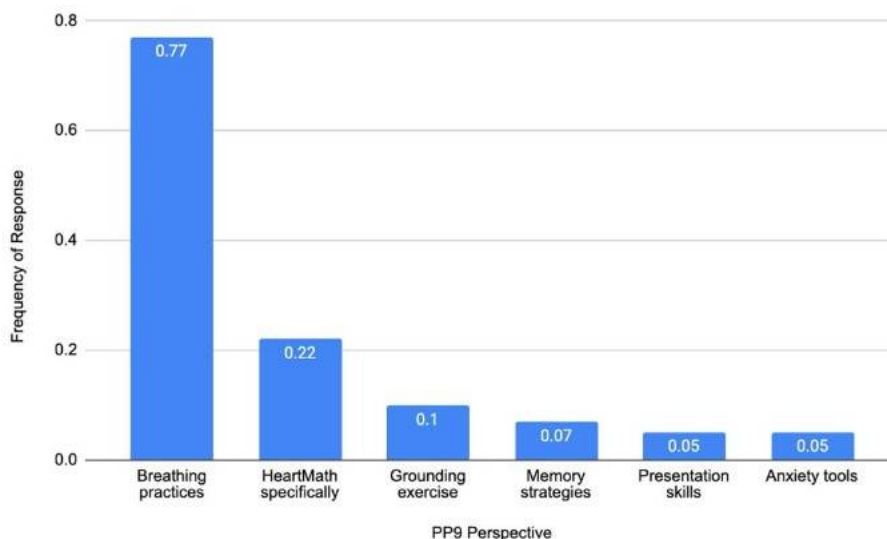
**Theme 4: Coping Strategies.** One of the things I wanted to discern was whether my students had already learned some emotion regulation and coping strategies prior to coming into this class. A few students mentioned having previously learned a breathing practice, however many mentioned that they had not done it to the same degree as what we practiced in class. For example, Elianna said, “Yeah, I think it (the breathing) was different than what I was doing before. Just like the five minutes was a good length – because before when I was upset I would only do like 15 breaths!” A few students mentioned learning how to breathe from their mom, previous teachers, coaches, and therapists. Denise described a detailed breathing technique using a figure eight breathing technique: “Well, my old therapist, she’d give me visual ones, she’d give me touch-feel ones, and one would be like draw a figure 8 on your thigh or something – when you’re one side of the loop you breathe in, when you’re in the middle you hold, when you’re on the other side – so things like that.” Jacqueline mentioned being outside with her horses and listening to music. She said, “Yes! I love being outside! That or music, really! Sometimes I’ll go ride my horse and I’ll listen to music – or I’ll ride the quad and I’ll listen to music – or I’ll just go for walks or something – so those are like my happy places!” Several other students (27%) mentioned using sports and exercise as a form of stress and emotion regulation. Mandy said, “I feel like all the noises in my head just go away when I’m playing my sports which is really helpful to me.”



**Strategies Learned in Class.** I asked the students which coping strategies stood out to them as useful in terms of managing their emotions and calming themselves down. They overwhelmingly (77%) commented on the breathing practice as being the top strategy learned as a result of taking this course. Jade stated, “Like, I don’t know, I just felt better after class. More relaxed.” Patrick said, “I think, yeah, it (the breathing) helped pretty much I haven’t had one of my bad lose control moments...in like two months,” while Landon’s breathing practice was, “For the first one and a half minutes I say like I was focused on my breath and once I got the rhythm, I just started thinking I guess and it was not bad at all, it was like just calm thinking of like, the present moment.”

A few students mentioned the HeartMath sensor and app in particular as being important for their regulation. Jill said, “My focus has gotten better since this course - especially for math – ’cause I don’t like math whatsoever – but with learning the HeartMath breathing exercises – I’ve used those at the beginning of my tests and then my grade is actually – not like a lot – but I’ve done better on tests than I did beforehand!” Zahara, an ELL student new to Canada said, “If I’m angry, like I’m going to shout at people but now like I’m just going to breathe and because of that HeartMath thingy.” Figure 21 illustrates the breakdown of strategies learned in class that were mentioned in the interviews.

**Figure 21**  
*Frequency of Responses Regarding Strategies Learned in Class*



**Understanding of Mindfulness.** While the concept and understanding of mindfulness was not necessarily a strategy or formal tool like the other, more tangible ones mentioned, students seemed mostly unfamiliar with the concept and term at the beginning of the course. Throughout the course, I described the notion of paying attention on purpose to become aware of the present without judgement. We discussed the concept of becoming aware of the body and mind in the present moment while trying to let the past and future go during our heart-focused breathing practice at the beginning of every class. In this way, students started to become accustomed to the concept of being mindful of their thoughts, emotions, and bodily sensations. I asked the students during the interview what the term “mindfulness” meant to them and most were able to describe a sense of being aware and paying attention. When I asked whether they had improved on their ability to pay attention, many mentioned (50%) that it did in fact improve their focus. Table 29 depicts students quotes about their focus and attention.

**Table 29**

*Quotes from the EG Students about Focus and Attention*

Student	Quotes
Jill	My focus has gotten better since this course - especially for math – 'cause I don't like math whatsoever – but with learning the HeartMath breathing exercises – I've used those at the beginning of my tests and then my grade is actually – not like a lot – but I've done better on tests than I did beforehand!
Landon	Like before I came to the classroom, I was thinking about all the tests that are coming up, or just like next classes, right. But after the breathing, I'm just mainly focused on what's happening right now – which helps a lot.
Carly	I think mindfulness is like being aware of your surroundings and paying attention to small details as well as being able to like appreciate things.
Alice	It's like connecting yourself with your breathing and your brain and just getting into like a calm and neutral, you know, in the moment situation.
Malcolm	Just being in the moment not worried about anything that's happened or that will happen and sort of being peaceful and not letting your mind race to other places.
Michelle	I guess it would mean like your mind is like at rest, you're not overthinking or thinking about the past or like the future – you're just like in the moment.
Rowan	For me, when I am feeling like really stressed, um, I do take deep breaths. And that really helps me. I feel like the deep breaths really help me like get into like a peaceful mindset and help me focus.

The students' own perceptions of their ability to focus and pay attention appears to be corroborated with their MAAS-A scores (Zone 5), which shows a significant increase in mindful awareness from beginning to end of the course, and in comparison, to the control group (CG).

**Theme 5: HeartMath Biofeedback.** Given that for most students, this was the first time they had ever heard of the HeartMath sensor and accompanying Inner Balance app, I wanted to find out what they thought about it initially. Grade 9s tend to be brutally honest, and in this case did not hold back what they were thinking when it was first presented to them. I found this interesting – since many told me they thought it was weird, wouldn't work, was possibly a scam, or just another gimmick initially, but once they started using it, all but one student (Coleman) said that they liked using it and found it to be helpful to calm down their breathing. (Coleman mentioned that he did not think it matched how he was feeling with what the wheel was showing – however, given his ASD diagnosis, it is also possible that he had difficulty understanding how he was truly feeling in the first place). Coleman stated, “I just personally did not like it, it was just (pause), I just thought it was not that very accurate.”

Malcolm and Leon were doubtful initially, with Malcolm stating, “I sort of thought – does this thing even work? Is this a scam? (Laughs) I didn't know about the HeartMath thing and then once I got into it I realized that it works” and Leon saying, “At first, I was like, no way this is going to work! But as it went on, I started to realize that it really does calm me down, especially after lunch time and at the end of the day after everything's happened.” Devin simply said, “(at first) I thought it was a little bit pointless, but I could tell that it was working a little bit and it would like calm me down.” Isabel and Jacqueline were a bit more optimistic at first, however still a bit unsure as to how it was going to help them. Isabel stated, “I thought it was kind of weird (laughs) and I didn't even understand how it could tell, like with like the three colours. But then as we kept doing it, it was actually really helpful, and it was nice to just have like five minutes to relax and get yourself back together.” Jacqueline mentioned, “I wasn't so sure if it would work very well or how it exactly worked – but once I got the hang of it, I

really liked it and it was a good five minutes that was just a break in the day I didn't have to stress out or anything." And then there were a few believers right from the start – like Oaklynn who said, "I thought it was really cool, I'd never seen or heard of anything like it before and I thought that it was really interesting that it could track my heartbeat from where it was connected to my ear. So I thought that was really interesting, like to be able to see what my heart's doing is pretty cool!"

***Focusing Strategies.*** As mentioned, each class began with five minutes of heart-focused breathing using the HeartMath sensor paired with the Inner Balance app (on their phone). I tried to provide the students with a variety of strategies for focusing their attention – from using the mandala wheel on the app as a focal point, to just focusing their attention on their breath (or heart area), to visualization practices and sensory mental “walks,” and other things like colouring or drawing. I left it up to the students to pick which technique they liked best, and I asked them about this during the interview. The top pick was focusing on the mandala wheel (47%), followed by just focusing on the breath (23%), visualizing (16%), and other activities such as drawing, colouring, or Play-Doh (14%). A focussing technique I used often was the Quick Coherence technique, involving the following two steps (from the HeartMath Institute, 2024):

1. Focus your attention in the area of the heart. Imagine your breath flowing in and out of your heart or chest area, breathing a little slower and deeper than usual.
2. Make a sincere attempt to experience a regenerative feeling such as appreciation or care for someone or something in your life.

Often, I would also tell the students to think about a family member, special friend, or pet. Many students told me they loved thinking about their dog or cat, or in Jacqueline's case, her horse! Jacqueline stated, "I was usually looking at the wheel...and imagining things that I loved or appreciated so – my horses and my family and stuff! But looking at the wheel and breathing with it really helped me - and that's when I think I got the most green!" Mandy said, "I liked looking at the wheel and trying to match

my breathing to the wheel. Um, yeah, that’s kind of all I did. I would just focus on the wheel and then focus on the colours”. One student, Dana, loved the mental walks along the beach or through a forest that I would describe for them throughout the five-minute session. She explained her technique like this:

I closed my eyes! Um, all the time we were doing it, I closed my eyes and sometimes I’d listen to music –but not like upbeat music, I’d listen to like slow, calmer music and I’d just close my eyes. And I really liked it when you talked – like when you told us like a story or whatever, cause then it really made me like, at ease. And it made me like picture what was going on. And that’s when I got the most green.

***Understanding of the Sensor/App and Coherence.*** One of the things I wanted to understand from my students’ perspectives is what they thought the sensor and app were actually measuring. I spent several classes explaining the green, blue, and red zones to them, along with their correlation to their own physiology in terms of what their breath, heart, and mind were also doing while in that respective zone. Students quickly started using language like, “I feel like I’m in the green zone” or “I could not think straight – I was *definitely* in the red zone for that test!” The information provided by the sensor and app translates into biofeedback which then helps the student understand their present inner emotionality. The heart-focused breathing practice helps them see how dysregulation (being in the red zone) can change into regulation and calm (green zone). Students loved seeing in real time how their bodies and minds could calm down and feel more relaxed. When asked what each colour meant in terms of breath, heart, and brain coherence, most of the students (82%) were able to describe the connection in detail. Table 30 depicts some of the ways the students described their understanding of biofeedback.

**Table 30**

*Quotes from the EG Students about the HeartMath sensor and InnerBalance app*

Student	Quotes
Jacqueline	I think green is being coherent mostly and like being calm and breathing with the sensor and then red – um – is not good and I feel like you don’t have a

	sense of like where you are and what you're doing – um, and then blue is kind of in-between I think, so you're not fully focused, but kind of?
Oaklynn	Well, when you're in green, that means you're calm, your mind's calm, your body's calm, and then when you're in blue I think it's kind of like you're thinking about things, like your drifting from being in a calm state, and the red is when you're not calm and you're thinking about a lot of things and you're not being mindful of your body.
Marie	The green was like, you're really like zoned in I guess, like you're really just focusing on your breathing, and I think blue was when your mind is kind of wandering or you're a little stressed or something and then red was like you're not focused at all, and like you're just really like angry or upset, or really stressed out. Is that it? I think that's it.
Lucy	Ok, so it goes onto your ear and then there's different – green, blue, red. And red means like you're angry, you're not in a good place and blue means, maybe you're like anxious, or you're thinking about a lot of different things. And green's like you're good, you're ready to go and you're focused.
Alice	Yeah, so like the coherence is it's like how like connected your body and your breathing and your mind is – so like in the green zone you're very like, it's connected and you're calm and like you're <i>in</i> the moment in your body, versus like if you're in the red, you're kinda like your brain's jumping all over the place and your breathing's not very calm it's like all over the place as well, and you're not very focused. And that can be quite hard to focus after that.
Paige	Coherence is like when your mind and your heart and your breath is like all on the same pace and just like if you're in the green, blue, or red zone. Like red and blue aren't really very good – it means you're like pretty hyper and you're not really on a good pace – but green is like everything's on pace.
Jill	You take your sensor – I had the plug-in one. You plug it in, put it on your ear and then you press play and then you try to like just focus on your breathing and like trying to calm down and like slow down your breathing, essentially.

One of the projects that students did at the end of the course was to (as a group) teach the sensor/app and connection to the body and mind to somebody else. They were required to use the correct physiological terminology, so they became well versed in the technique and were able to explain it quite articulately, as is seen in the above quotes.

***Effectiveness of the Sensor/App.*** When asked whether the sensor and app works (in terms of regulating stress and calming oneself down), most students were able to connect the ability to calm down with a calm and rational brain, capable of solving problems, writing tests, presenting in front of a class, and engaging difficult conversations (for example). Carly described her thinking process as, “When my thoughts are racing it's really, really hard to just like clear my mind, so I think definitely

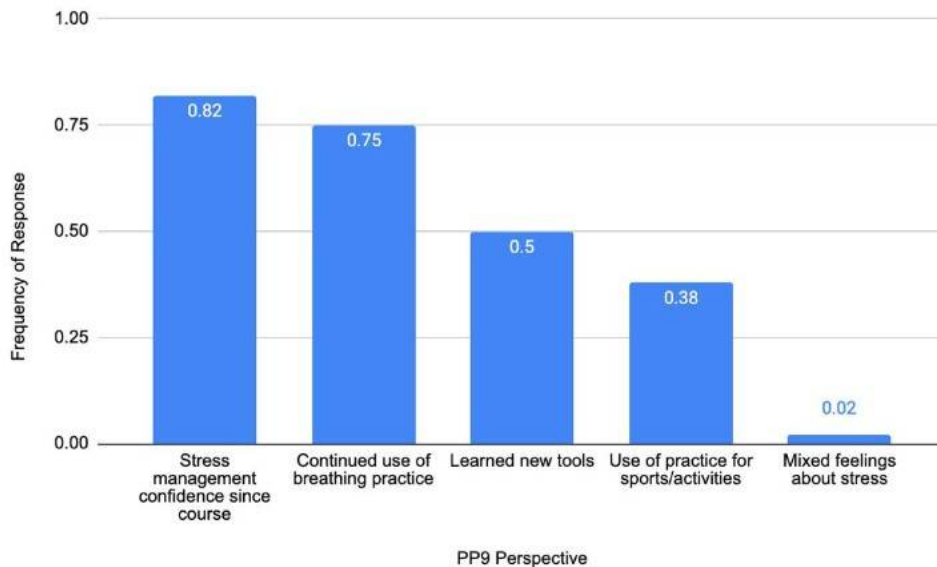
breathing is a lot easier than trying to clear my mind.” Amber stated, “I guess your breathing if it’s slowed down you’re more relaxed which slows down your heart rate which then calms your mind.” Connie brought in the element of mental processing when she said, “I feel like when you slow down your breathing it lets your brain think for awhile and it lets it process everything that’s happening.”

Two students (Pablo and Coleman) mentioned that they sometimes felt different than what the sensor and app showed them. Both of these students had experienced difficulty regulating emotions in the past and were possibly still unsure as to how they were feeling inside their bodies and minds. Sienna had been in therapy previously and was exposed to many different strategies. She was unsure as to how the strategies learned in this course would work for her. She said, “I don't know – I find not a lot actually works for me like I do try the breathing and it does work, but it just takes a long time for it to actually work.” It is important to recognize that for some students, it will take longer to feel like they are benefitting and that it is not just another therapy tool that they have found to be ineffective in the past. As well, a couple of students mentioned that looking at the colours on the app actually stressed them out more, given that they wanted to get a high score, and possibly felt a sort of peer pressure from other students around them. Jacqueline described feeling “stressed out about what colour it was supposed to be,” whereas Mandy described it as something that would “stress me out and I’d try going back into green. But then I would go even more in red because I’m freaking out so I’d have to like just turn my phone off and just start breathing normally and not looking at anything.” This is certainly a consideration given that students are sitting in close quarters and can see each others’ screens. Making sure students are comfortable and not feeling pressured or judged for their scores is important. As mentioned, students self-recorded their coherence scores each day, only sharing their data with me at the end of the course (not counted for marks).

**Theme 6: Coping Self-efficacy.** Self-efficacy relates to how the individual believes in their ability to effectively manage the situation that they find themselves in. In this case, self-efficacy

indicates the confidence that the student has in managing their stress and emotional dysregulation. I asked each student whether they were continuing to use the breathing practice (given that all of the interviews took place several weeks after the course was complete) and how confident they felt about managing their own stress. Figure 22 illustrates the response frequencies regarding coping self-efficacy.

**Figure 22**  
*Frequency of Responses Regarding Coping Self-efficacy*



For Grade 9s, feeling confident and sure of their ability to handle their emotions and even potentially calm their anxious minds down during stressful situations is a massive benefit towards success in situations that might have previously derailed them. Table 31 depicts what some of the students had to say about their new-found confidence in managing their stress.

**Table 31**  
*Quotes from the EG Students about Confidence in Managing Stress*

Student	Quotes
Kate	It definitely increased because of positive psych because of the breathing strategy and like knowing that like emotions like you just have to like feel them and then you can like go on accept them and stuff, so yeah, I definitely feel a lot more positive about them after positive psych (smiles).
Chloe	I think I would (be confident handling stress), I'd probably act differently because it's been a bit of time since the course started and ended so I've probably grown as a person I'd like to think – but um, there's lots of like



	mental health strategies that you tied into there that I'd probably continue using like the breathing exercises and the red and green zone stuff. I can probably key into those more and it'll help me like in the long run and during confrontations I think I'd probably try and be more mindful to like how other people feel about what I'm saying and I can tune into their emotions better by looking at their facial expressions – crazy!
Isabel	After doing it everyday, it's just like a nice feeling, and I just recognize it and it's good. In class, like, now that I have an idea of how to slow like my thoughts down and everything, I'll do it before a game (volleyball) and before a test and I'll try and really to just relax so I can actually remember the things I need to remember – and so I just use it way more than I'd ever had. It's a reassuring feeling because before Positive Psych I like had, I did nothing – I just waited it out and hoped it would be better. But now that I know what to do, it's like, it's reassuring and I'm like not as stressed as I should be.
Devin	I feel like kinda confident. I like feel that I would be able to control myself a little bit but not like fully.
Nigel	I'm pretty confident, yeah. I'm not like, super, super, super good at it, but I'm kinda confident about it, yeah. I know when I can calm myself down and when I can't so that's good yeah.
Raisa	I think it has helped me like understand like how to better focus and how to be in the present – um, I really enjoyed the course and it also is like not just like focusing and emotions but it also is like a time where you can just sit back and reflect on things and just take a minute to think.
Lily	Yeah, I'm not like worried to be stressed out 'cause I do know how to calm myself down, like just take a few breaths and sit down for a second and just reconnect. I do that like on the daily, cause sometimes it's like little tiny things, even like I get mad easily I know, it's just like a little thing that'll make me mad, and I'll just know how to calm back down so then I don't like keep getting mad! From positive psych, I have learned how to control it more – I was like focusing on the things that I love and stuff – like pets and family and like I was really focusing on my breathing as well too to help calm me down.

Students talked about the various ways they were using the breathing practice in other areas of their life. For example, Oaklynn and Lily described using their new skills to help them sleep. Oaklynn said, “When I can’t fall asleep, I’ll do like the square-thing (box-breathing) and when I’m doing tests, I’ll make sure I’ll breathe, cause like I know that I’ll just get way too overwhelmed if I don’t take just a second.” Lily stated, “If like I slow down my breathing, do I think I’ll be in the green zone, and if I don’t, then I would try to slow it down even more and – yeah, especially at night cause sometimes I have trouble sleeping. But since positive psych, I have not had any problems.” Mandy mentioned finding some relief for her nosebleeds. She stated, “So first term when I didn’t have this class, I would get

nosebleeds when I was stressed... [but] then they stopped when I went in your class! I haven't – I mean I still get them – but I don't get them at school anymore.” Jade talked about using it for both panic attacks and volleyball. She said, “I think I do better after this class – like – I feel like it helped a lot in terms of calming down, and panic attacks and stuff... and every single time I go back to serve I (takes a deep breath) do a deep breath and then I go and I serve it – and it helps!” Of course, Patrick, who struggled with emotional outbursts previously, stated, “I think, yeah, it (the breathing) helped pretty much I haven't had one of my bad lose control moments...in like two months.” As mentioned, his “bad lose control moments” involved head bashing and aggressive outbursts where he felt completely out of control. Helping Patrick achieve a sense of control over his emotions and behaviours was a huge testament to the techniques learned in this course.

A few students ended up acquiring their own sensor (either purchasing it themselves or in a couple of cases, I have loaned them to the students) because they felt that they needed the sensor to stay focused. Mandy describes having the sensor to keep herself from mindwandering and getting distracted. She also came to me privately looking for ways to help with her panic attacks. She found tremendous relief using the sensor, and as a result, I have loaned her a sensor to use while she is at the school. Here is how she described her need for the physical sensor for her own practice:

I can do it without the sensor but I prefer doing it with the sensor because I like watching the wheel cause it's like when I do it by myself, I get more distracted easily cause it's just me in my head and I start thinking about other things, but with the wheel I just focus on the colours, I focus on the wheel and I feel like it helps me just like be not distracted. I get really bad panic attacks and I went to the hospital for it and they gave me a bunch of breathing techniques and stuff. And then you gave me a breathing technique and I find I use yours more I find yours more helpful cause it really just grounds me.

Thus, the confidence that these students have developed in only two and a half months has given them a sense of control and self-awareness that will carry them forward. The question now is, how long does it last? Are there lingering positive effects from this course that can stick with these students as they move through their high school experience? The next section will address those questions.

### ***Analysis of Semi-structured Interviews from Alumni Group***

To determine whether the positive effects of the PP9 course had a carryover effect after the course was finished, I interviewed students who had taken the course in Grade 9, thus were named alumni group (AG). I had the school's administrative assistant for attendance send out a recruitment email to all 160 students who had taken the course previously. The email contained the recruitment letter, consent and assent, as well as links to the SOS and DPS. The students were asked to contact me if they were interested in participating in the study after which I asked them to complete the surveys (one time only) and then book themselves for an interview. Given that this email was sent out in May, students whom I was teaching at the time were only permitted to book a time after classes had finished and marks were submitted (as per CFREB recommendations). Twenty-five students returned the consent and assent forms, but one of those students only wanted to do the surveys and not participate in the interview. Of the 24 students who volunteered for the interview, 5 were in Grade 10, 12 were in Grade 11, and 7 were in Grade 12. Nineteen identified as female, four as male, and one as nonbinary. This provided a fairly balanced cross section of the three alumni grades, with similar gender demographics to the Grade 9s. All 24 students were given the same semi-structured interview questions however, some conversations did expand into other areas as students felt the need to expand on particular topics or experiences. After interviewing each student, I manually transcribed each one into NVivo, and from there, selected sections of the interviews to slot into predetermined and generated codes. Once coded, I developed themes and grouped statements into similar categories of experience. Using the responses generated from the participants, I counted the statements aligning with each category to generate a

frequency measure, which was then graphed to help visualize how often these thoughts and ideas were described. Each participant was asked approximately ten questions, however, there were three questions specifically that were asked to every one of the participants: “What do you remember about the positive psychology class?” (this was the question I began each interview with); “Do you think that the PP9 course should be a core or an option and why”; and “What are your thoughts on SEL and mindfulness learning as universal (for example – in a class like this one) versus prescriptive (for example – in individual therapy)?” I mention this because the frequencies were much higher for these themes, as every student was asked those questions. There were other questions that may have been modified, added, or deleted due to the semi-structure nature of the interview process.

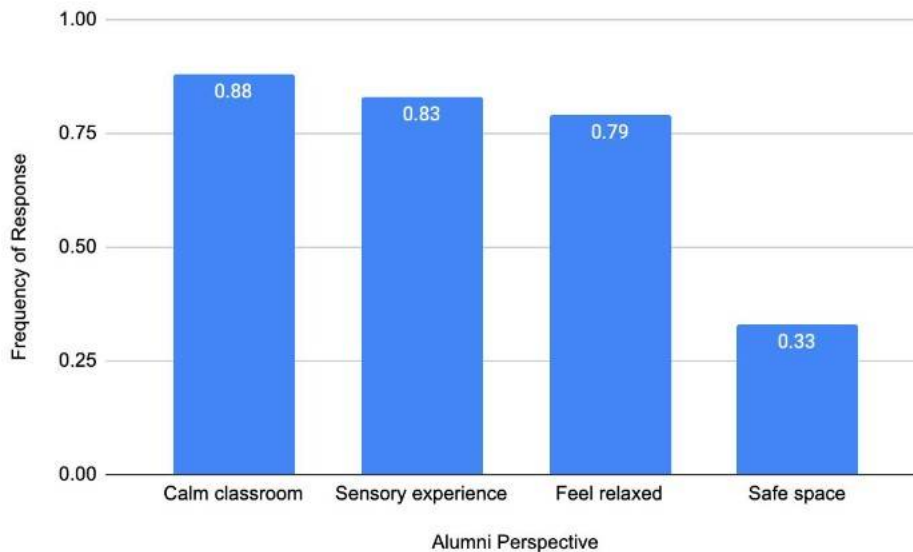
A second read of salient statements attached to codes allowed me to group them according to a common theme but separate into categories depending on the specific type of experience the student had. After examination of redundancies and coordination of categories, four themes emerged: Social awareness; Self-awareness; Course Reflections; and Coping Self-efficacy. These are similar to the Grade-9 themes, but instead of focussing on the specifics and details of the course itself, I wanted to know how these students were managing several years later. I was less interested in the specific elements of the course (however I did want to know what they remembered and what they were still using from the course), and more interested in the way they felt, their perspectives, personal growth, and self-efficacy when it came to managing and coping with stress. It should be noted that of the 24 students I interviewed, 11 presented with diagnosed anxiety and within that group, two had autism spectrum disorder (ASD), five had ADHD, and two had diagnosed dyslexia. Thus, this alumni group have much higher rates of anxiety and learning diagnoses than the main school population (46%, compared with the typical 20–25% in a school population), which makes them an ideal group to have share their experiences beyond Grade 9. All 24 students are represented with comments in this analysis. The mean

interview time was 30.0 minutes and the total amount of interview time was 11.5 hours. The shortest interview was 15.7 minutes (Shannon), and the longest was 52 minutes (Hannah).

**Theme 1: Social Awareness.** Like the Grade-9 group, this theme focused on the classroom affective experience and relationships, however, I did not spend as much time with this group asking them about their emotional intelligence and regulation. I was more interested in how this class made them feel, and whether this embodied style of learning was more pervasive and extended beyond their Grade-9 experience. Therefore, I asked them if they remembered how they felt in the PP9 class, what sensory experiences stood out to them, relationships formed within the classroom and with other people throughout the school, and what it meant to feel safe in a classroom. Figure 23 shows the frequencies of responses for the classroom affective experience.

**Figure 23**

*Frequency of Responses Regarding Classroom Affective Experience for Alumni*



***Classroom Affective Experience.*** Eighty-eight percent of the participants commented on the classroom being calming and peaceful. I have taught this PP9 class in three different classrooms – the Grades 10s and 12s were in my old classroom (now the Chemistry lab), the Grade 11s were in another teacher’s classroom (due to a space issue – mine was used as a science lab that year), and of course the

Grade 9s were in my current classroom (Figure 3). All the Alumni interviews were conducted in my new classroom, thus any feelings they might have had from Grade 9 would have had to come from their memory of being in that class – in other words, there were no cues or reference points for them during the interview itself. Table 32 depicts what some of the students had to say about their recollection of the classroom affective experience.

**Table 32**

*Quotes from the AG Students about Classroom Affective Experience*

Student	Quotes
AD (Gr 11)	I think everyone really realized [the breathing] was important for them as well. And so it did get very quiet and it was really calm. Everyone kind of just adjusted to – this is the time where I can just calm down for a little bit of the day and they kind of just absorbed that energy. So, yeah, I think it was really good energy in there. It wasn't stressful at all.
Kimberly (Gr 10)	Definitely an energy shift in the room. Like I feel like everyone got a lot more calm and they were able to not yell across the classroom and stuff and they were able to just take a moment and be like, oh wait! I don't need to be so loud to be heard or be seen – I can just be. And that was a lot nicer!
Hannah (Gr 12)	I don't know if it was you, or the environment, but even now, like you have switched rooms, but it's still such a calming environment in here. Like it's still – it doesn't feel stressful, it just feels easy and relaxing and I always remember the things that we learned and just like breathing and like focusing on my heart and my heartbeat and trying to match those up. I'll do it subconsciously now without even noticing it – and I'm going to attribute that to positive psych. And I even bought a sensor!
Alyssa (Gr 12)	I just felt really relaxed and comfortable and it was like – with the sounds you would play, I always remembered I knew always instantly this was gonna be my time to kind of get back into a good space for the day. And it just was a very, it was just a pleasant place to be, and everybody felt really comfortable with each other in that environment which was really nice cause you don't always get that in a classroom.

Several of the students (83%) described their sensory experience by commenting on sights, sounds, smells, and tastes when thinking back to their experience in PP9. Kimberly described it as, “I would say it was very calm, it was quiet, it was nice, and then you would dim the lights a little bit so that just made it more calm – and I believe there was like a diffuser where the smells were lovely! So it was a great space to be in for something like that!” and Darius stated, “I liked having all those plants

everywhere and kind of the smells and it doesn't feel like you're in a classroom." Often I started the class with meditation music and visuals on my Promethean whiteboard, so that when students came into the room, they would get their bin, connect to their sensor and sit quietly, taking in the sights and sounds. I also had tea, hot chocolate, and toast, which students could also quietly help themselves to while their classmates were getting settled in. This "soft start" to the class is something I have recently added to all of my classes – giving students a sense of easing in and feeling comfortable before beginning the classwork. Tegan described it like this: "It felt like – Zen almost? Like the lighting, it wasn't super bright fluorescent lights like some other parts of the school and stuff, it was kinda like dimmer light, and more natural light from the window – it seemed like a safe place, almost, if that makes sense?"

I also wanted to get a sense of whether students felt safe in these spaces. Given that almost half of them struggle daily with anxiety, it was really important to hear firsthand what their experience in Grade 9 was like. Several students specifically homed in on the classroom feeling safe, even when they likely felt quite afraid and anxious just being in Grade 9. Table 33 depicts students' feelings about the classroom environment.

**Table 33**  
*Quotes from the AG Students about Classroom Environment*

Student	Quotes
Sadie (Gr 11)	In Ms. T's class I sat by the window – and I hated being there! All the time...I liked it [being in positive psych] 'cause I was by the door and it was a much mellower class – it didn't even really feel like the same room.
Valerie (Gr 11)	I think definitely the vibe was super relaxing and like hearing everyone's breath together like we were all kind of like moving in sync – was really relaxing, no one was really saying anything. And yeah, I just felt like we were all really calm, and just breathing together and yeah, we were all in a safe space together.
Madeleine (Gr 12)	I remember feeling (pause) like if I just take a minute to close my eyes (closes eyes) I feel like –I felt like I don't know – like we were all like breathing together and it made me feel like more safe in a way? 'Cause I was like – we're all just like relaxing right now and we don't have to think about anything else but this. I was very shy when I was in Grade 9. Like I probably

	barely raised my hand or something. But yeah, I did feel like it was a safe space and I always felt really calm in your classrooms.
Harper (Gr 11)	I remember like – I feel like my soul learned from it. Like everything I grew over the 10 weeks I did that course. And it would just great if <i>all</i> school could be like that!

***Relationships and Coherence.*** Many students were able to reflect on their Grade-9 year and describe some of the relationships they had – with their peers and teachers. Many mentioned developing friendships within the PP9 class, with some remaining very close friends. Creating a safe, caring, and welcoming atmosphere permeates into relationship building through a sense of respect and trust. Fifty-eight percent of the alumni students describes positive relationships with peers and classmates. Stella said, “I think that a lot of the activities that we did were really like group-based? So that was a good thing. And – I guess like because it was easier to become friends with those people because we were sharing our thoughts and feelings – and that’s something that Grade 9s don’t usually do”. Maddie mentioned the close connections she developed from the PP9 course: “That class just started connections – like I’ve been friends with Hannah, and other people in that class, since Grade 9! And I’ve stayed friends with them throughout because that was relationship was created.”

Thirteen of the students mentioned relationships with teachers as being important and mostly positive throughout their high school journey. Hannah, an aspiring teacher, stated, “Not only because it’s a wonderful course, but getting to know you over the past four years and creating a bond has been one of the best things! When I’m a teacher, I want to be like you! Like really truly! Like I want to have this bond with my students.”

One student, Sadie, indicated some struggles with some of the teaching staff – in particular, teachers not taking the time to address her diagnosed learning disability. She stated, “I feel like in general, teachers need to check on their students one by one – ’cause I feel like if I had a little more support it (dyslexia) wouldn’t be as bad as it was.” Another student did leave our school to go to online



learning, expressing some frustration with the large class sizes (at our school) and often times difficulty getting the support they needed to help them with their specific learning needs.

**Theme 2: Self-Awareness.** Self-awareness is one of the SEL competencies and involves the understanding of our thoughts, feelings, and culture, and how these things can influence our behaviours and beliefs (CASEL, 2024). I asked the alumni students about their memory of themselves in Grade 9 and their subsequent personal growth, as well as the situations that are currently stressful for them. Categories include: feelings about their Grade-9 self; personal growth; and current stressful situations.

***Feelings About Grade-9 Self.*** I asked the students to think back on themselves in Grade 9 – both in the course itself, and also in general. I wanted them to use the temporal space and personal growth to see themselves almost as a separate being – seeing how it was to navigate through that year. Many students talked about feeling awkward, nervous, and very worried about being in high school and not getting good enough marks. Forty-six percent of the students described feeling nervous, awkward, and unsure as whether or not they even belonged there. Table 34 depicts a few of their comments about their Grade-9 self.

**Table 34**  
*Quotes from the AG Students about their Grade-9 Self*

Student	Quotes
AD (Gr 11)	At the start of the year, sure it was a little awkward, but that's 'cause we were all in Grade 9, and we were in a new place, and I just remember everyone was kinda grouping together – they were frantically trying to support each other.
Kimberly (Gr 10)	I would say, I felt very small. And not necessarily because I was new to this school by being in Grade 9, I just think overall my anxieties really ruled how I behaved throughout the day and I would take – wherever I could find control in my life, I would almost overly get attached to that.
Alyssa (Gr 12)	I mean, like I was terrified for the whole entire Grade 9 year! And like Grade 9 was definitely not the best year for me. I still had a lot of issues with myself and issues with school that I just didn't want to do it and I really felt like my option classes were the only thing I paid attention to.
Madeleine (Gr 12)	For gym class, I had no friends in that class, and I couldn't make friends 'cause I was so shy so I skipped gym class in Grade 9 for like six months! (Laughs) I don't know how I passed.

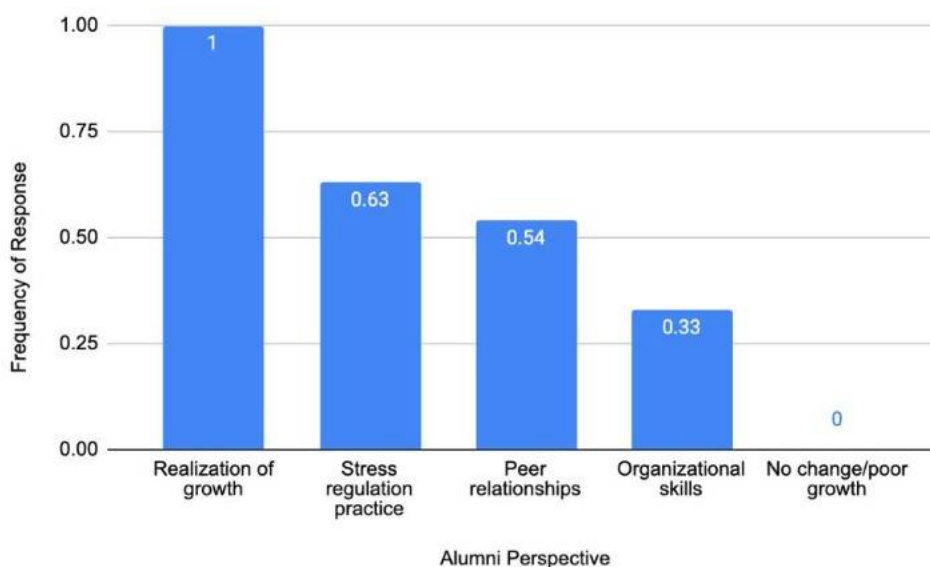
Bethany (Gr 12)	No one had ever told me like how stressful high school was going to be? Like they were just like, oh! It's stressful, it's busy – but I was never taught how to deal with it. Whereas positive psych gave me better tools that I could actually apply to my life – which was like, really nice!
--------------------	---

Forty-two percent mentioned school stress as standing out for them in Grade 9. Bethany (Table 34) indicates arriving in Grade 9 without the necessary tools and strategies to cope with the stress.

Thirty-three percent talked about peer stress and friend drama, and only two students mentioned difficulties with teachers. One student, Lindsay, talked about jumping in with both feet, getting involved with every opportunity she could find and described her Grade-9 self as “super energetic, super happy.”

**Personal Growth.** One of the things I was interested in was how these students felt they have changed or grown since Grade 9. For several of them, I had them in my classes this year and could see particular changes in them when I thought back to how I remembered them in Grade 9. But more importantly, was how *they* saw themselves, both then and now. This theme produced 4 categories – Realization of change/growth; a current stress regulation practice; improved peer relationships; and improved organizational skills. None of the students indicated that they felt worse or less prepared than Grade 9. Figure 24 illustrates the frequencies for each category.

**Figure 24**  
*Frequency of Responses Regarding Personal Growth*



All of the students described a type of positive personal growth. I found that the students were thoughtful and incredibly introspective. Table 35 depicts comments about personal growth.

**Table 35**

*Quotes from the AG Students about Personal Growth*

Student	Quotes
Kimberly (Gr 10)	So for instance my grades – I would try so hard to get the highest grades possible. And I was never really satisfied with my grades, 'cause I'd go, oh I could do better, I could do better! So I'd take something like that where I knew I had control over and just hold on to that and that wasn't good for my mental well-being either. So I was basically just going in a circle, not knowing how to control and understand <i>how</i> I was really feeling and learn I guess a different way of feeling – because before that I think I was still overall a very anxious person, but this year I've really noticed a huge difference, because I know how to control my feelings. Or even if I'm not necessarily in control, I know how to respond to that in a healthy way.
Lindsay (Gr 11)	So now I think I <i>have</i> calmed down, but I have more of a voice, like I'm willing to stand up for myself more, compared to Grade 9.
Harper (Gr 11)	I try to acknowledge how I'm feeling cause then I can try to move through it – cause I when I'm like I'm just going to ignore all the stress that I'm feeling - I just feel more stress and I don't resolve it. I've started looking into going into autistic advocacy – or just disability advocacy in general. 'Cause there's a lot of ways that the world could improve and a lot of things that could be done. I feel like the most important learning you do in life is about yourself.
Maddie (Gr 12)	I've learned about study methods and I've learned about like my past traumas in my life and how to deal with them now and how they come up in different circumstances – so for example to stop tiptoeing around someone when they're upset, when I didn't do anything wrong, right? And stuff like that.
Alyssa (Gr 12)	I think as well like Grade 9 was really the first year I kind of discovered that part of myself? So knowing how to – like you said – set my boundaries – which was something I really struggled with, as you knew – but it was really helpful just to keep myself protected, and keep myself grounded.
Megan (Gr 10)	...like the energy just feels like too much almost. If like there's a lot of people talking or something, it can just be like the classroom's like vibrating, I guess! In positive psych, I was still nervous (to present) just cause going in front of people isn't my favourite, but I think it was easier just cause the energy was so good in the room.
Madeleine (Gr 12)	Yeah! I mean I've been through a lot of different experiences that have shaped me into the person that I am. I don't want to go into detail – but yeah! Like I've been through a lot and I'm happy to where I am right now.

Many students (63%) also commented on their ability to deal with stressful situations better than they were able to in Grade 9. One interview was with Ellis, diagnosed with ASD and very limited

speech. I conducted the interview using his Educational Aide, Ms. C., who filled in details of Ellis's experiences in the Learning Hub, where he spent the majority of his day (Ellis was not in regular programming but did take the PP9 course with the class.) Ellis embraced the HeartMath sensor and breathing techniques, which has helped him to control his outbursts over the past 3 years. Ellis expressed himself in this way:

“So when you feel anxious now, do you feel like you know what to *do* to calm yourself down?”

(Ms. C.) “Yeah” (Ellis) “Yeah, that’s a good feeling, eh?” (Nods) (Ms. C.) “Ellis recovers *way* quicker than he used from his anxiety and his stress and anything that happens. And it’s less often that you have the outbursts, right Ellis?” (nods).

Many students commented specifically on their stress regulation practice as part of their growth since Grade 9. They were able to think about themselves currently while at the same time, reflect onto their Grade-9 selves and recognize the changes that they have made towards emotion regulation and stress management. Table 36 represents a few of the comments.

**Table 36**  
*Quotes from the AG Students about Emotion Regulation and Stress Management*

Student	Quotes
Bethany (Gr 12)	I’m feeling more confident – ’cause I’ve had to deal with like a lot of stresses that were new to me in Grade 9, but now they’re more common to me and I feel like I’m more experienced, and I have like better tools to deal with my stress.
Darius (Gr 11)	I have more perspective on the way I feel about my anxiety or the way I see it – it’s like a breakthrough. I did the breathing. I just really focused – it’s just the anxiety, it’s my body – I don’t actually want this anxiety, it’s really my body that’s doing this right? So I just focused on changing my body and then it definitely helped, I mean it was still difficult. But <i>now</i> , I find it’s actually quite easy for me to get up and present in front of people.
Kimberly (Gr 10)	I do use that along with the breathing and everything. I think overall just the whole concept of being able to control my emotions and regulate them a lot better – for me, I was, I <i>am</i> still a very anxious person – but I’ve noticed this year I’ve improved tremendously with not only like socially or even academically, just overall with like my mental well-being, I feel a lot more secure in myself. And I guess, yeah, I don’t know – all of it has kind of helped contribute to make me what I am today!

Madeleine (Gr 12)	On a scale from 1 to 10 – the beginning of high school was like a 2 out of 10! (Laughs) Now it's more like a 7 or something like I just think now that I know that I'm graduating and I'm gonna go into a different environment or whatever, I think I'm really excited about that!
----------------------	---

### Theme 3: Course Reflections.

**HeartMath Biofeedback.** I asked the alumni students to reflect back to the course to remember particular elements of it. Every one of them remembered the heart-focused breathing techniques using the HeartMath sensor and app as a way to visualize their level of relaxation. They were all able to tell me about the zone colours – green, blue, and red – although Maddie did mix up purple for the blue zone. All of them recalled “wanting to be in the green zone” because that’s where they felt the most calm and relaxed. Table 37 depicts ways students remembered the HeartMath biofeedback techniques.

**Table 37**

*Quotes from the AG Students about HeartMath Biofeedback Techniques*

Student	Quotes
Nadira (Gr 11)	I mostly remember HeartMath – just 'cause it was like every day. Just like 5 minutes where I could just like relax.
Bethany (Gr 12)	I feel like my favourite part of it was when we did the HeartMath at the beginning of every class. 'Cause I remember we would just take like 15 minutes and just like breathe, which was so calming and grounding. And I remember like looking forward to that class every day! And I remember it was first period too, so it was super nice to just have that moment of stillness right in the morning. And I feel like it set me up for success for the rest of my day.
Melissa (Gr 10)	Every day at the start of class, the HeartMath things, and that was a good way to start off the class. And you put the music on the Smartboard, I liked that.
Grace (Gr 12)	The actual idea of the HeartMath of really understanding of how deep you have to breathe, or how fast to kind of like regulate yourself? Like I think now especially if you're doing the HeartMath, I have <i>more</i> of an understanding – like I can almost like <i>feel</i> when it's in beat together, kind of thing? Like I can feel more of a rhythm, than just the idea of – I'm breathing! I don't feel anything happening! Right? Like just knowing that there is a connection makes it feel a little more like – real.
Kimberly (Gr 10)	We also had the chart and so we kept track of everything and that was helpful to see progress – and I guess it helped make something sense for me – on a day where I wasn't feeling my best and I couldn't necessarily put that into words, I just had this negative feeling – after doing the breathing exercise, not only would that <i>help</i> me move over into the green zone and have better control and become just more calm and positive, it would almost like validate the fact that

	I wasn't feeling great, and that's OK – but I was able to control that and it was helpful for me to realize that the world – there may be things that influence your emotions but you're the one who can decide how you take those things – and then how you can face those adversities or just change the way you perceive conflicts.
Madeleine (Gr 12)	I think that for a long time I never knew what I was feeling – I just felt like I was like unsure but didn't know. And I feel like seeing that and something telling you – hey, this is what you're feeling right now though your actual heart rate, then it became more like this makes sense why I'm feeling this way.
Evan (Gr 11)	And when you can see the biofeedback – so you can see the colours shift – did that help sort of validate, that yes, I am getting calm and I can see that I'm getting calm?
Hannah (Gr 12)	I always remember the things that we learned and just like breathing and like focusing on my heart and my heartbeat and trying to match those up. I'll do it subconsciously now without even noticing it – and I'm going to attribute that to positive psych. And I even bought a sensor!

Each one of these student experiences provides evidence of their deep understanding of how biofeedback helped them connect their inner physiology (breath, heart, brain) with the visualization from the sensor and app. Additionally, I asked students if they remembered what the sensor and app measured specifically, and why it was important to try to achieve high coherence (by being in the green zone). Seventy-one percent of the students were able to comment on how their breath, heart, and brain connection translated directly into a specific zone which could be presented to them visually on their phone through the app. The alumni students were able to describe this connection with a little more depth and higher degree of understanding than the Grade 9s. Melissa stated, “It was a circle and it was your breathing and if it was red, you're not focused I guess and blue was in the middle, and then green was you're focusing good. And then it would just give you like a reflection of everything – I remember that.” Grace described the connection as “we breathe, so we can slow our heart rate, so that our mind thinks clearly and we can feel better about our tests.”

***Calm Classroom.*** As mentioned previously, most recalled the classroom as quiet and calm, a place where they could continue to relax and find some peace in their otherwise chaotic school day. Eighty-eight percent of the students remembered learning about emotions – how to read them and also

how to regulate. Harper, who had a difficult Grade-9 year (which ultimately resulted in an ASD diagnosis and a move to online school) described how learning about emotions helped them: “Learning about emotions leads you to learn about yourself. And like it’s just very important for self-discovery is learning about the brain and emotions and that really helped me. I was like – there’s parts of the brain that do different things and that’s so cool and I want to learn more!” Rachel remembered how we examined the granularity of the emotions wheel to try to pin down specific ways of feeling, which helps students understand how they are feeling – as opposed to just “bad” or “sad”. She said, “I felt it helped to like figure out what was going on and – especially if you were in like the angry or sad emotions, that can be helpful, so you’re not just feeling really like frustrated!”

Other memories from the class included colouring mandalas (29%), learning about anxiety and panic and ways to handle it (25%), brain anatomy (25%), memory tips and class projects (25%), and forming lasting friendships while in the class (25%). Maddie remembered feeling supported and had a sense of belonging from her classmates in her PP9 class: “[The course] makes you feel like you’re surrounded by all these people and even if they don’t know what you’re going through it still feels like you have support all the way around you and I think that was the lovely thing about positive psych! Like it just started connections – like with friends.”

***PP9 as a Core or Option.*** All 24 alumni students were asked whether they thought a course like positive psychology, with mindfulness, SEL, and other coping strategies should be taught in Grade 9 as a core subject (similar to math, science, language arts, social studies, or gym) or an option (as it is currently). Their responses were somewhat mixed – with 67% feeling that it should be a core, whereas 33% felt it might be better as an option. Table 38 provides statements for support of PP9 as a core.

**Table 38***Quotes from the AG Students about PP9 as a Core Subject*

Student	Quotes
AD (Gr 11)	I think it would be really – in my case – it would be fantastic if it would be a core! I’m not gonna lie, for me, it would be really fun! (Laughs) I would enjoy that a lot! It would be good if a lot more people took it.
Lila (Gr 11)	Like it seems kinda obvious – like they teach you that when you’re younger in school – so like why should you stop? Shouldn’t everyone learn how to regulate their emotions, learn how to breathe, learn how to get along with each other and learn about mental illness?
Bethany (Gr 12)	I feel like even if it’s in Grade 9, it should be either like mandatory or incorporated into Phys ed or even CALM. ‘Cause it just teaches you life skills and even if you’re not wanting to participate, the environment kind of forces you to at least recognize your breathing which is like baseline. And I feel like even if you weren’t interested in it, you can still take skills away from that?
Darius (Gr 11)	I think 100% a core! I think it’s something that people completely miss in their lives. I see a lot of like anxious people.
Kimberly (Gr 10)	So if they are put into the environment and see like, OK, this is <i>me</i> ! This is like why I’m anxious here, or why I receive validation when I do <i>this</i> thing! I think physical literacy and mental literacy should coincide with one another and just work in tandem. Because they’re both so beneficial and they interlock in so many different ways, so I don’t really see <i>why</i> we wouldn’t?
Rachel (Gr 11)	I think it would be helpful for like all Grade 9s to take it because I know it helped me a lot for tests. And just like anxiety in the school – but I also feel like there are some people who just wouldn’t want to be there and it would make it hard for the other people to try and learn the techniques.
Hannah (Gr 12)	I think it would be a good breather from the other cores – and a good way to like split it up and yeah, I definitely think it would be a really good thing. And I think everyone should take it.
Alyssa (Gr 12)	Yeah, like having a course or even if it was a part of CALM or something where <i>all</i> students learned mindfulness – whether they wanted to or not. Kind of like <i>all</i> students take Phys Ed, whether they want to or not.

Several students thought that as a core, some students would feel forced to take it and might ruin it for the other students who actually wanted to be there. They felt that the beautiful calm atmosphere could be in jeopardy if students came in and were hostile, jeopardizing the calm and safe space that was present for their experience. Table 39 depicts those who feel PP9 should be offered as an option.

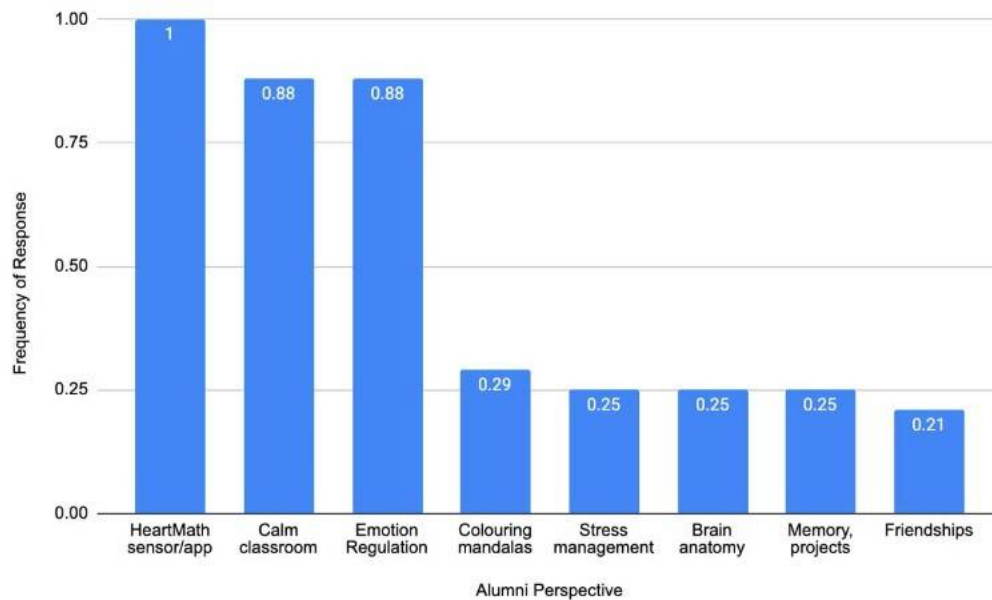


**Table 39***Quotes from the AG Students about PP9 as an Option Subject*

Student	Quotes
Anna (Gr 11)	I think forcing things on people makes them resent it. Like I <i>hated</i> gym and I was counting down the years – ever since 6th grade and I found out Grade 10 was the last year – I was counting down the year.
Grace (Gr 12)	I don't think it should be forced – I think one of the best parts of it was that it was an active choice you were making to want to learn about it – like it also could disturb the environment for the people that are there purely because they need to be, or they want to be.
Lindsay (Gr 11)	I think kids that are interested in this would definitely choose it and enjoy it and have fun with it – but I don't think that forcing certain kids into it would benefit the program at all.
Valerie (Gr 11)	I think it should stay an option because then if people choose it, they're gonna <i>want</i> to learn it – and I think options are generally more fun.
Evan (Gr 11)	I think at the start of the course, I was that kid! But then I saw the actual effects of it, and I went – oh! This actually works, this is <i>not</i> stupid! I think the issue if it did become a core class, would be you're always going to have kids who go, this is stupid! This isn't worth my time! and I think that could ruin the program. 'Cause if one person's not calm, you can <i>feel</i> that in the room. If one person's going, oh, this is stupid, I'm going to cause chaos with my friends the entire time instead – I think it would not be a positive experience.

Despite the differing opinions about where to place the course, 88% of the students commented on the importance of the course for Grade 9s, and that it seems to be the ideal time developmentally to introduce and learn these important concepts. Madeleine, who struggled with crippling shyness in Grade 9 and was later diagnosed with ADHD felt that the course was an important way to reduce the stigma of mental health and said she would “recommend this course to like every child going into high school.”

Figure 25 illustrates the types of course activities recalled by the alumni participants.

**Figure 25***Frequency of Responses Regarding Course Content*

Another question asked to of all of the participants was whether they felt that for students who have diagnosed anxiety or other mental health difficulties – that offering a course like this with elements of mental health awareness, coping strategies, and emotion regulation tools works best as a universal practice. Many of the students in this cohort had or currently have a therapist that they see regularly and were able to provide some relevant insight. An overwhelming number of students (88%) felt that the course could sufficiently meet the needs of students struggling with mild to moderate mental health challenges, and potentially help those who had not yet realized they might need the help. (This was the case for 3 students, who commented on finally reaching out for help after taking this course.) Table 40 depicts what some of the students stated about PP9 as a way to deliver universal mental health support.

**Table 40***Quotes from the AG Students about PP9 for Universal Mental Health Support*

Student	Quotes
AD (Gr 11)	I think it's good to always cover these generalized things that can happen to everyone. Because there was for a long time the stigma around it. And it is good that we're covering it now – and it's high school and everyone's gonna

	be a little bit anxious and a little bit stressed out. And you're gonna get those feelings depending on what you do. But it's good to know how to handle them as we go, and with that stuff in the course, I think that – even if it was a little brief, like we <i>did</i> figure out how to deal with it, and how to talk to others about it – so yeah! It was good!
Anna (Gr 11)	You feel like it's a safe place to learn about anxiety when we're all talking about it together and we're all just sort of like, nobody's being singled out, nobody targeted – but we're all like, if you're feeling anxious, try this.
Grace (Gr 12)	Well, I think it was good especially cause at the time I hadn't dealt with it, I hadn't talked with anybody about it – Whereas it's like – we're learning about it, we're looking at it where you could be, hey I kinda relate to that whereas it's not as much as you having to like seek it out.
Lindsay (Gr 12)	I mean I think it was kind of interesting to hear other peoples' perspectives and like their experiences 'cause it just develops a more empathetic person and like just cause I can go up in front of the class and say whatever and be confident, doesn't mean that everyone can?
Sadie (Gr 11)	It felt good cause I was gonna learn about what was going on. 'Cause the doctors aren't really like – they're just like you have anxiety and I'm like OK! So I feel like I kinda learned like <i>why</i> and how my brain works, kind of? And I would say it's definitely less stigmatized cause everyone's sort of recognizing it.
Kimberly (Gr 10)	Yeah, prescribedness of being in therapy is definitely not something I enjoyed. So yes, the class itself – plus that also made it feel a lot more casual and natural – and I think that's how it helped I guess destigmatize it for me – because it wasn't a strict environment where you're sitting in front of somebody who's prescribing you things. Yeah, it was just conversations with a group of people who felt similar but all had different stories but we were all just kind of embracing parts of ourselves that we were all struggling with. It's the opportunity to talk about it cause everyone in the class is hearing the same messages so when you go to therapy, you're very much alone, and you're the one being told about your condition, so you don't feel like you can share it really, necessarily. So, it was nice, it was a good environment.
Stella (Gr 11)	I also think it's a good environment to become aware – because I think like sometimes people are a little bit intolerant and that kind of stuff until you actually learn about it and realize that it's out there? And I think that that also kinda happened to me where I was like – I don't know! I think that people stopped joking about it as much – and I think that was good. But I think everybody became more like aware of their own mental health.
Rachel (Gr 11)	I remember that it was really nice to know that I wasn't alone because I feel like a lot of the times I was just thinking, I'm the only one going through this.
Maddie (Gr 12)	I think it's much more normalizing – like I think the issue about people reaching out and getting help is that they always – like I think it's either people think that other people aren't going through the same things, or they always think that there's someone who has it worse than them. And both of those – right? I find that a lot of people don't reach out because they're like well, this person needs it more than I do, so then why would I take up this person's time?

Bethany, on the other hand, wondered if some people might need a bit more support. She tried to balance the two approaches and said, "...if it were more broad they wouldn't think that it was directed at them and they wouldn't feel like they're receiving help? But then, on the other hand, a lot of people have a lot of trouble reaching out for help –so then it's good to give them the tools without them having to ask. So, I feel like it depends on the situation."

#### **Theme 4: Coping with Stress.**

***Coping Strategies.*** When I asked the alumni students what kinds of coping strategies they were currently using for stress and anxiety management, all of them (100%) mentioned a type of breathing practice. For a few, it was a few quick breaths before a test or presentation, while for most, it was a much more involved practice which began after the PP9 course and evolved into something that was tailored and unique to each student. Table 41 describes their continued use of breathing practice.

**Table 41**

*Quotes from the AG Students about Continued Use of Breathing Practice*

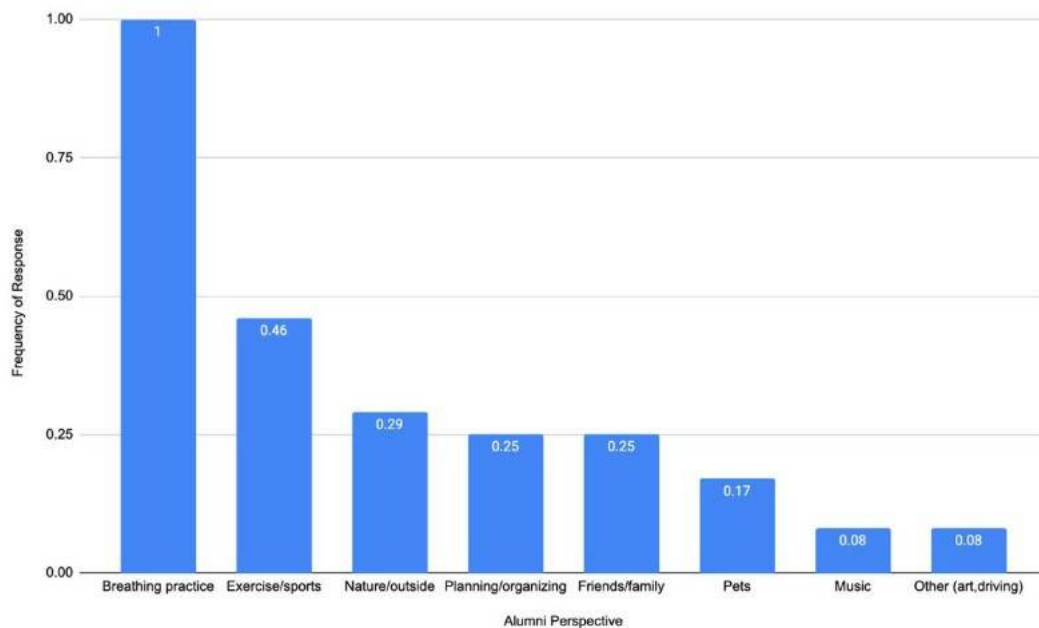
<b>Student</b>	<b>Quotes</b>
Grace (Gr 12)	I feel like most likely what it is when I start to like feel my signs of anxiety a little bit – where I <i>feel</i> like I'm stressed – like it's almost instinctive now like I don't have to really think about it as much and I just kind of – it doesn't take long – I'll just breathe for as long as I feel it makes me feel better – the other times I do it, I do for actual long amounts of times, like before I go to sleep for 5 or 10 minutes.
Shannon (Gr 12)	If I'm in a stressful situation or know there's a lot going through my head or something, then I'll just take a minute and step back and using the breathing method to ground myself.
Ellis (Gr 11)	(I do the breathing) The same way you taught me. The way you taught me.
Madeleine (Gr 12)	I remember that being like really relaxing and really helped. 'Cause I have anxiety, so that really helped me a lot. Like especially in the morning 'cause they you could just relax and like take a step away from your other classes and just like focus on your breathing and stuff.
Stella (Gr 11)	We did a lot of breathing stuff – so that was probably my favourite part about it. 'Cause it kind of made me realize that it wasn't like cringy to just practice your breathing. 'Cause I was like – as you know – I was like, why would I do this? But now I just try like whenever I'm stressed out to just breathe – I feel like I can feel myself like getting angry and I'll be like, OK, just breathe, just think or whatever and – I feel like the breathing part is what I took from it and what I use – like a lot. Still using it too.

Kimberly (Gr 10)	Definitely the breathing! That has probably been the number one thing that stuck with me the most – and I found to be very helpful. I guess the whole concept of when you’re trying to change your perspective on something or your mood overall, always start within your body itself and with your breath, and that, I still use to this day, really helps me.
Lindsay (Gr 11)	I think the deep breathing did really help. And it kind of taught me to be more grounded and stuff during tests and all that – and I still definitely do use the deep breathing when I do tests.

Figure 26 illustrates the different types of coping strategies currently used by this group of students. Madeleine mentioned needing to be in nature to feel calm and relaxed and stated, “...going outside and just seeing nature, and seeing trees and stuff, somehow calms me down. Or just like hugging a tree! Or putting my feet in the grass – grounding myself that way.” A few students mentioned planning and organizing as a way to feel calm and distress.

**Figure 26**

*Frequency of Responses Regarding Coping Strategies for Alumni Students*



**Coping Self-efficacy.** A key question for this group of PP9 alumni was whether they had developed a sense of self-efficacy, in that they felt confident in their ability to address and manage stress, and that they felt that they had control even in difficult or uncertain situations. All of them mentioned continuing to use elements and practices learned in the Grade-9 course, even years later (for

the 11s and 12s). Grace (Grade 12) said, “But this (the sensor/app) feels more validating almost. It shows like actually – like if you do breathe, it *will* help – so I use it all the time, right – tests, or when you’re just stressed out with a lot of assignments... I am a person with diagnosed anxiety, so I tend to use it often.” And Hannah (Grade 12), who received her own sensor for Christmas one year said, “I do use it (the sensor) quite a bit, and especially around exams. And especially before I go to bed...But I think with a combination of the meds and just learning better coping skills, I was really able to take a minute to breathe... And I haven’t had a panic attack in a really long time.” Table 42 depicts the students’ feelings of confidence in handling their emotions and navigating through stressful situations.

**Table 42**

*Quotes from the AG Students about Confidence to Manage Stressful Situations*

Student	Quotes
Kimberly (Gr 10)	I think I feel confident in my ability to take on any stressors – I don’t know what may come my way, and I know there’s a lot of different variations of what could happen! (Laughs) But as long as I can take a challenge or an adversity like that and take what I know and have learned about myself and try and apply those to whatever the conflict might be, and if that doesn’t work, then I can just learn more! And I’m not somebody who gives up easily so I will continue to try and fight for whatever I need to do but without this course, I don’t know, I probably would have just panicked and (pause) um, probably the conflict would have gotten worse because I wouldn’t have know <i>what</i> to do and I would have – yeah! Panic!
Sadie (Gr 11)	I do it whenever I feel like I need it – like if I’m feeling stressed and I can feel my fingers tingle and stuff, then I start to breathe. I breathe before I do my tumbling!
Bethany (Gr 12)	I’m feeling more confident – ’cause I’ve had to deal with like a lot of stresses that were new to me in Grade 9, but now they’re more common to me and I feel like I’m more experienced, and I have like better tools to deal with my stress. I feel like it’s honestly breathing. Like every time I go to write a test, I like sit there and I close my eyes and I take 3 deep breaths. And I feel like that’s like something that I do in every aspect of my life.
Ellis (Gr 11)	I know what to do when I feel anxious. Just think about positive stuff. Happy stuff.
Melissa (Gr 10)	Yeah. I think the breathing was like the biggest thing I took out of it. It was like how to calm myself down cause breathing can work like any time, so I’m just used to it and I know what to do to calm down now.

Hearing these students speak so confidently and bravely about their previous struggles with anxiety, and their current self-realized superpowers – with breathing practice as their prized tool in their coping toolbox, fills me with pride and contentment. As I watch and listen to each of these students tell me their stories of struggle, diagnoses, stressors (past and current), and even trauma, followed by their fierce pride in their high school journey complete with a new confidence in handling the slings and arrows that continue to come their way, I am filled with hope and optimism. I also feel deep gratitude that I was able to play a small part in their social-emotional developmental journey by providing and embodied learning practice. Not only did we *learn* techniques to calm down and regulate stress, we *did* calm down through our shared practice.

**Classroom Affective Experience.** Both cohorts reported feeling very strong, positive, calm vibes in the classroom. Several students talked about feeling safe and comfortable and were able to attribute these feelings to the sights (low light, nature visuals on board), sounds (music, quiet room), smells (diffuser, toast), textures (weighted blanket, soft lounge chairs), and even tastes (toast and tea). Raisa, a shy, reserved student said, “It was like calming and I felt safe there with people I could like talk to – just like a place where people could feel safe and where they could like just be at peace for a bit.” The alumni group remembered this feeling – for some, it had been almost four years since they were in the class in Grade 9. Madeleine, also a very shy and reserved student when she was in Grade 9, felt much like Raisa stating, “I remember feeling (pause) like if I just take a minute to close my eyes (closes eyes) I feel like – like we were all like breathing together and it made me feel like more safe in a way?” Every one of the alumni students reported feeling calm and enjoying the atmosphere in that classroom. As I talked with each of them, they imagined themselves back into that room, remembering how it felt when they were there and how *they* felt in that classroom. Maya Angelou (n.d.) was on to something when she said that people may not remember what you said, but they will remember how you made them feel. These students remembered how I (and our coherent classroom) made them feel.

## UL Quadrant: Zone 2 Individual Subjective Outside Perspective

The Developmental Perspectives Survey (DPS) was designed to provide a sense of the developmental level(s) each cohort (Grade 9s and alumni) aligned with, in order to get a sense of their worldview. The survey was made up of both Likert scale questions (several aligned with the epistemology of each quadrant) and two sentence completion statements, again from each quadrant. From there, two separate data analyses were used, given that the Likert questions required a quantitative method, and the sentence completions a thematic analysis. Table 43 illustrates the themes that emerged from the two parts of the DPS given to the EG and AG.

**Table 43**

*Findings Map – UL Zone 2*

Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews (EG and AG) Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Themes:</b> <b>Social Awareness:</b> EI and ER increased Calm classroom and positive relationships increase coherence (EG/AG) <b>Anxiety Symptoms:</b> Cognitive impairment (EG) <b>Anxiety Situations:</b> Tests, presentations, peers (EG) <b>Course Feelings:</b> Positive, safe space, enjoyed HeartMath biofeedback, recommend to others <b>School Feelings:</b> Need teacher connections, better engagement (EG/AG) <b>Self-awareness:</b> Breathing practice contributed to increased personal growth and ER <b>Coping Strategies:</b> HeartMath sensor/app and breathing practice was very effective, still using <b>Coping Self-efficacy:</b> Increased confidence in stress management using breathing practice <b>SEL as a core:</b> EG/AG recommend	<b>Themes:</b> <b>Social Awareness:</b> EG slight increase in SA <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect) <b>Anxiety Symptoms:</b> EG slight decrease in anxiety <b>Cognitive Interference:</b> EG slight decrease in CI <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG) <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?
<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app (N=47)
<b>Themes:</b> <b>Behaviours caused by nature and nurture</b> EG, AG <b>Science is truth, explanatory</b> (EG/AG) <b>Mixed feelings about growing up</b> (EG) <b>Relationships, coping important for health</b> EG,AG	<b>Themes:</b> <b>Significant increase in Average Coherence score</b> from Baseline to Time 2 for EG and McLeod



<b>Inclusion and diversity important for connections (EG/AG)</b> <b>Schools/society need to be safe, inclusive, tolerant for all (EG/AG)</b>	
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

### *DPS Quantitative Findings*

The DPS consisted of 5–7 Likert scale questions and two sentence completion statements per quadrant. Likert scale statements (1 – strongly disagree; 5 – strongly agree) were analyzed for the EG (N = 41) and AG (N = 20) using univariate ANOVAs for each factor. Each statement corresponded with a particular developmental level (red-orange-green-turquoise) such that the participant’s rating either aligned with the identity of that level or was opposed to it (at the most extreme ends of the scale). Figure 27 depicts the colours and respective developmental levels.

**Figure 27**

Wilber’s Altitudes of Development

<b>POST INTEGRAL – INDIGO (Spiral Dynamics Coral)</b> Realizes Oneness. Exhibits wisdom, joy & love. Seen in saints and sages throughout history. Theoretical and aspirational.
<b>INTEGRAL – TURQUOISE</b> Sees the World as alive and evolving. Holistic & kosmo-centric. Lives from both individual self and trans-personal Self. Emerging now.
<b>INTEGRAL – TEAL (Spiral Dynamics Yellow)</b> Sees natural hierarchy and systems of systems. Holds multiple perspectives. Flexible, creative and effective. Leading edge of consciousness and culture.
<b>POST MODERN – GREEN</b> Values pluralism & equality. Relativistic & sensitive. Civil rights & environmentalism. World centric. Online 50 years.
<b>MODERN – ORANGE</b> Values rationality & science. Individualism & democracy. Capitalism & materialism. Risk-taking & self reliance. Online 300 years.
<b>TRADITIONAL – AMBER (Spiral Dynamics Blue)</b> Ethno- or nation-centric. Values rules, roles & discipline. Faith in a transcendent God or Order. Socially conservative. Online 5,000 years.
<b>TRIBAL – RED</b> Ego-centric, vigilant & aggressive. Impulsive and ruthless. Courageous, determined and powerful. Online 15,000 years.
<b>INDIGENOUS – MAGENTA (Spiral Dynamics Purple)</b> Sees the world as enchanted. Values ritual & deep community. Individual subordinate to group. Online 50,000 years.
<b>ARCHAIC – INFRARED (Spiral Dynamics Beige)</b> Dawning self-awareness. Survives through instinct, intuition and banding with others. Online 250,000 years.

From: <https://www.dailyevolver.com/2018/01/evolution-humanity-human/>

An exploratory Principle Components Factor Analysis with a Varimax Rotated Factor solution was run on the Perspectives Survey that the EG and alumni (AG) students completed. Items with were grouped into factors according to loading scores (SPSS raw data is available upon request.)

### ***DPS Qualitative Findings***

Data analysis in Zone 2 used a structuralist approach, where I was able to “look for interior structures and stages in the psyche and in culture” (Wilber, 2006, p, 54). Wilber (2006) stated that structuralism as a methodology is studied by asking participants a series of questions and looking to see if their responses “fall into any classes [which] if so, follow these classes over time and see if they emerge into a sequential order of stages” (p. 53). At this point, the researcher can peer into the interior psychological structure of the participant from an outside perspective. I was interested in what my participants were thinking and feeling from each of the integral model quadrants. From there, I looked for patterns or “classes” to determine at which level the Grade 9s and alumni were operating at, and whether there were similarities and differences.

The DPS was completed by students in the PP9 class (EG) (N = 41) as well as the alumni group (AG) (N = 20) at one time point only. Each group was initially analyzed separately for emerging themes from sentence completion statements from the DPS. Frequency tabulations indicate the number of responses coded with a particular theme. Themes were derived from both the codes that emerged from the statements made as well as predetermined from the research question. Codes, along with relevant participant quotes were collected in NVivo and then aggregated into larger themes. (Theme analysis data can be provided upon request.) After separate group analyses were completed, a synthesis of data allowed for comparisons and contrasts between the groups to look for developmental trends. The reason for this comparison was to get a better understanding of which level(s) these groups of students tend to operate from, which in turn, affects their perception of themselves, others, and the world. To help simplify these findings, I will address each quadrant separately, discussing the quantitative data first, followed by the qualitative data.

### ***UR Data Analysis***

**UR Quantitative Data Analysis.** The UR quadrant (What others think/believe) produced two

factors. Factor 1 (Items 2: People have equal chance to be whatever they want to be, and they must work hard and rise up to be successful; and 3: If people work hard, they should make more money so they can buy nicer things) meaning a belief in meritocracy. Factor 2 (Items 1: Science provides us with the ultimate Truth, no matter your race, culture, or wealth; and 4: Climate change is real but affects people, animals, and plants in different ways, depending on where they live on the planet) meaning a belief that science provides us with the absolute truth. Table 44 provides an overview of the quantitative data from all of the quadrants.

**Table 44**  
*DPS One-way ANOVAs for EG and AG*

Theme	Factor	EG (N = 41) M (SD)	AG (N = 20) M (SD)	F	p	ES
UR What others think/believe	Meritocracy	7.22 (1.67)	6.60 (2.16)	1.52	.222	-
	Science as Truth	7.68 (1.59)	8.50 (1.32)	3.96	.051*	.05
UL What I think/ believe	External Authority	7.07 (1.89)	7.00 (1.72)	.021	.884	-
	Int. Locus of Control	6.71 (1.57)	7.90 (1.30)	8.66	.005*	.11
	Nature Connection	7.68 (1.35)	8.15 (1.50)	1.50	.226	-
LL What we think/believe	Tolerance Equality	10.46 (2.26)	12.05 (1.99)	7.15	.010*	.09
	Peer Influence	9.12 (2.20)	9.70 (2.43)	.864	.356	-
LR What the system believes	Universal Acceptance	8.35 (2.37)	9.68 (2.26)	4.20	.045*	.05
	Punishment & Control	5.69 (1.56)	4.84 (1.53)	4.14	.047*	.05

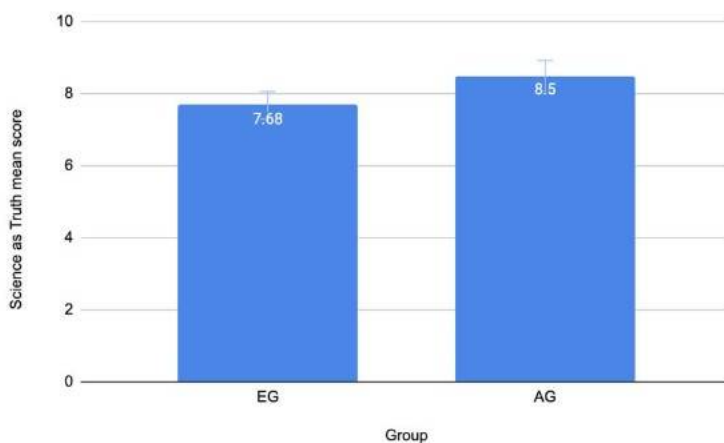
\*indicates significance ( $p < .05$ )

Factor 1 (the belief in meritocracy) resulted in a slight (not significant  $p = .222$ ) difference between the EG and AG. Interestingly, the EG was 8.6% higher, indicating their stronger belief that if you work hard, you will be rewarded. It is possible that the AG group have experienced more failures (many had already completed a round of Diploma exams) and have become more jaded with respect to just having to work hard to get rewarded. They have likely nuanced their view of meritocracy after having seen a number of different scenarios beyond what they might have only experienced in Grade 9 (as per the EG experience).

Factor 2 (science is the absolute truth), revealed a large difference between the AG and EG for their belief in science as truth. The AG score was 10.7% higher than the EG, and the difference in reported scores was significant ( $p = .051$ ). The emphasis on science as a fundamental way of understanding the world only becomes more entrenched as students spend more time in school and contemplate and try to explain the way the world works. Figure 28 represents a comparison between the EG and AG for science is truth.

**Figure 28**

*Univariate ANOVA of EG and AG for UR Factor 2: Science is Truth*



**UR Qualitative Data Analysis.** The UR quadrant examined students' beliefs about what causes human behaviour and their feelings about science. The responses from the students will tell a story of how they view themselves individually from an outside, objective perspective. Developmental levels from Piaget and Wilber can be used to determine generally where each group is positioned. Table 45

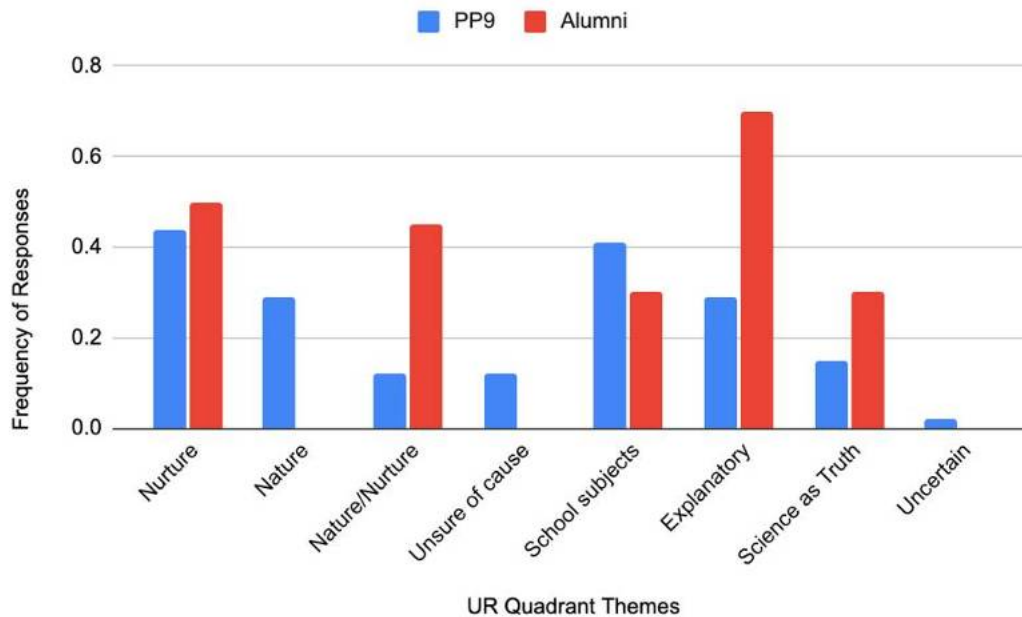
summarizes the major themes that emerged from the survey and provides a comparison of the EG and AG for the UR quadrant. Frequencies were calculated from the number of responses aligned with each theme and then divided by the total number of students ( $N_{EG} = 41$ ;  $N_{AG} = 20$ ). The EG students are bolded (and appear first), followed by the AG (unbolded) for each theme. (Note: The UR section on the DPS was positioned at the end, and as a result, 1 student from each of the groups did not complete the question. Thus, for the UR data, there were 40 students from the EG and 19 students from the AG.

**Table 45***Thematic Analysis Comparison of EG and AG for UR Quadrant*

Quadrant	Themes	Summary of responses	Freq- uency	Student Quotes
<b>UR Feelings about Human Behaviour</b>	Behaviours caused by experience – nurture	<b>Past experiences, traumas, influences, how you were raised</b>	<b>.44</b>	<b>“Influences around them, the environment they grow up in, and simply having a bad or good day” (Lily)</b>
		Influences from the environment you were raised in, traumas	.50	“the experiences we have endured and how we have been taught to react from them” (Lila)
	Behaviours caused by genetics and your emotions – nature	<b>The brain and how it is wired, influence of emotions</b>	<b>.29</b>	<b>“How the brain is wired” (Danica)</b>
		None of the alumni students reported nature as the cause of behaviours	0	
	Behaviours caused by nature AND nurture	<b>The brain/mind and how we were raised/influenced</b>	<b>.12</b>	<b>“Genetic and environmental factors [and] also how we exercise and get out in the real world” (Hudson)</b>
		Alumni include more factors – brain, environmental influences, society, culture, climate	.45	“A mixture of nurture and nature. A balance of the knowledge, abilities and traits we are born with and the experiences we have” (Lindsay)
	Unsure of what causes behaviours	<b>Students report unsure of the causes</b>	<b>.12</b>	<b>“I don’t know” “Unsure” (several)</b>
<b>UR Feelings about Science</b>	Science in school subjects	<b>Bio, Chem, labs, atoms, Periodic table, tests</b>	<b>.41</b>	<b>“What we learn in science class at school” (Rowan)</b>
		Bio, Chem, labs, atoms, Periodic table, tests	.30	“Passing Chemistry” (Sadie)
	Science as explanatory	<b>Understanding the world around us – biology, nature, universe</b>	<b>.29</b>	<b>“What has been discovered in this world. Pretty much everything happens for a reason that science can explain” (Elianna)</b>
		More detailed view of complex ecosystems, interrelationships, understanding of chemistry (molecular level)	.70	“When I think of science, I think of biology and physical sciences including cell structures and natural elements, chemistry, physics, and all those associated to the explanation of the natural world around us and figuring out what is both possible and separately achievable by the human species” (A.D.)
	Science as Truth	<b>Science provides us with facts, knowledge, truth about the world, research, medicine</b>	<b>.15</b>	<b>“Things that are proven by tests and things that we learn more on” (Oaklynn)</b>
		Science provides us with facts, knowledge, truth, research, medicine	.30	“Facts and truth. Reason and questions. Science is the pursuit of truth” (Anna)
	Science as mystery, uncertainty	<b>Science as false, God/religion as the truth</b>	<b>.02</b>	<b>“Science is not true. God is the ultimate truth. Science is false” (Freya)</b>
		No alumni reported science as a mystery or false	0	

When thinking about what causes human behaviour, the Grade-9 students felt that both nature and nurture played a role, with responses slightly favouring the environmental influences. The inner mechanisms of the brain and neural wiring (nature) seemed much more important to the EG than the AG, who overwhelmingly believed that outside influences played a much bigger role, with no alumni students believing that *only* the brain and mind were responsible. Thus, considering the stronger focus on the self, the Grade 9s likely represent a red, or egocentric level of development, whereas the alumni are moving towards a more expansive orange and formal operations level, where the outer world plays an important role.

With respect to beliefs about science, both groups were quite similar in that they believed strongly in science as truth and reason. Given that they are both currently in the same school system, they are taught through science courses that scientific facts and knowledge do in fact explain how the world works and why things are the way they are. The majority of alumni students highlighted the explanatory ideas, whereas more of the Grade 9s focused on science as being more about school subjects, like biology, chemistry, and physics. Grade-11 A.D.'s quote offers more detail and a deeper understanding of how science works and what it is for; whereas Grade-9 Elianna simply feels that science "discovers things in the world" and that science can explain it. Both groups are operating at an orange level of scientific understanding, where science and technology provide us with the sole, objective way to view and understand the world around us. Figure 29 represents relative frequencies of responses of Grade 9s and alumni.

**Figure 29***Thematic Frequency Analysis for EG and AG for UR Quadrant***UL Data Analysis**

**UL Quantitative Data Analysis.** The UL quadrant (What I think/believe) produced 3 factors. Factor 1 (Items 2: When I feel afraid, I go to my parents for help; and 6: Rules are made to protect people) converge on a leaning towards external authority. Factor 2 (Items 1: I believe that my health is totally dependent on my behaviour; and 3: Creativity is a skill that can be taught) meaning an internal locus of control. Factor 3 (Items 4: I can feel connected to nature or to a pet; and 5: There is the same life energy running through all living things and people) meaning a nature connection.

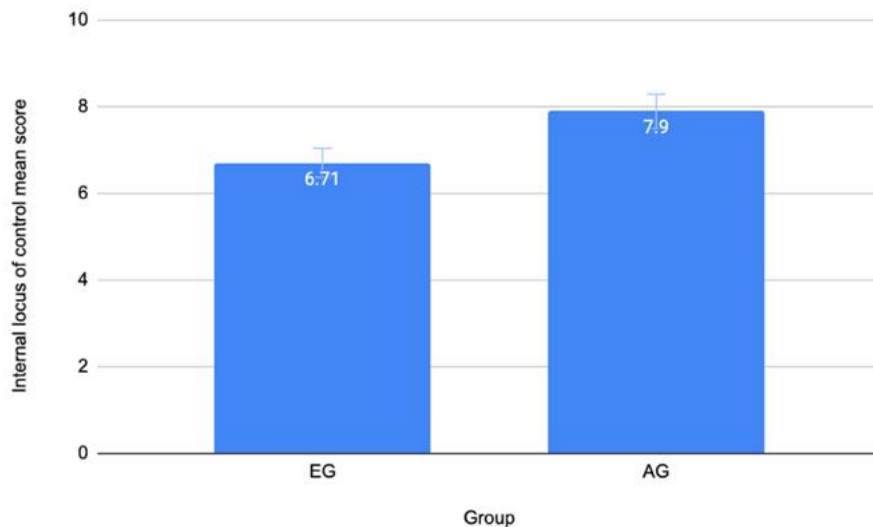
Factor 1 (external authority) resulted in almost identical mean scores for the EG ( $M = 7.07$ ,  $SD = 1.89$ ) and AG ( $M = 7.00$ ,  $SD = 1.72$ ) and therefore no significant difference. It appears that how students feel about external authority (parents, teachers) does not seem to change from Grade 9 to older students. This makes sense, given these students are all still in school, still having to respond to authority and still living with their parents. Factor 2 (internal locus of control) showed a significant difference ( $F(1, 60) = 8.659$ ,  $p = .005$ ) between the EG and the AG. The AG scored 17.7% higher, which means that the AG

feels more strongly that how they think, feel, and behave and have a stronger influence from within, as opposed to an external source – such as their family and friends. The EG, on the other hand, are still relying more heavily on external sources to help guide them, however, a continued dependence and deferral to an external locus of control is associated with lowered self-efficacy and self-awareness.

Figure 30 represents a comparison between the EG and AG for internal locus of control.

**Figure 30**

*Univariate ANOVA of EG and AG for UL Factor 2: Internal Locus of Control*



Factor 3 (nature connection) showed a slight (but not significant) increase in mean scores for the AG ( $M = 8.15$ ,  $SD = 1.50$ ) as compared to the EG ( $M = 7.68$ ,  $SD = 1.35$ ). The belief that all living things are connected through a holistic life energy may be more abstract for the younger students, but possibly can be better visualized and understood with the alumni students.

**UL Qualitative Data Analysis.** The UL quadrant examines feelings about growing up and how students feel about themselves as individuals. Comments derived from the sentence completions will help establish a developmental level according to ego development and perspective of individual self. Table 46 represents a thematic analysis comparison of the EG and AG for the UL quadrant.



**Table 46***Thematic Analysis Comparison of EG and AG for UL Quadrant*

<b>UL Feelings about growing up</b>	Getting older, more mature, more responsibility	<b>Getting older, maturing, getting wiser, more responsibilities</b>	<b>.34</b>	<b>“Maturing and becoming more aware. Gaining more responsibilities and becoming more self- reliant” (Carly)</b>
		Handling more responsibility, adult things, financially responsible	.30	“Maturing is getting new stressors such as bills and driver’s license, etc. Growing up is learning to handle new things” (Hannah)
	Mixed feelings, Loss of innocence	<b>Loss of innocence, excited about getting older, but afraid to lose childhood innocence</b>	<b>.22</b>	<b>“A rollercoaster. There are so many ups and downs along the way, and so many different emotions and feelings being tossed around. It is fun and exciting, but can also be scary and stressful.” (Lily)</b>
		Loss of innocence, excited about getting older, afraid to lose childhood innocence	.40	“Almost sad. I feel as though I grew up too fast, had to live through too much. But I also see it as a fresh start and hope” (Grace)
	Feeling scared, worried, pessimistic	<b>Stressful, hard, not ready</b>	<b>.20</b>	<b>“As I grow older the more stressed I get about things in the future” (Landon)</b>
<b>UL Feelings about me</b>		Stressful, hard, not ready	.20	“A really scary thought that I’m not ready for yet” (Maddie)
	Feeling hopeful, excited, optimistic	<b>Learning new things, getting to do more stuff</b>	<b>.07</b>	<b>“Being able to have a fun experience and being able to try what you want” (Hudson)</b>
		Learning new things, getting to do more stuff	.05	“Learning new things...exciting” (Bethany)
	Relationships	<b>Friends, family, pets</b>	<b>.39</b>	<b>“I’m with people who love me” (Oaklynn) “being with my horses” (Jacqueline)</b>
		Friends, family, people I love	.75	“When I am with people I know love me and I love them” (Bethany)
	Being alone, safe environment	<b>Feeling good, safe, comfortable</b>	<b>.20</b>	<b>“I am in a safe and calming environment” (Connie)</b>
		Feeling good, safe, comfortable	.10	“I’m in my safe spaces or with the people I love” (Grace)
	Stress and pressure	<b>No stress or pressure, doing things I love</b>	<b>.10</b>	<b>“I feel my best when I have nothing to worry about and when I’m doing the things I love...I have free time and there’s no school the next days” (Zane)</b>
		I have everything I need, organized	.10	“I feel best when I have everything I need at my fingertips, a quiet environment, time to plan and complete everything I have on my plate” (A.D.)
	Healthy mind and body	<b>Eating well, taking care of my body, well rested</b>	<b>.07</b>	<b>“I also feel my best when I eat well, am productive and organized, and get things done.” (Lily)</b>
		Exercise, physical and mental health	.10	“I’m being mentally or physically active” (Evan)

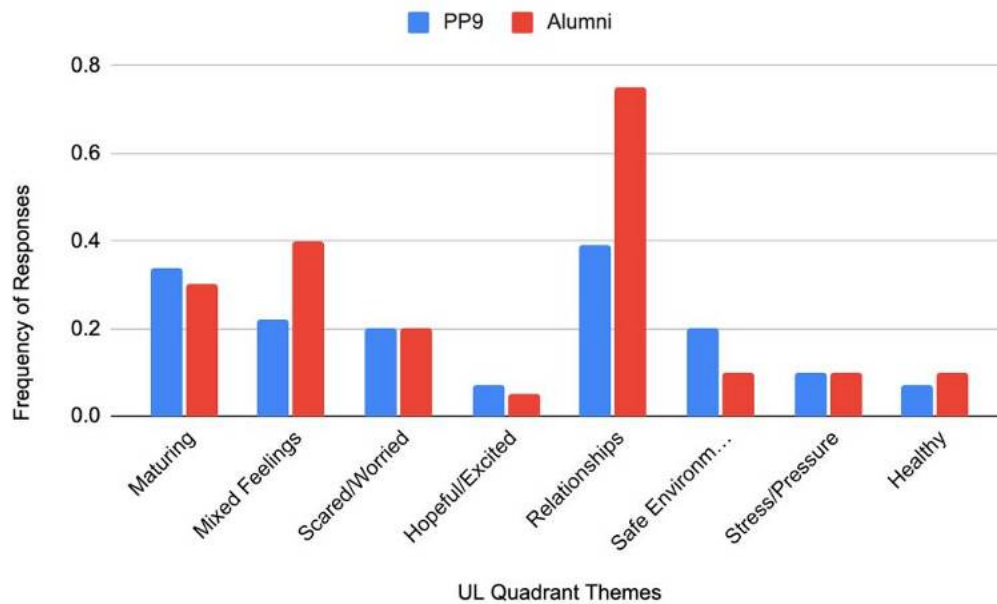
When asked to reflect on growing up, the Grade 9s mainly talked about maturing, having to accept more responsibilities, and basically just getting older. For Carly, growing older means “maturing and becoming more aware. Gaining more responsibilities and becoming more self-reliant,” whereas for Grade 12 Hannah, growing older means increased responsibilities and additional “stressors such as bills and driver’s licence.” The majority of the alumni, on the other hand, had mixed feelings about growing up – likely as a result of some of them (Grade 12s) about to leave childhood behind and enter the new world of adulthood. As Grade-12 Grace looked back, she stated, “Almost sad. I feel as though I grew up too fast, had to live through too much. But I also see it as a fresh start and hope.” In both groups, there

were more responses indicating a sense of stress or worry about the future as compared to a feeling of hope and excitement. While Landon indicates that as he grows older, he begins to feel more stressed, Hudson kept it light, stating, “Being able to have a fun experience and try what you want.”

When asked to describe when they feel their best, both groups overwhelmingly (AG = 75%; EG = 39%) talked about relationships – friends, family, significant others, and pets. Many expressed the importance of being with “people who love me and people that I love” (Oaklynn). Some mentioned their pets, such as dogs and cats, while Jacqueline mentioned feeling her best when she’s with her horses. Both groups responded somewhat equally when it came to feeling safe and managing stress. Zane said, “I feel my best when I have nothing to worry about and when I’m doing the things I love...I have free time and there’s no school the next days” and A.D. felt his best when “I have everything I need at my fingertips, for example access to technology, a quiet environment and time to plan and complete everything I have on my plate at the moment.” The lowest frequency of responses involved a having and maintaining a healthy mind and body, with Lily mentioning eating well as a function of feeling her best. The heavy focus on relationships indicates a movement towards green for both groups and in particular the alumni group (who reported feeling their best when involved in relationships at a much higher frequency). Figure 31 shows the frequencies of responses for the individual subjective perspective.

**Figure 31**

*Thematic Analysis Comparison of EG and AG for UL Quadrant*



### ***LL Data Analysis***

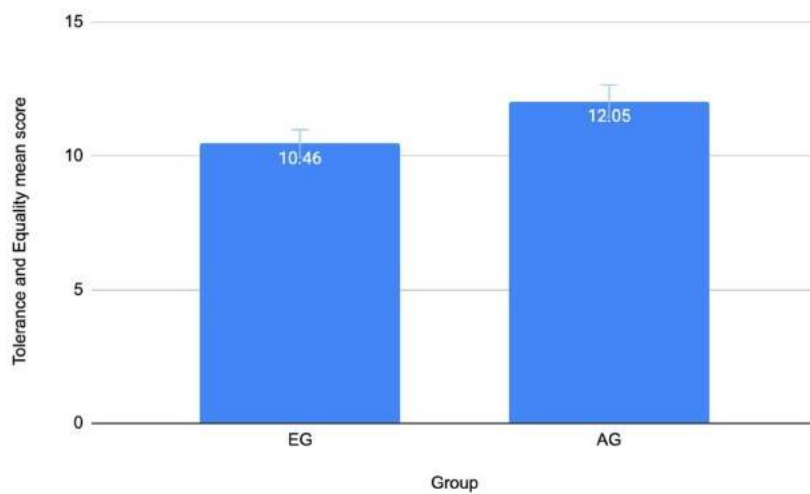
**LL Quantitative Data Analysis.** The LL quadrant (What we think/believe) produced two factors. Factor 1 (Items 2: Everyone should be treated equally and given the same wages, homes, opportunities, benefits, no matter that they do or who they are; 3: It is important to learn more about other cultures, races, religions, and ways of living so that we can understand other peoples' points of view more clearly; 4: We are all connected in some way and the things I do influence many other people) meaning tolerance and equity for all. Factor 2 (Items 1: It's better to do something you don't want to (still legal) in order to fit in and be liked by your peer group; 5: If you work hard in school, you can get any job you want; 6: It is important to belong to a group of some kind) meaning conformity to others.

Factor 1 (a belief in tolerance and equality) revealed the largest difference between the two groups, with the AG ( $M = 12.05$ ,  $SD = 1.99$ ) scoring 15.2% higher than the EG ( $M = 10.46$ ,  $SD = 2.26$ ). The difference was statistically significant ( $F(1, 60) = 7.152$ ,  $p = .010$ ). This would indicate an increased awareness, understanding, and expansion of their worldview towards tolerance and acceptance of

diversity. In social studies (a mandatory course in high school), students learn about different cultures, ethnicities, socio-economic factors, and others that help to broaden their outlook and expand their worldview of tolerance and equality. In psychology courses (of which most of the alumni have several of), mental health, stigma, and acceptance for all is taught explicitly, providing students with the opportunity to engage their thinking and challenge their assumptions. Figure 32 looks at tolerance and equality between the EG and AG.

**Figure 32**

*Univariate ANOVA of EG and AG for LL Factor 1: Tolerance and Equality*



Factor 2 (conformity to groups) did not show a significant difference, with the AG ( $M = 9.70$ ,  $SD = 2.43$ ) scoring slightly (not significant,  $p = .356$ ) higher than the EG ( $M = 9.12$ ,  $SD = 2.20$ ). Again, considering that these students are still in school, where conformity to others, including peers, teachers, and families is common and often times even necessary to achieve the desired school-related outcomes.

**LL Qualitative Data Analysis.** The LL quadrant examines one's feelings about relationships with others and inclusion in groups. As Grade-9 students mature to upper levels, they are likely to progress from an individualistic, ego-centered red level to a third person, societal orange level, and then to a pluralistic, group-focused and likely more tolerant and diversity-aware green level. Table 47 looks at the comparison between these two groups from the collective inter-subjective perspective.

**Table 47***Thematic Analysis Comparison of EG and AG for LL Quadrant*

<b>LL Feelings about relationships</b>	Type of relationships	<b>Friends, family, boyfriend/girlfriend</b>	<b>.34</b>	<b>“Love between two people between boyfriend and girlfriend or even just friends can have a relationship” (Hudson)</b>
		Family, friends, co-workers – more expansive than PP9s	.40	“My family, my friends, classmates, love interests, coworkers. Anyone I believe you can have a relationship with everyone, platonic or romantic” (Shannon)
	Trust and safety in a relationship	<b>Trust, loyalty, safe social connections</b>	<b>.29</b>	<b>“Family, friends, and people you’re close to/feel safe with” (Alice)</b>
		Understanding the value of trust, loyalty, bond, feeling safe	.35	“My friends and my family. These people help me be me and they make me feel safe and I can truly be myself without judgment or fear.” (Hannah)
	Importance of relationships	<b>Commitment, belonging, long-lasting, positive emotions</b>	<b>.20</b>	<b>“long-lasting partnerships that are truthful and sincere” (Connie)</b> <b>“healthy groups to feel wanted” (Amber)</b>
<b>LL Feelings about inclusion</b>		Deep connections, trust, commitment, love	.40	“Making important connections, lasting friendships and impactful bonds” (Rachel)
	Including everyone in groups, equality	<b>Including everyone, not leaving anyone out</b>	<b>.41</b>	<b>“Including everyone no matter who they are or what they believe in; including others in what you do, having everyone be welcome” (Millie)</b> <b>“Thinking of others and including them if they are alone” (Connie)</b>
		Including everyone, not leaving anyone out	.55	“including everyone no matter where they come from, what they look like, or what they believe in and giving everyone equal opportunities no matter what” (Rachel) “Asking someone to be in your group if you see them alone” (Sadie)
	Mutual respect, Kindness	<b>Making sure others feel welcome, helping others</b>	<b>.20</b>	<b>“Involving everyone, being kind to everyone, being fair” (Carly)</b>
		Treating others with respect, not letting differences get in the way	.20	“Inclusion means a place for everyone, not necessarily in your group but everyone deserves to be a part of something and with someone. It’s important to respect everyone no matter what and treat everyone equally” (Hannah)
	Unsure of terminology	<b>Students unsure as to what inclusion means</b>	<b>.15</b>	<b>“I don’t know what it means” (Michelle, Coleman)</b>
		No alumni reporting this	0	
	Feelings of belonging	<b>Feeling included, group</b>	<b>.10</b>	<b>“Feeling like you are a part of something”(Elianna)</b>
		Feeling included, a part of a group	.40	“People coming together and being able to express themselves in their own way. It brings a feeling of belonging and security” (Chloe)
	Diversity, race, disability	<b>Including everyone, no matter race or diversity</b>	<b>.07</b>	<b>“Letting everyone in no matter their race” (Marie)</b>
		Including everyone – more expansive list of differences than PP9	.10	“Including everyone, no matter race, gender, disability, and mental health struggles” (Madeleine)

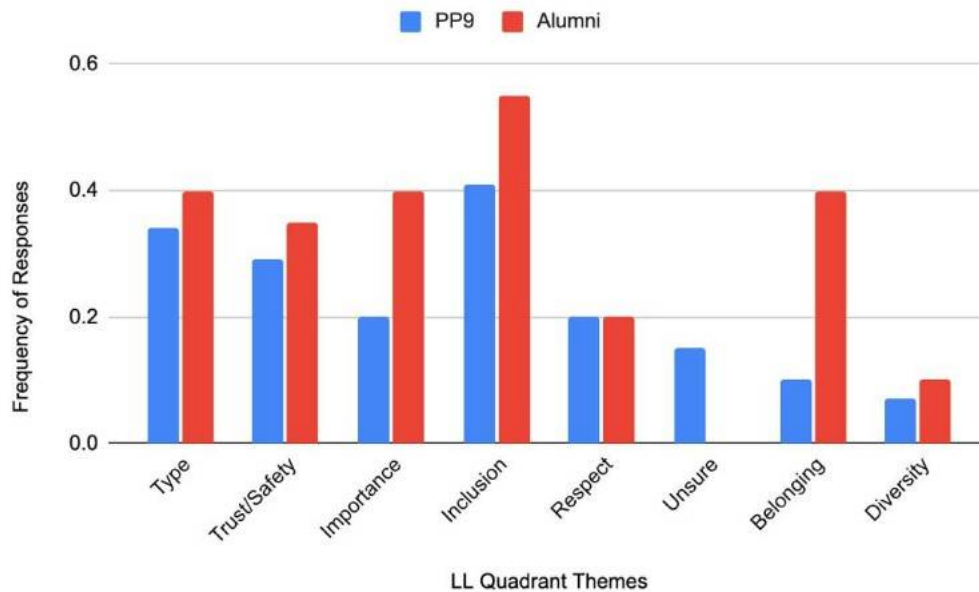
The LL Quadrant focused on inter-subjective feelings of relationships and inclusion. Both groups responded with examples of relationships and (in some cases) how they differ from each other (that is, romantic, platonic, familial). The alumni students reported higher response frequencies for trust and the importance of relationships in terms of the long-lasting bond and inherent commitment. As Hannah stated, “My friends and my family. These people help me be me and they make me feel safe and I can

truly be myself without judgment or fear.” Alice mentioned that relationships are, “Family, friends, and people you're close to/feel safe with,” which is a very similar type of response. Overall, there were very few differences in types and frequencies of responses regarding relationships for these two groups.

Response frequencies for inclusion themes were also very similar, with most responses describing a sense of ensuring everyone is included, not judging or excluding anyone based on diversity, race, or disability, and helping others if there is a sense someone is alone. Differences include a few Grade 9s (six) not really understanding what “inclusion” meant or how to describe it, whereas all of the alumni were able to comment with a fair amount of detail. The sense of belonging as a benefit of being in relationships was more evident with the alumni than the Grade 9s (40% of AG statements as opposed to 10% for the EG). Perhaps the older students have seen the benefits of more secure, longer lasting relationships over the course of their high school experience, whereas the Grade 9s are still experiencing more rapid friend transitions as they experiment with their own identity and sense of self in shorter-term relationships. As the Grade 9s mature, they tend to move from egocentric red and orange worldviews to pluralistic green and then (sometimes) yellow/turquoise worldviews (However, as Wilber (2020) has often stated, less than two percent of the population currently operate from that level of conscious development.) The alumni do place more value on the sense of belonging to a group and feeling included, however both groups showed high response frequencies in these areas. These students are moving towards a more expansive worldview, where they reach out to find meaningful relationships and find groups that they can belong to. Figure 33 shows a comparison of the frequencies of themes regarding relationships and inclusion to illustrate the interpersonal developmental levels.

**Figure 33**

*Thematic Analysis Comparison of EG and AG for LL Quadrant*



### ***LR Data Analysis***

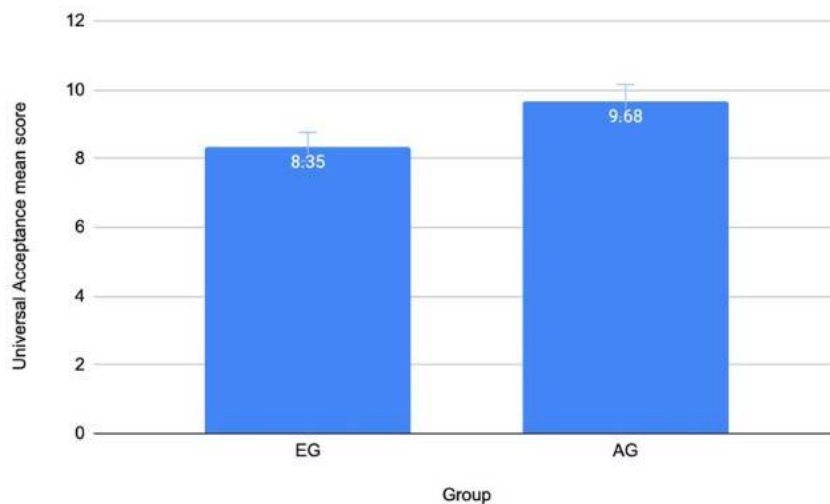
**LR Quantitative Data Analysis.** The LR quadrant (What the system thinks/believes) produced two factors. Factor 1 (Items 2: More time and money should be spent on marginalized groups such as LGBTQ+, ethnic minorities, disabled, and homeless people; 4: The leader of a country (prime minister or president) should be in control of people's interests – including money, rights, and freedoms; 5: Everything in our world is connected – including plants, animals, rocks, oceans, sky, and humans) meaning universal acceptance. Factor 2 (Items 3: When crimes are committed, punishment works better than rehabilitation; 6: Schools should enforce their rules better and kick kids out who just want to fool around and not take it seriously) meaning a belief in punishment and control over people. (It should be noted that for this quadrant, there was one missing data set per group – (AG: N = 19; EG: N = 40.)

Factor 1 (a belief in universal acceptance) resulted in a significant ( $F(1, 58) = 4.20, p = .045$ ) difference in the AG ( $M = 9.68, SD = 2.26$ ) and the EG ( $M = 8.35, SD = 2.37$ ), with the AG scoring 15.9% higher than the EG. Similar to the LL Factor 1 (tolerance and equality), students have learned and experienced a variety of different ways of thinking and seeing the world. The notion of acceptance and

understanding for all walks of life increases as the students age and mature. Exposure to inclusive learning spaces, social studies and psychology topics and themes, and experiences with lived stories and shared struggles (guest speakers, presentations, etc.) are all beneficial ways to help students broaden their view on others and become more tolerant overall. Figure 34 depicts the belief in universal acceptance.

**Figure 34**

*Univariate ANOVA of EG and AG for LR Factor 1: Universal Acceptance*



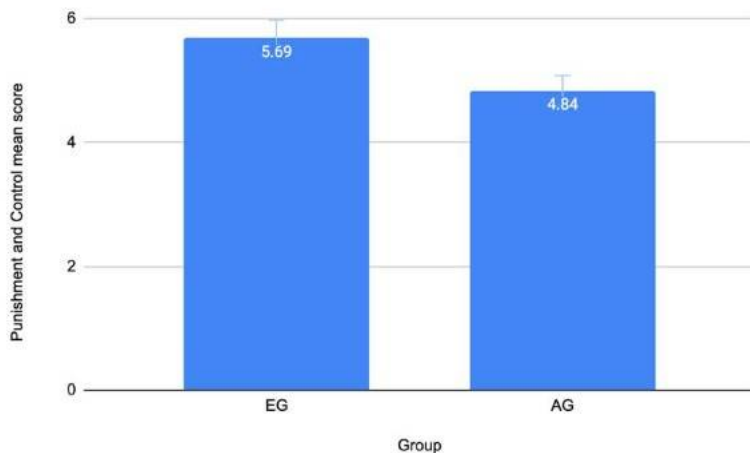
Factor 2 also showed a significant difference ( $F(1, 57) = 4.14, p = .047$ ) with the EG ( $M = 5.69, SD = 1.56$ ) scoring 17.6% higher than the AG ( $M = 4.84, SD = 1.34$ ). This means that the younger students likely felt the need for greater control and punishment for those who do not behave. This aligns with my conversations with both groups – where the Grade 9s mentioned several times that some of their classes were extremely chaotic, disruptive, often with one or two unruly students ruining it for the rest. They mentioned wanting better control, proper punishment meted out to those who deserve it, and a tighter run school (as well as things like bullying, vaping, feeling unsafe in parts of the school for these reasons). The alumni, on the other hand, are likely more in favour of self-governing, and given that they are older, their classmates are likely more mature and actually do require less overt management and punishment. Thus, they would likely opt for less punitive measures and the ability to choose how they



wish to behave. Figure 35 illustrates the difference in belief in punishment and control.

**Figure 35**

*Univariate ANOVA of EG and AG for LR Factor 2: Punishment and Control*



**LR Qualitative Data Analysis.** The LR quadrant examines one’s beliefs about their outside world – in this case, school and society. Students who tend to focus on the rules, expectations, and conformity to the system are likely operating at a red or orange level of development. Students who are able to include more diverse explanations and ponderings as to how the system might be flawed, not inclusive, too rigid, and unbalanced might be leaning towards green or even yellow (transcended) levels of development and worldviews, where nuances are more likely considered. Table 48 looks at the comparison between these two groups in the collective inter-objective perspective.

**Table 48**

*Thematic Analysis Comparison of EG and AG for LR Quadrant*

<b>LR Feelings about school and education</b>	School rules and expectations	<b>Shorter days, more rules, less content/homework</b>	.41	“There were no drugs, unsafe conditions, just nice people” (Mandy) “They didn’t tolerate so much bad behaviour from kids and consequences were more severe for severe acts” (Carly)
		More rules, more punishment for truancy	.30	“A more effective method was used on disobedient students, and those who use drugs in the school washroom” (Evan)
	Relationships	<b>Being able to choose classmates, deal with bullies, teachers more in tune</b>	.34	“Teachers had a better understanding of how some kids learn and that not every student can learn in the same environments. Offer support to those who need it” (Paige)
		Classmates, teachers caring about student welfare	.25	“If teachers cared more about their students’ mental health” (Sadie)
	Feeling safe and cared for, treated fairly	<b>Safety for all, fairness in treatment/grading</b>	.20	“There were more rules put in place to protect teachers and kids” (Amy) “Teachers graded students fairly” (Danica)
		Safe environment for learning, fairness in grading	.17	“Learning was directed more by kids” (Stella)

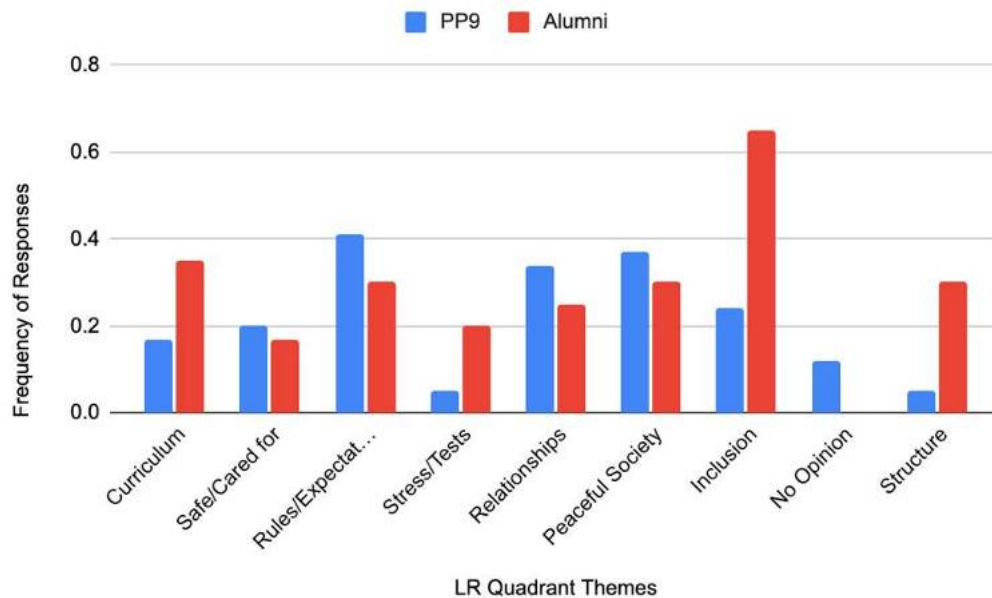
	Emotions and school, curriculum	<b>Wish school was more fun, less boring</b>	.17	<b>“we didn’t have to sit in a desk all day and didn’t have to be forced to learn topics that don’t interest us” (Kate)</b> <b>“They took the time to acknowledge peoples’ learning styles, and then help and provide resources to allow everyone to feel comfortable and succeed” (Alice)</b>
		More variety, help for those struggling, outdated schedule	.35	“We had support for everyone and not made the education system one size fits all. Everything is outdated and doesn’t work for everyone, there is a very specific type of learner who truly benefits from school” (Hannah)
	School stress, testing	<b>Stressful environment, too controlled</b>	.05	<b>“They didn’t feel controlling and stressful” (Elianna)</b> <b>“They gave more understanding to the differences – – – – – students face. And if they didn’t focus so strongly on the significance of test-based grading” (Grace)</b>
		Too stressful, too much focus on marks, outputs	.20	
<b>LR Feelings about society</b>	Society as peaceful and safe	<b>Peaceful, no wars, everyone gets along, feel safe</b>	.37	<b>“peaceful, with lots of love” (Hudson)</b> <b>“One where everyone’s nice to each other” (Lucy)</b>
		Peaceful, no wars, everyone gets along, feel safe	.30	“A peaceful one, which is hard to achieve, so I will just say one where people rely on money less and instead strive for happiness which is still impossible” (Shannon)
	Inclusion, fairness, equality	<b>A society where everyone is treated equally, included</b>	.24	<b>“one where everyone is included; one where everyone can be who they want to be” (Millie)</b> <b>“where there is no judgement and social standards” (Paige)</b>
		A society that is equal and does not judge, freedom to choose	.65	“One that treats everyone equally and gives everyone fair opportunity while maintaining liberty and freedoms to do what they please and how. A good society would support people and include everyone no matter the circumstance” (Hannah)
	No opinions	<b>Unsure, haven’t thought about it before</b>	.12	<b>“I don’t know, I’m 14” (Kate)</b>
		All alumni responded	.0	
	Societal structure and politics	<b>A mix of liberal, conservative – dualistic understanding of politics</b>	.05	<b>“I’ve heard that socialism works well” (Tamara)</b>
		A balanced structure, more nuance and detail than PP9s	.30	“The best kind of society would be a less limiting one, meaning less political corruption in nations that could help to better the world and people all around, less focus on overall power and personal issues instead of national issues would benefit individuals and nations alike” (A.D.)

The LR Quadrant focuses on the student’s view of their larger world – from their school to greater society. Students who believe that schools and societies would be better if there were more rules and everyone just conformed and got along are typically operating from an orange worldview. Students who can see where there are gaps, injustices, and are aware of and want to include more diverse groups and make exceptions due to additional contextual information, are likely moving into a green level. When students were asked about school, the Grade 9s felt most strongly about rules and the requisite conformity. Carly indicated that she wished, “They didn’t tolerate so much bad behaviour from kids and consequences were more severe for severe acts.” Many Grade 9s also commented on school being too long and not having enough free time outside of school. Zane said simply that he wished “[school] was shorter because it is way too long and takes up too much time in life.” These comments clearly show a

firm position in the orange level, where students believe that rules are applied to everyone and must be adhered to no matter what. Those who choose to break them must then face the consequences, which again, are uniform and serve as a deterrent. Several alumni also commented on shoring up the rules to control “disobedient students, and those who use drugs in the school washroom” (Evan), however more responses focused on finding ways to help students who are struggling and provide extra supports to those who are not fitting into the rigid system. This is more of a green way of thinking – where the student is seeing the diversity and inability to conform to a tight and unforgiving system. The Grade 9s responded with higher frequency about relationships – in particular, those with teachers and peers. Paige wished that “Teachers had a better understanding of how some kids learn and that not every student can learn in the same environments. Offer support to those who need it.” Grade-11 Sadie felt that, “teachers [should] care more about their students' mental health.” One other difference involved feelings about test taking and stress from school. The alumni reported feeling more stress and dislike of high stakes testing. Lindsay wished “they didn’t focus so strongly on the significance of test-based grading.” Anna mentioned that “many teachers haven’t been in the same shoes as students for some time and they may not remember exactly how it felt, the pressure, the stress, and responsibility.” This is quite likely true, Anna, as it definitely looks and feels different on the other side of the classroom! Figure 36 illustrates a thematic analysis comparison of the EG and AG for the LR quadrant.

**Figure 36**

*Thematic Analysis Comparison of EG and AG for LR Quadrant*



This comprehensive analysis of structures of consciousness used both quantitative and qualitative measures to establish patterns and trends for each of the groups examined (EG and AG). The Grade 9s overall appear to be operating from an orange, traditional worldview, with beliefs in science, Truth, and conformity to societal systems. However, there are early leanings into the pluralistic green, with increasing interest and desire for relationships, connection, belonging, and diversity and inclusion. The Grade 9s are early in their third-level of consciousness exploration, where they are starting to look outside of their inner egocentric world, to seek out alternative explanations and take on others' perspectives to try to understand the complex social networks around them. (Note: the "third-level of consciousness" refers to the developmental level where individual becomes aware of themselves and others, able to critically and abstractly think while taking on multiple perspectives, and is "the culmination of adolescence, mak[ing] one both capable of, and vulnerable to, socialization" (Kegan, 1994, p. 288). The alumni show an advanced progression away from the orange level, with high priority on diversity and inclusion, tolerance, and looking for alternative ways for systems (such as the one they are in – school) to run more effectively and to not exclude those due to learning disabilities, mental

illness, and other factors. It should be noted, however, that despite this inclusion and transcending into the green, the power of orange still lingers, exerting a stronghold on their beliefs about science, Truth, and society. The influence of a neoliberal positivistic dominant narrative, which they are entrenched in while in school, remains a large part of their worldview.

### **LL Quadrant: Zone 4 Intersubjective Collective Outside Perspective**

Zone 4 provides shared meanings and understandings from an outside, inter-subjective perspective. Three separate Grade-9 focus groups were conducted – each approximately one week after the course was completed and marks were submitted. One small alumni focus group was also conducted at the end of the year (June 2024). Table 49 illustrates the themes that emerged from the focus groups.

**Table 49**

*Findings Map – LL Zone 4*

<b>Upper Left (UL)</b> (Individual subjective perspective)	<b>Upper Right (UR)</b> (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews (EG and AG)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Themes:</b> <b>Social Awareness:</b> EI and ER increased Calm classroom and positive relationships increase coherence (EG/AG) <b>Anxiety Symptoms:</b> Cognitive impairment (EG) <b>Anxiety Situations:</b> Tests, presentations, peers (EG) <b>Course Feelings:</b> Positive, safe space, enjoyed HM biofeedback, recommend to others (EG/AG) <b>School Feelings:</b> Need teacher connections, better engagement (EG/AG) <b>Self-awareness:</b> Breathing practice contributed to increased personal growth and ER <b>Coping Strategies:</b> HeartMath sensor/app and breathing practice was very effective, still using <b>Coping Self-efficacy:</b> Increased confidence in stress management using breathing practice <b>SEL as a core:</b> EG/AG recommend	<b>Themes:</b> <b>Social Awareness:</b> EG slight increase in SA <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect) <b>Anxiety Symptoms:</b> EG slight decrease in anxiety <b>Cognitive Interference:</b> EG slight decrease in CI <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG) <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?
<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app (N=47)
<b>Themes:</b> <b>Behaviours caused by nature and nurture</b> EG, AG <b>Science is truth, explanatory</b> (EG/AG) <b>Mixed feelings about growing up</b> (EG)	<b>Themes:</b> <b>Significant increase in Average Coherence score</b> from Baseline to Time 2 for EG and McLeod

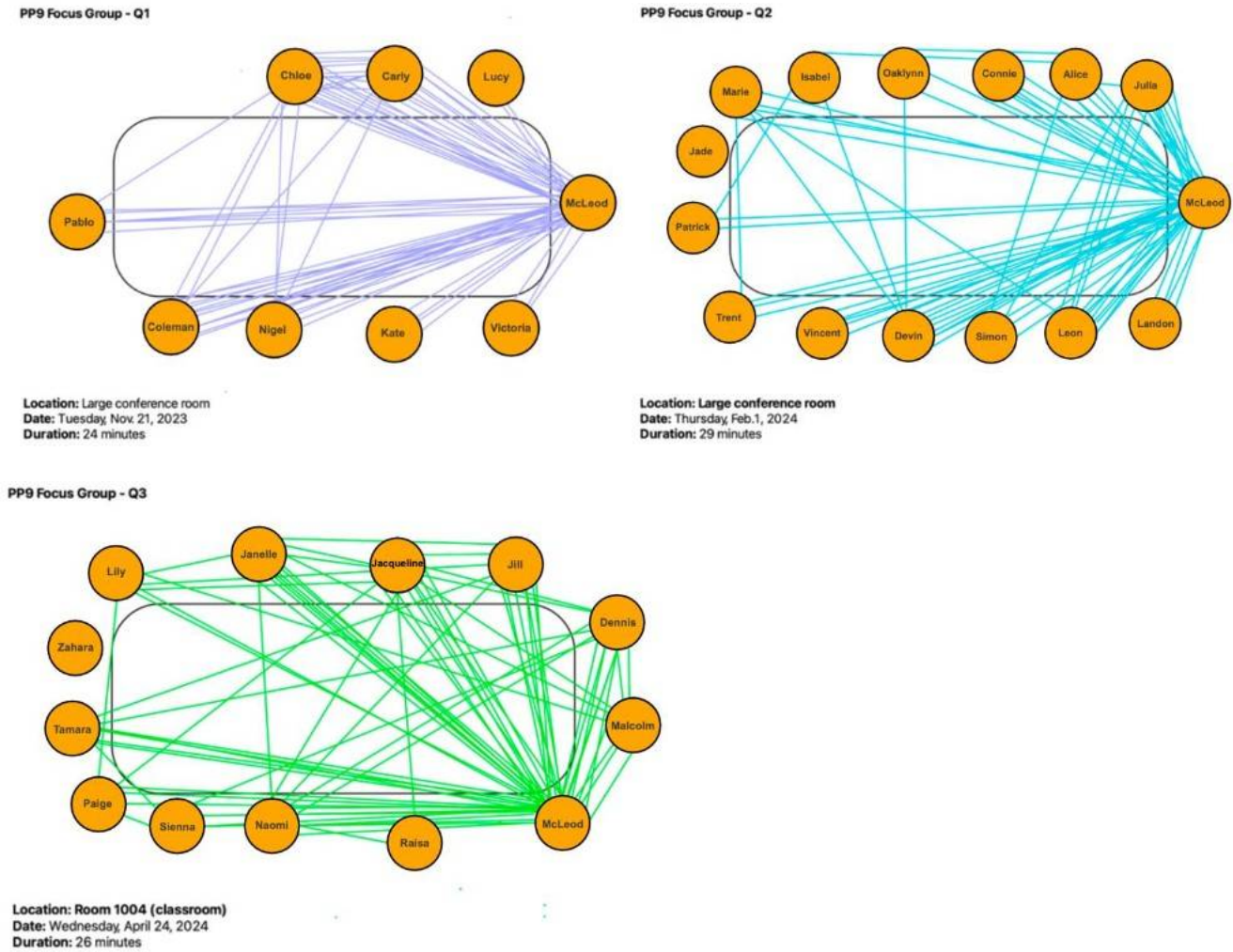
<b>Relationships, coping important for health EG,AG</b> <b>Inclusion and diversity important for connections (EG/AG)</b> <b>Schools/society need to be safe, inclusive, tolerant for all (EG/AG)</b>	
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school? <b>Methods:</b> student focus groups and exit questions	
<b>Themes:</b> <b>Social Awareness</b> – Increased ER for EG; emphasis on calm, coherent classroom (EG/AG); teachers need to attune to student needs <b>Stress symptoms/situations</b> – cognitive impairment during stress, tests/presentations stressful (EG/AG) <b>Feelings about course</b> – positive, beneficial, still using strategies (EG/AG) <b>HeartMath strategies</b> – effective, help to focus breathing, matched colours to emotions <b>SEL as an option</b> – preferred over core (EG) <b>SEL as a core</b> – preferred over option (AG) <b>Coping self-efficacy</b> – improved confidence in stress regulation due to breathing practice (EG/AG)	

Adapted from: Bohac Clarke (2019; Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

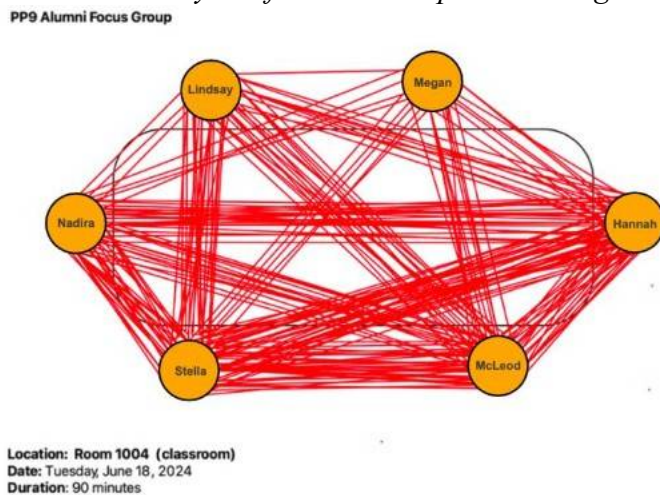
Zone 4 provides shared meanings and understandings from an outside, inter-subjective perspective. Three separate Grade-9 focus groups were conducted, with each approximately one week after the course was completed and marks were submitted. The first focus group was conducted in an office conference room, while the second two were conducted in my classroom (during a spare period). All three focus groups were provided with pizza to eat (while in the session) and a gift card awarded at the end in a raffle. Students who had been interviewed could sign up for the focus group but did not have to. The alumni had a separate focus group, which had to be conducted during the exam week in June. For that reason, very few interview participants were able to commit to the focus group, thus the number of participants in this group was much lower. Figure 37 illustrates the seating arrangement of each participant for the Grade-9 focus groups, along with interactions between participants (the coloured lines indicate the progression of the conversation, as derived from the transcripts). Figure 38 illustrates the seating arrangement of the alumni group.

**Figure 37**

*Schematic Analysis of Focus Group Positioning and Interaction for Grade-9 groups*

**Figure 38**

*Schematic Analysis of Focus Group Positioning and Interaction for Alumni group*



### ***PP9 Focus Group Thematic Analysis***

**Focus Group Logistics.** Each of the three focus groups was quite different – in terms of size, location, and topics of focus. While I did have several “scripted” questions for each group, I allowed the group to take conversations where they wanted to, resulting in a few different trajectories for each group, while maintaining several similar themes. As mentioned, I allowed students to sign up for the focus group (enticing them with pizza and a raffled gift card!) and did not turn anyone away who wanted to participate. The result of that was the second group being quite large ( $N = 14$ ), which made it much more difficult for each participant to have sufficient airtime. I noticed that at the beginning of each focus group session, students were quite unsure about the process. In particular, the arrangement of themselves and me sitting around a table, all equally positioned (physically and logistically) meant that they would get much value and airtime (or more) than me, their teacher. This is very unlike the world of the classroom where the teacher gets most of the airtime (and power), and the students get very little. This seemed confusing to them at first – and in all three cases, students were quite quiet at first, and then started to emerge once they realized the environment and format was safe, the ground rules were established (confidentiality and no judgement), and they could contribute as much or as little as they wanted to (In Focus group 2, one student (Jade) did not speak at all.) Unfortunately, all three were limited by time, as they were conducted during a 40-minute “Flex” block before lunch. I found that the students really did not get going until about halfway through each session. However, more time may have exhausted the conversation anyway, as these students do have a shorter attention span (Contrast that to the alumni focus group which lasted 90 minutes and was not time-constricted.) Next, a look at the themes that emerged from the focus groups will be discussed (While the themes did vary between the groups, I will cover the ones that had linkages to all.) Themes that emerged were: Social Awareness (emotion regulation, Classroom affective experience, relationships); Stress Symptoms and Situations; Feelings about Course/School (favourite class activities, school musings); HeartMath Biofeedback



(understanding of sensor/app and coherence); and Coping Self-efficacy (confidence in stress management and continued use of breathing). While these themes are much like the ones derived from the UL interviews, they produced different elements due to the interactive format.

**Theme 1: Social Awareness.** Social awareness includes how the student perceives themselves and others in social situations. Subcategories include: Emotion regulation; classroom affective experience; and relationships.

***Emotion Regulation.*** Students were asked about learning about emotions in class and their ability to both read others' emotions and regulate their own. This topic only came up when students were discussing what they remembered/liked about the course. Coleman in Focus Group 1 (FG1) simply said, "(I remember) the emotions poster. We had to describe an emotion and stuff" while Alice (FG2) stated, "I really liked how you like explained like *why* we were feeling what we were feeling and you gave us some tools to work with. So like we could understand why that was happening." Tamara (FG3) stated, "I feel like I'm more aware of how my emotions are impacting other people and how like me talking impacts other people, and so I've just kinda learned to not be mad at someone – if I'm mad, just say something else – cause it's not their fault!" So, much like the individual interviews, students felt that learning about emotions was relevant to their social interaction and awareness.

***Classroom Affective Experience.*** All three FGs commented on the sensory experience, with multiple participants chiming in with their recollections of how they felt while in class. Table 50 represents the natural flow of that part of the conversation, thus capturing the interconnectedness of the participants in this group setting.

**Table 50***Participant Descriptions of Classroom Affective Experience*

Flow of conversation	FG1	FG2	FG3
↓	I do think that like having the lights low during that class definitely – like not just during the sensors – but during the whole class, it kind of help keeps like a calm environment – or at least for me (Carly)	I really liked the classroom we were in – just because there was always like some kind of calm video in the background or something like that – just to kind of make it peaceful I guess – I really liked that! (Marie)	I thought it was really good, and it was super calming. So I would come back from a class and it would just like calm my mind especially cause it was usually after or before math and especially when it was like before a test, it made me feel super calm and like way better going into my test, so I took it better (Jacqueline)
	Yeah, like when the lights are low and the windows are open and you have natural light (Chloe)	Like the sea turtles when you were working on stuff? (Yeah) Yeah! For sure! Landon? (McLeod)	I thought it was good to just take a break from normal classes – just to have some chill time (Naomi)
	Mhm, yeah – I did that a few times, put on some music. Yeah, I agree with you! It's nice to have something – it's like ambience or something (McLeod)	I liked the 5 minutes of just like quiet and breathing. Like having that quiet environment really helped out to start off the class (Landon)	I like how you call this not a normal class! (Laughs) (McLeod)
	Yeah, yeah! (Chloe)		Well, it's not <i>not</i> normal – it's just different from all the other classes! (Laughs) (Naomi)
			Yeah, going along with both of them, it was just such a calm environment – like it wasn't like you were pressured or something – like obviously you still had to do work but it wasn't like such hardcore work like English, social, math, or science would be? It was just more of a go with the flow type of thing (Denise)

It was interesting to hear the students jumping off each other's ideas and building on the shared understanding of the calm, “chill,” comfortable classroom. The idea that this class was “not normal” or somehow very different from their other classes in terms of the embodied experience really came through with all three focus groups.

**Relationships.** Only one focus group (FG2) spent time discussing teacher relationships, and none of the groups talked about peers. FG2 had mixed reviews of teachers – from teachers are helpful and are here for students (“like teachers that have a good like personality actually like make the class more fun” (Julia) to teachers are unhelpful and unwilling to figure out what students need to be successful. As Connie stated, “We kinda get told what to do. It's kind of annoying because teachers' teaching ways are kind of harder to do if you're a visual learner or if you learn by yourself.” Leon said, “I think it would be a lot better if teachers found that [the students] need to get this done – you can work on it how you want to – but you just have to get that done – instead of telling us exactly how to work – give us a little bit of freedom.” Table 51 represents a brief exchange between Alice, myself, and Julia.

**Table 51**  
*FG2 Brief Exchange*

Student	Quotes
Alice	So I feel like if we could have a chat with our teachers before the course starts, we'd be like, Hey, this is what I need – what can we expect from each other?
McLeod	Yeah, so have a bit more say – do you feel like your teachers are open to hearing what you are learning?
Julia	I feel like they're open to hearing it but they don't do anything about it. Like they'll listen to what you have to say but they won't say or do anything about it

Some of the students felt that their teachers were not attuned to their individual needs, and that possibly they could do a better job of checking in with each of them to try to understand how they might be most successful in their learning and progress.

**Theme 2: Stress Symptoms and Situations.** Each student was asked about their stress symptoms and situations, however in the group setting, they were able to extend their understandings by bouncing off each other's ideas. Table 52 reveals some of the conversation flow that resulted when students were asked about the effects of stress.

**Table 52***Participant Descriptions of Stress Symptoms and Situations*

Flow of conv.	FG1	FG2	FG3
↓	What happens when you get really, really stressed out in your brain? How does it change, does anybody know? Yes, Carly? (McLeod)	Anyone remember any parts of the brain or what they do? (McLeod)	I mean, I do it (breathing) in math because I get stressed really easily and I try to rush thorough it (Sienna)
	Isn't like your prefrontal cortex shuts down? (Carly)	Uh, the amygdala? (Alice)	Does anyone want to talk about that (feeling stressed) or express your feelings? Jacqueline? (McLeod)
	Mhm. Yeah, and then what happens to you if you're trying to write a test, or like I've been talking to you this morning about exams coming up in January um – what could happen if you're feeling really stressed in your exams? Yeah, Chloe? (McLeod)	Sure! What does the amygdala do? (McLeod)	One thing is when I'm riding I get really frustrated sometimes if I'm trying to work with my horse to try to teach him something and he doesn't pick it up right away – so I get stressed out and then he feeds off of that so lots of time the breathing really helps and I breathe and helps us communicate better (Jacqueline)
	Your mind goes blank (Chloe)	It's like the fight or flight, like response and like controls the fear (Alice)	Yeah, horses are so intuitive, aren't they? (McLeod)
	Yeah, your mind goes blank. OK, now that we've done the course does anyone know what you could potentially do if you're feeling super stressed and your mind is blank and you're sitting in front of a test? Anyone have any strategies or thoughts or ideas? Carly? (McLeod)	Absolutely! Let's start with the amygdala then – the fight or flight. What other physical symptoms do you get when you're stressed out? When you're feeling stressed or anxious? Anybody want to offer any thoughts about that? Ya, go ahead (McLeod)	I used the deep breathing stuff on my math test – cause I'm not very good at math and sometimes it like stresses me out a lot and then I'm just like, I just need to take a minute to breathe before moving on – and then it helps me cause I actually like let myself think about how to do it instead of just rushing in to do an answer and then moving on (Naomi)
	Um, if you are, like, blanking on certain parts, you can leave them, try to answer others, and then come back to it to see if any of those other questions might help you answer that one? (Carly)	So like your prefrontal cortex kind of shuts off so you can't think so you don't know what's going on and you're just panicking (Alice)	For the past 2 weeks, like I've noticed that I've just been really stressed cause of stuff that's been going on with like friends and I was like, I need to change something – so I started doing like the breathing whenever I'd start feeling really stressed and it helped a lot! Like I just feel more jolly this week! (Tamara)
	Mmmm. I love that technique! That's really effective. Kate? (McLeod)	Yeah, absolutely. Anybody else? (McLeod)	
	Um. You can use like your breathing to calm down and be coherent to try and get rid of everything? (Kate)	Your heart beats faster (Leon) Yeah, your heart beats faster for sure. Anything else? What else happens when you're stressed out? (McLeod) You like, sweat (Devin) You freeze (Julia)	
	Excellent. How many of you know – like I know you don't have the sensor on right now, but how many of you – if I was to put a sensor on you – you'd know how you are right now, you'd know what color you are? Is anybody able to kind of sense that now? (McLeod)	Sweat yeah, for sure! Freeze, yeah! That's a common one! So sort of withdrawing and you feel like not really saying anything kind of distancing from the situation. What stresses you out the most? What kinds of things? (McLeod)	
	Yeah! Yeah! (Multiple voices)	Public speaking in big groups (Oaklynn) Lots of work (Vincent) Lots of schoolwork? For sure (McLeod) Tests (Connie) Sports (Trent)	
		Sports, yeah – so competitions, games – being evaluated. Anybody's friends stress them out? (Yes! Multiple voices) Family? Siblings? Uh huh (Trent)	

Like the interview comments, students mentioned tests, presentations, and other school stressors as being top of mind for stressful situations. Stress symptoms included sweating, shakiness, panicky feelings, fast heartbeat, and brain freeze. Many students wanted to also talk about how breathing helped them alleviate some of their stress to help navigate the situation.

**Theme 3: Feelings about Course/School.** Students were asked about favourite parts of the course and any activities or strategies that stood out. Additionally, thoughts about the school overall were addressed by all three focus groups.

**Course Reflections.** Favourite activities in the course included the Senses lab, the emotions lab, anything that was hands-on was popular, the brain biology, Wellness Fridays, the movies watched, and many students mentioned the breathing practice with the sensor and app. FG3 had the most to say about the class activities and ended up having quite a rich and engaging discussion on this topic. Table 53 describes the flow of conversation during FG3 where the students worked off one another to come up with their favourite course activities.

**Table 53**  
*FG3 Conversation Flow for Favourite Course Activities*

Student	Quotes
Denise	I liked the deep breaths and using like the Heart monitor.
Janelle	I enjoyed the brain stuff – I liked learning about the brain, I thought that was pretty cool!
McLeod	Yeah, learning about the parts of the brain, some of the biology.
Lily	I really liked the smell, seeing, taste kind of things – the senses lab. Because there was food, (lots of laughter) but also because it was just like a fun kind of experiment (yeah, yeah) to see like how it is, and like without one sense how difficult it would be.
Paige	I liked learning about personality because like I learned more about my personality and like everyone else's and stuff, so yeah.
Sienna	I also liked what Janelle said – I liked learning about the different parts of the brain and what they do, especially cause when I got my MRI and saw my brain I could name the different parts.
McLeod	Yeah, you showed it to me, yeah that's so cool! Yeah, you know what? The more you can learn about your mind and your body, the better conversations with your doctors and professionals you can have.

Naomi	I also liked doing the food tasting one and seeing how good your eyes were. And I liked how after almost every unit we had we watched a movie that was based on like what we learned?
McLeod	Definitely! The movies were fun, weren't they? Janelle?
Janelle	Kind of like what she said – the <i>Divergent</i> movie – I don't know why, but I feel like that was a super fun movie to watch 'cause I feel like a lot of the movies we watch in school are kinda boring – but I thought that one just seemed really fun to me – I liked watching that movie.
McLeod	Yeah, and then when we can relate it to like Paige said, learning about personality and then when I had you guys put yourself into a faction – Jill?
Jill	Going along with Janelle and Paige, I really liked learning about personality and learning how everyone's different but also the same – like in different personality groups and also connecting it back to the movie <i>Divergent</i> – I really liked that movie!
Paige	I liked the budgeting time thing – like how it was low-quality fun and high-quality fun? 'Cause I feel like that helped me in school.
McLeod	Oh really? Had you ever heard of that before?
Paige	No – like I knew it was a thing – there's like things you can do, like scrolling on Instagram that are just like brain-rob, basically! (Laughs) but then there's also things like hanging out with friends which you could reward yourself with.

As you can see from this exchange, students really listened to each other (“going along with Janelle and Paige”; “I also liked what Janelle said”) and added to each other’s comments and experiences. For some, elements that they might have otherwise forgotten were mentioned, allowing them to reflect back on things they might not have otherwise mentioned. For example, when Pablo mentioned carving pumpkins on Hallowe’en, Chloe said right away, “Oh! I totally forgot about that! That was really fun!” The movement of conversation (particularly with FG3, as in the example above) was quick and lively, and students were able to think about their own experience while at the same time reflecting as a collective and coherent group who had just been through aa common experience together. Many students, particularly in FG2 and 3 spoke about the importance of the course, and as a recommendation for others. Table 54 represents the conversation thread from FG2 focused on the importance of the course and recommendations.

**Table 54***FG2 Conversation Flow for Course Recommendation*

Student	Quotes
Devin	I think that every student should have the ability to take this course. Learn how to breathe correctly.
Isabel	I think it should be recommended a lot. So like people who are like aware of it.
Julia	I would (recommend the course) because it has a lot of good life skills in there but to like actually go into the world without like school – so I think it’s good for them.
Marie	I think it’s really like I’m glad I did it because like during the PATs, it was um it was really easy to just like calm myself down and so I wasn’t stressing about studying and stuff. I think it really helped me to just relax.
Leon	I’m happy I did that. It was way less stress than a lot of other options. It really gave me a – especially before the PATs – it kinda helped slow things down.
Julia	One of the main reasons I did it was because a lot of my friends that did it like in the first quarter really recommended it to me and then I also heard about it and it sounded fun and then I really liked it. I’m glad I was in it!

Table 55 represents the conversation thread from FG3, focused on the benefits of the course.

**Table 55***FG3 Conversation Flow for Favourite Course Activities*

Student	Quotes
Jacqueline	I thought it was really good, and it was super calming. So, I would come back from a class and it would just like calm my mind especially cause it was usually after or before math and especially when it was like before a test, it made me feel super calm and like way better going into my test, so I took it better.
Naomi	I thought it was good to just take a break from normal classes – just to have some chill time.
Denise	Yeah, going along with both of them, it was just such a calm environment – like it wasn’t like you were pressured or something – like obviously you still had to do work but it wasn’t like such hardcore work like English, social, math, or science would be? It was just more of a go-with-the-flow type of thing.
Janelle	I felt like this class was just a class that I felt like everyone can like – like stuff like construction I think specific people would like it and specific people wouldn’t – but I think a class like this is like good for everyone.
Jill	Yeah, and I think everyone would benefit from it too cause like I know for sure that I benefitted from this class, but I think everyone could.
Lily	I thought it was like a good learning experience – like learning how to like calm yourself down and stuff and like I definitely benefitted from that.
Jacqueline	I thought it was also nice that you had like a toaster, bread, and everything? And hot chocolate – it’s just another thing – it’s calming, and you kinda get

	freedom to do what you want but there are still guidelines which I think is really good.
Naomi	I also liked doing the food tasting one and seeing how good your eyes were. And I liked how after almost every unit we had we watched a movie that was based on like what we learned?
Malcolm	I used some of the strategies before my big math tests and they actually worked pretty well.
Lily	I have a friend who has like pretty bad anxiety so when she gets stressed out I will tell her to take like 5 minutes or even less to just take some deep breaths and like I learned that from this class. And then I also just told her about positive psychology so she can sign up for it next year 'cause she's in Grade 8 so yeah, I think that would be good for her to help with her anxiety.

Again, students were able to build off each other's experiences and collectively, reimagine what it was like to be in the class. The overall feeling was positive, helpful, and effective at calming them down and regulating their emotions.

***School Reflections.*** While there were no specific questions about school in general, all three focus groups were asked about their experience so far in Grade 9, high school, and from past school experiences. Table 56 illustrates the categories that emerged about school beliefs and feelings.

**Table 56**  
***Categories Emerging from School Beliefs and Feelings***

Theme	Categories	No. of responses	Student Quotes
School beliefs, feelings	Not enough say in programming	10	We're kind of thrown into our option classes cause the school's kind of overrun with grade 9s. (Chloe)  We kinda get told what to do. It's kind of annoying because teachers teaching ways are kind of harder to do if you're a visual learner or if you learn by yourself (Connie)
	SEL course is important and valuable	18	I think it should be recommended a lot. So like people who are like aware of it. (Isabel)  So do you learn any of these things that we did in our class – do you learn them in any of your other classes? (McLeod) (Multiple voices – resounding “No’s”)  I felt like this class was just a class that was good for everyone (Janelle)  Yeah, and I think everyone would benefit from it too 'cause like I know for sure that I benefitted from this class, but I think everyone could (Jill)
	SEL should be mandatory	3	I thought it was like a good learning experience – like learning how to like calm yourself down and stuff and like I definitely benefitted from that (Lily)  I think it should be mandatory – I think that every student should have the ability to take this course. To learn how to breathe correctly (Devin).
	SEL should be an option	10	I don't think it should be mandatory. But I think like it should be optional but I think like schools should encourage it a lot 'cause it was really helpful (Marie)  I don't think it should be mandatory because I think a lot of people I guess would take advantage of this class and then it would ruin it for everyone else. But I think this class is definitely something that I would like tell people to take – like I'm definitely going to get my sister to do this class 'cause I thought it was a really good class (Janelle)



		<p>I don't think this should be mandatory – but I think they should emphasize this class (Denise)</p> <p>I think it works well – like this class as an option – but it should be an option in more places – like in middle school, it would have helped me and other people I know and like in other schools as well (Tamara)</p>
	Mental health currently not being addressed	<p>4</p> <p>I took it 'cause I really liked learning about psychology and stuff and behaviour – 'cause we have a lot of mental health issues in my family – from both sides – so I think it's really interesting to learn about why people behave the way they do (Denise)</p> <p>Sometimes mental health is taught – like we'd have these people come in and do presentations to us – but most of those things would be like the extreme stuff – like the depression and the anxiety – but they wouldn't be like, well if you're in a test, use breathing techniques to help. It was mostly about seeing signs of other people with it – just basically slides that say, if you have this, get help. Which they never said what that help was! (Denise)</p>

Many students thought this type of course worked best as an option – citing students who were not as invested as “ruining it for everyone else” (Janelle). At the same time, those who wanted the course to remain as an option added that they felt that schools should “emphasize this class” (Denise) and “schools should encourage it a lot” (Marie) and “it should be talked about more” (Naomi). In other words, collectively, they appreciated that they were able to pick the course and feel that others had chosen it as well. Three students commented on it as being mandatory, as every student should “learn how to breathe correctly” (Devin).

**Theme 4: HeartMath Biofeedback.** Categories that emerged from the conversations that students had about their collective experience with the sensor and app centered around focusing strategies, matching the colours to emotions, effectiveness of the sensor/app, and comments about levels and scores. Table 57 illustrates the categories and numbers of responses that emerged in conversation.

**Table 57***Focus Group Conversations about HeartMath Sensor/App*

Theme	Categories	No. of responses	Student Quotes
Effectiveness of sensor/app	Focussing strategies	17	<p>I'd breathe in really big and then when I breathed out I'd just let all my muscles go (Malcolm)</p> <p>My best was when everyone was quiet and you were playing like spa music or something – and then I could just watch the wheel (Denise)</p> <p>I just didn't look at the wheel, cause whenever I did it would like make me really anxious to try to get to green so I just put my phone face down and just like stared at something (Paige)</p> <p>I was just watching the wheel just go in and out so I would match my breathing to that (Jill)</p>
	Helps focus breathing	20	<p>For me, it was like really focussing on trying to slow down my heart, or like focussing on really nice experiences or a person or pet that I really love so like I'd think about my dog or my friends and then I'd start to like calm down. I'd just really like try to breathe slowly so that then my heart would like slow down and I would calm down (Lily)</p> <p>I have to look at the wheel and match my breaths because I actually tried closing my eyes, but as soon as I would close my eyes, it would go immediately down. It would go to red but then when I opened them and like could track it, I could bring myself back. (Sienna)</p> <p>I liked the deep breaths and using like the Heart monitor, and how like it kind of forced you to do it so then you can actually see yourself and like how you're going to bring it down, and then you can even envision that so that you're like, OK, right now I might not be in the green zone but I can bring it back down (Denise)</p>
	Matching colours to emotions	8	<p>I honestly thought it was pretty beneficial because it kind of gave you like evidence as to how you're feeling through like the colours, 'cause there could be times where you're like, Oh, I <i>think</i> I feel fine? I think I feel calm? But I don't really know? (Carly)</p> <p>And to kind of build off what Carly said – like it helps you kind of understand more what zone you could be in (Kate)</p> <p>I found that it let me like know <i>how</i> I was feeling and that when I'd breathe I like could know that I'm calming down (Alice)</p> <p>Well, when we were doing the HeartMath sensor, whenever I was in the blue, I could like hear my heartbeat when it was just quiet, so when I was in the green, I couldn't hear it as much. So when I'm doing tests, I try to focus on trying to drown out the heartbeats, if that makes sense – like make it quieter? And then that usually helps me. I actually did it on my social test yesterday! And it worked! (Paige)</p>
	Improved levels, scores	8	<p>I liked that it tracked your progress, so you could see how you got better over time! (Naomi)</p> <p>I started not very good on level 2 – um, towards the end I definitely got better (Jacqueline)</p> <p>I feel like for level 2 you need to be a little more concentrated on breathing and stuff 'cause sometimes if I wasn't concentrating on like the wheel breathing, I wouldn't breathe as slow as I needed to and then I'd be in the blue instead of the green as much – so then I'd need to concentrate more! (Naomi)</p>
	Not matched/ inaccurate	2	<p>Like, what Carly said you don't know what you're feeling all the time especially at this age – it's kind of – oh ya! I'm great! I'm feeling wonderful! And then you turn it on and it's red – sometimes everything isn't as it seems (Chloe)</p> <p>I personally didn't like it 'cause I know a new technology that is way more accurate, so – so like sometimes right or wrong. Like for example I was mad that time and it read happy. (Coleman)</p>

General summaries from these segments of conversations indicate a variety of focusing strategies, from simply focusing on the mandala wheel which appears on the student's phone (via the

app), focusing on the breath or heart, feeling the love of a person, pet, or place, closing eyes and letting the mind wander, visualizing a nature walk, muscle relaxation, and several others. Most students described a matching of feelings of relaxation (from deep breathing) to being in the green zone, and conversely, feeling stressed or anxious and being in the red zone. In other words, it seems the inner physiology did in fact match the visuals displayed by the app. One student seemed unsure as to the match, with Carly commenting on feeling “wonderful” and then seeing the app show red. She also mentioned that “you don’t know what you’re feeling all the time especially at this age” – very insightful comment and likely quite true. They are in the process of noticing and paying attention to how they are feeling and how that actually shows up in their bodies. Coleman, indicated that he did not find the sensor and app to be particularly accurate, mentioning that he had worked with a different device that seemed to be a better representation of his inner physiology. While Pablo also mentioned this in his individual interview, he did not comment on this during the focus group. Finally, many of the students (particularly in FG3) enjoyed talking about the levels and achievement scores. They did not see it as a competition – to see who got higher scores – but instead, as a way to measure and track individual goals. As Naomi stated, “I liked that it tracked your progress, so you could get better over time!”. Given that the students did track their achievement scores (which were later collected and analyzed in Zone 6), they were able to continually reflect on previous days and levels throughout the term.

### **Theme 5: Coping Self-efficacy.**

*Feelings about Breathing Practice.* Students discussed their continued use of the breathing practice in all three focus groups. As Kate said, “You can use like your breathing to calm down and be coherent” and Tamara stated, “I started doing like the breathing whenever I’d start feeling really stressed and it helped a lot! Like I just feel more jolly this week!” (Laughs). Several students commented on the effectiveness of the breathing practice, with Simon saying, “It helped me calm down and like get ready for class and stuff. It was pretty helpful,” Devin stating, “It slowed your breathing

down,” and Trent with “I kind of calmed me down. It was relaxing. I liked it.” Alice found that the sensor and app helped her monitor her inner state so that she was aware of her sense of calm and relaxation. She said, “I found that it let me like know *how* I was feeling and that when I'd breathe I like could know that I'm calming down.” Lily appreciated learning how to calm down when stressed and is now able to take those new skills with her as she navigates through high school. She says, “I thought it was like a good learning experience – like learning how to like calm yourself down and stuff and like I definitely benefitted from that.” Jacqueline used the breathing practice to calm both herself and her horse down, particularly when trying to work through a difficult skill or riding technique. She stated, “lots of time the breathing really helps with that and I breathe and it makes everything better and helps us communicate better.”

***Confidence in Managing Stress.*** Students discussed their feelings of confidence in using the breathing practice along with other tools and strategies learned in the course to manage oncoming stressful situations such as assignments and tests, peer and teacher relationships, and the rest of life's curveballs. As Carly said, “with the sensor it kinda showed you that you are calm and it would show you how - not necessarily how you're feeling, but like if your head is clear and how your heartbeat is.” A few students talked about how to calm themselves down, using the language and technical aspects of the sensor and app. Denise said, “I liked the deep breaths and using like the Heart monitor...and right now I might not be in the green zone but I can bring it back down.” Naomi described: “I used the deep breathing stuff on my math test – cause I'm not very good at math and sometimes it like stresses me out a lot and then I'm just like, I just need to take a minute to breathe before moving on – and then it helps me cause I actually like let myself think about how to do it instead of just rushing in.” At the end of FG3, I asked the group, “So how many of you feel a little bit more in control of your mind and body and emotions and ability to kind of find yourself calming down?” I paused, and looked around the table and stated, “So all of your hands are up! Does anyone want to talk

about that or express your feelings?” At this point, several of the students (Jacqueline, Paige, Naomi, Denise, Tamara, and Sienna) had comments about their confidence in their ability to manage stress.

### ***Alumni Focus Group (AFG) Thematic Analysis***

**Focus Group Logistics.** The alumni focus group (AFG) had to take place after Semester 2 classes had finished and marks were submitted (therefore during the June exam period). Given the more difficult timing, only five students (Lindsay joined the group halfway through) were able to attend. This made for a lively and highly interactive conversation (lasting 90 minutes), however a few more students would have allowed for more perspectives for each topic discussed. Compared to the Grade-9 focus groups, this one was much more unstructured, allowing for more of a free-flowing range of topics and comments to emerge. The upside was the natural and authentic conversation with less dependence on me for direction, however the downside was that several questions that I had were not addressed or covered. Thus, the themes that emerged were more limited, and did not cover as broad a range as the Grade-9 groups. The themes covered by this group included: Social Awareness (personal growth, classroom affective experience, relationships), Stress Situations, Feelings about the Course/School, HeartMath Biofeedback (understanding of sensor/app and Coherence) and Coping Self-efficacy (confidence in stress management).

#### **Theme 1: Self/Social Awareness.**

**Personal Growth.** My question to the group was “So what's the one big thing you feel like you learned since Grade 9? When you think back to your Grade-9 self and now your grown-up self?” The students loved this question, and much like their individual interviews, were able to use the temporal and psychological space to look back onto their Grade-9 self and observe the change that had taken place. The difference however from the individual interviews, was that in this case, the students were able to jump right into a full, interactive discussion with each other – bouncing off each other’s reflections and memories to connect their own self-narratives. Table 58 represents this conversation thread from the

alumni students about personal growth.

**Table 58**

*AFG Conversation Thread about Personal Growth*

Student	Quotes
Hannah	I learned how to relax. When I think back to my Grade-9 self, I would get so down on myself and lose my shit – and now I've learned how to relax a lot more and I think that's good! And if it doesn't go my way, it's not the end of the world.
Stella	For me it was FOMO and I had a big issue where I needed to be everybody's friends and everybody's favourite – and I think I've realized that other people can't dictate what I do with my life – and I realize that now I'm doing what I want to do – and to let that whole popularity thing go – like worries about what parties I was getting invited to and what ones I wasn't. And now I realize that I don't really care cause I'm having a good time.
Nadira	I feel like I was the same as that – but in Grade 9 I didn't try so I wouldn't have to worry if I failed. But now I'm really trying – my mindset is different and I'm pretty good at what I'm doing.
Megan	I probably just learned to try my best 'cause usually I'll try super hard for a test but it won't turn out the best but then I'll just try to forget about it so I won't do bad on the next one.
Lindsay	I think I learned how to stand up for myself better – and now I can speak for myself. This is my opinion, this is what I want – I've lost some friends, being able to stand up for myself. It was an internal thing – I felt like I had to do everything. And now I can stand up and say – no, I don't want to do this.
Stella	I really like what Lindsay said – I think growing into yourself – realize like what do I think is cool? Trust myself. I don't think that every night going on a bender is cool! Sometimes I think everyone has a different version – and that's what I've learned. Accepting what I think and feel – and I have different goals and priorities – and what do I think is awesome? Instead of everyone else.
Hannah	Or even just like – I want to be at home by myself.
Stella	Yes, I love to be by myself!
Lindsay	I love to hang out with my mom!
Hannah	Yeah, I kinda want to hang out with my mom – and being OK with that.
Stella	I think jumping over the teenage angst – like screw you mom – that has changed my course. Like I think family is so important – and I'm so grateful for my family 'cause a lot of people don't. That's another thing that I've learned.
Lindsay	I've also learned to not take things to an extreme. I think that's more finding yourself and personal preference. Like I don't have to hang out with people going on constant benders and have crazy parties – but I also don't think I fit with the people that don't want to go out at all? But I should be able to do both – go to parties sometimes and other times go to a market with my mom or sit at home and have a bath and hot chocolate – it's OK to do both.

This conversation was seamless and did not involve me at all, except at the beginning for the prompt. The students shared common ideas of feeling more confident in their choices, not worrying as much about what others think, and being OK with things like hanging out with family or even being alone. They all saw these experiences as being new and evolved since Grade 9, in that their Grade-9 selves were much more concerned with social stresses and peer pressure, and just generally fitting in. As Lindsay said, “Just stand[ing] up for myself better” and Stella: “accepting what [she] think[s] and feel[s]...instead of everyone else.”

***Classroom Affective Experience.*** The students spent a few minutes during their focus group reflecting back on the positive and calming experience while they were in PP9. As Stella said, “Yeah, I think that positive psych, kind of like with the COVID thing, I think we needed that! And like everyone had a chance to breathe, especially our class – we just had a nice chill class.” A few students mentioned the importance of the atmosphere and setting the tone in the classroom, with Hannah stating, “I think it was really important and I’m going to miss it!” The conversation went quickly from the positive vibe to the relationships that they established – both classmates and teachers.

***Relationships.*** The students began by reminiscing on the new friendships that they made while in the PP9 class. Lindsay said, “One of the biggest things I took out of positive psych was the friend group” and then Nadira chimed in with “That was a super good time – we all had a friend that we could hang out together.” Stella, after a few moments of contemplation stated:

I was just thinking – I know all these courses are so important – but it’s not the class, but it’s the people, it’s the relationships you take. That’s what I take away. It’s like learning how to interact in a community, how to be a member of a community or learning how to navigate relationships – like a boyfriend or girlfriend or partner – like how to know if it’s toxic or not. And learning how you are as a person and how you respond to things Because I think what high school provides is

a safe place to navigate things. As an adult – you have to learn all those things without the community.

From there, the conversation turned to teacher relationships over the years. All of the students described strong feelings about different teachers and how that translated into their increased or decreased engagement in that class. I allowed them to speak openly and honestly, letting them know that their conversations would be protected and confidential. The began with a few teachers they had struggled with – mainly due to a lack of connection, not feeling seen or heard in the classroom, teachers who were exhausted and overwhelmed, and in one case, a new teacher who was struggling to manage her classroom. Hannah, the aspiring teacher, turned the conversation by stating, “I find if I have a good relationship with a teacher, I’m much more likely to try harder and even show up to class.” Nadira jumped on board with “It’s like there’s – and you can ask anybody and you can name the five teachers that are the greatest in the school – like you’re one of them!” (She pointed to me.) Intrigued (and somewhat humbled!), I then asked the group, “So what makes the difference then?.” Stella jumped in quickly with “Energy, man! I am 1000 percent about the energy! I think that a lot of teachers do put in the energy to create relationships and to create an environment that’s fun and easy to learn in.” Nadira wondered how some teachers seemed to “have the respect of the students” while others did not and asked the group why this was. Stella came back with, “I think it’s a confidence thing. I feel like if you have confidence, you can command the room. I don’t know if that’s something you can teach, but it is something that has to be learned – and you have to care!” Hannah thought that maybe it was more about mutual respect, as she said, “I’ve always felt like an equal, like you guys (teachers she likes) aren’t looking down on us, like we are at the same level and you respect me and I respect you! Whereas other teachers might just feel like only *they* get the respect and that we are just the students.”

**Theme 2. Stress Situations.** When asked about stress in their lives, the students in this group commented on a variety of things – from school stress and Diplomas, to changing friend groups, work,



and the looming “real world” of adulting awaiting them. Lindsay and Hannah briefly discussed the Diplomas that they had already written, describing math as the most stressful one. Lindsay said, “Yesterday was very stressful ’cause it was math. Social is tomorrow. Stating your opinion is easier ’cause you can just provide evidence and prove your point – with math there’s only one right answer.” Hannah follows that up with, “Yeah, the math Diploma’s hard. It’s meant for you to pass, but not meant for you to do well.” The pervasive math anxiety is alive and well and felt by many students, even those who are “good at math.” Hannah (the only Grade-12 student in the group) talked about stress beyond high school, stating, “it’s very different stress – which is hard to handle because none of us have had it before. We’re not experienced with this weird stress of adulting!” A few of the students also talked about not really learning how to prepare for the “real world” in high school. They thought that a course like Career and Life Management (CALM) could provide more elements of “adulting” to help them transition beyond high school. Stella talks about the need for “having a life management course – maybe not mandatory – but an optional course – especially if you’re moving away.”

### **Theme 3: Feelings about the course and school.**

**Course Feelings.** All of the students in this group found the course to be helpful and important. They mentioned being glad they had the opportunity to take it in Grade 9, and that it helped set them up for success in their high school years. Table 59 represents a few of the comments made on this topic.

**Table 59**  
*AFG Conversation Thread about PP9 Course*

<b>Student</b>	<b>Quotes</b>
Stella	It was also the first class that I took that was something that I was interested in that wasn’t a core class – so like more of something that I enjoyed. But was also learning – so I really liked that about it.
Megan	I learned a lot from it that I can use like every day. Like in school and in personal life and stuff.
Hannah	Yeah! I really liked the course I had a very positive experience – and I mean, it definitely like Stella – piqued my interest in psych (and) the strategies that we learned is something that I want to bring into my day today and into my career
Nadira	I thought it was like a good course to take in Grade 9 – that kind of taught you habits but also just like being a break in your day.

Stella	I think that positive psych actually helped me be able to voice my opinions – because I think that I’m pretty open about that stuff but I think that it also just like came with like learning about it and realizing that it wasn’t not normal and that I was allowed to feel that way?
--------	--

These students went on to take more psychology courses throughout their high school careers – thus, their comments about this course “piqu[ing] their interest” was relevant to all of them.

***School Feelings.*** Much of the discussion about school in general centered around course selection and teacher relationships. Students mentioned wanting more autonomy over their schedule and being able to request certain teachers. As Nadira stated, “So having people request teachers, it just doesn’t work? But also, if maybe there’s a lot of kids requesting a teacher, then maybe analyze the other teacher that kids don’t want – not to be mean but.” As mentioned in Theme 2, many students discussed their personal experiences with specific teachers and how that influenced their perceived success in that course. As Stella said, “Like last semester [I was] struggling – I kinda like need someone to say this is not OK – just noticing me.” Stella then had a brilliant Biology teacher in her second semester who *did* notice her, and in fact, embraced her quirkiness and continual need to challenge and question everything.

**Theme 4: HeartMath Biofeedback.** The question I posed to the group was, “What did you think about using the sensor every single day like that?” I wanted to learn whether that experience stuck with them and how they thought and felt about it now. Table 60 represents some of the responses regarding daily sensor use.

**Table 60**  
*AFG Conversation Thread about Daily Sensor Use*

Student	Quotes
Megan	I really liked it! I think it was like a good start to the class too, cause then I was like ready to learn lots, I guess? And like throughout the day, 'cause I remember I had it in the morning, so it was good to start the day that way – and then rest of the day just goes better!
Hannah	Yeah, I a hundred percent agree! It was a good way to start – I would start in the green zone, starting in a calm place – and like doing it so much, I was able to integrate it self-consciously and do those breathing activities without even consciously thinking about what I needed to do without even needing the sensor. Just being able to get into that zone on my own and something that I

	really loved and I want to do that with my students, and do that every morning cause I thought that doing that started the day SO well!
Stella	I think that it was a good like habit – like it was nice to just have a routine like in just one class where it’s like you just knew what you were doing – there was no like going into class and wondering, oh, what are we doing today? It was a good basis and then also – I think it made me a little bit more aware of what I was feeling and it made me more aware of like how I was presenting myself to others.
Nadira	I just like – this sounds bad – but I just used it for not for the point of getting the green circle, but I would just use it to just like daydream and not pay attention. And then it would be green at the end – so it worked in the end! But it was just more time I just used to just sit there and chill.

Students were extremely positive about this experience, and all were grateful for the opportunity to learn how to calm themselves down using the sensor and app to monitor their progress. (Note: Lindsay did not comment here given that she missed the first half of the focus group as she was writing an exam.) These students were able to understand and appreciate not only how it made them feel in the moment, but also how it helped them navigate through the rest of their day and beyond. They mentioned being “a little bit more aware of what I was feeling” (Stella) and being able to get into the green zone “without even needing the sensor” (Hannah). The lasting effects of this practice learned in Grade 9 is evident from these students’ reflections.

**Theme 5: Coping Self-efficacy.** This focus group did not spend as much time on this topic (in comparison to their own individual interviews), however, a few conversation threads did result. A few students talked about using the breathing practice currently, and how it helps them with their life stressors. Hannah talked about wanting to structure her classroom (once she becomes a teacher) using the breathing practice to start each day. She said, “Just being able to get into that zone on my own and something that I really loved and I want to do that with my students, and do that every morning cause I thought that doing that started the day SO well!” Stella mentioned being able to really confirm how she was feeling by using the sensor and app. She stated, “why am I feeling so – like elevated almost? I was able to recognize that and be able to take it down and like learn how to take it down – so yeah, that’s

what I liked about the heart monitor.” For her, the sensor acted like an internal emotion barometer, where she could tune in and decide if that was how she wanted to present to the outside world or use her breathing practice to “take it down.” As far as self-efficacy goes, these students all commented on feeling more confident in their ability to manage their emotions, their relationships, schoolwork, and other stressors coming along. As Nadira stated, “[M]y mindset is different and I’m pretty good at what I’m doing.” Hannah said, “And if it doesn’t go my way, it’s not the end of the world.” These students have also experienced more successes and failures than the nines and have been able to put these experiences into perspective. As Stella described, “I think I’ve realized that other people can’t dictate what I do with my life – and I realize that now I’m doing what I want to do – and to let that whole popularity thing go.” Thus, being able to see oneself with a broader, more expansive lens – nuanced such that the blacks and whites are subdued to shades of grey – has provided these alumni students with an increased sense of confidence and belief in their ability to self-regulate and self-govern.

### ***Comparison of PP9 with Alumni Focus Groups***

The themes that emerged from the Grade-9 groups and alumni groups were quite similar. All of the focus groups commented on the positive effects of using the sensor and app to calm down and regulate their emotions. The classroom environment as one that included low lights, music, quiet atmosphere, and a “chill vibe” was common to all focus groups as well. When discussing stressful situations, the Grade 9s talked mainly about school and friend drama, whereas the alumni added the new stress of increased adulting – from work to a future beyond high school. School in general was discussed in a few of the Grade-9 groups, with students somewhat divided as to whether PP9 would work best as a core or option class. This topic was not discussed explicitly in the alumni group. As far as teacher relationships goes, both the Grade 9s and the alumni agreed that teachers who care, respect their students, and are positive and enthusiastic are the ones who are most effective in engaging students.

Both the Grade 9s and alumni discussed the HeartMath sensor and app as being an effective way to see inside the body to know how one is feeling. They also both commented on being able to now know how they are feeling, even without the sensor and app. The continued practice allowed them to familiarize with what the green zone feels like – and how one might get there (deep, slow breathing).

When it came to discussing coping self-efficacy, all students described feeling more confident in their ability to handle stress and manage their emotions. Students typically pointed to the breathing practice as the way to calm down and gain control over stressful situations.

### LR Quadrant – Zone 8 Interobjective Collective Outside Perspective

Zone eight provides a comprehensive examination of system policies and directives that influence programs such as the one that I have developed to support the social-emotional learning for my Grade-9 students. Table 61 represents themes emerging from the documents analyzed.

**Table 61**

*Findings Map – LR Zone 8*

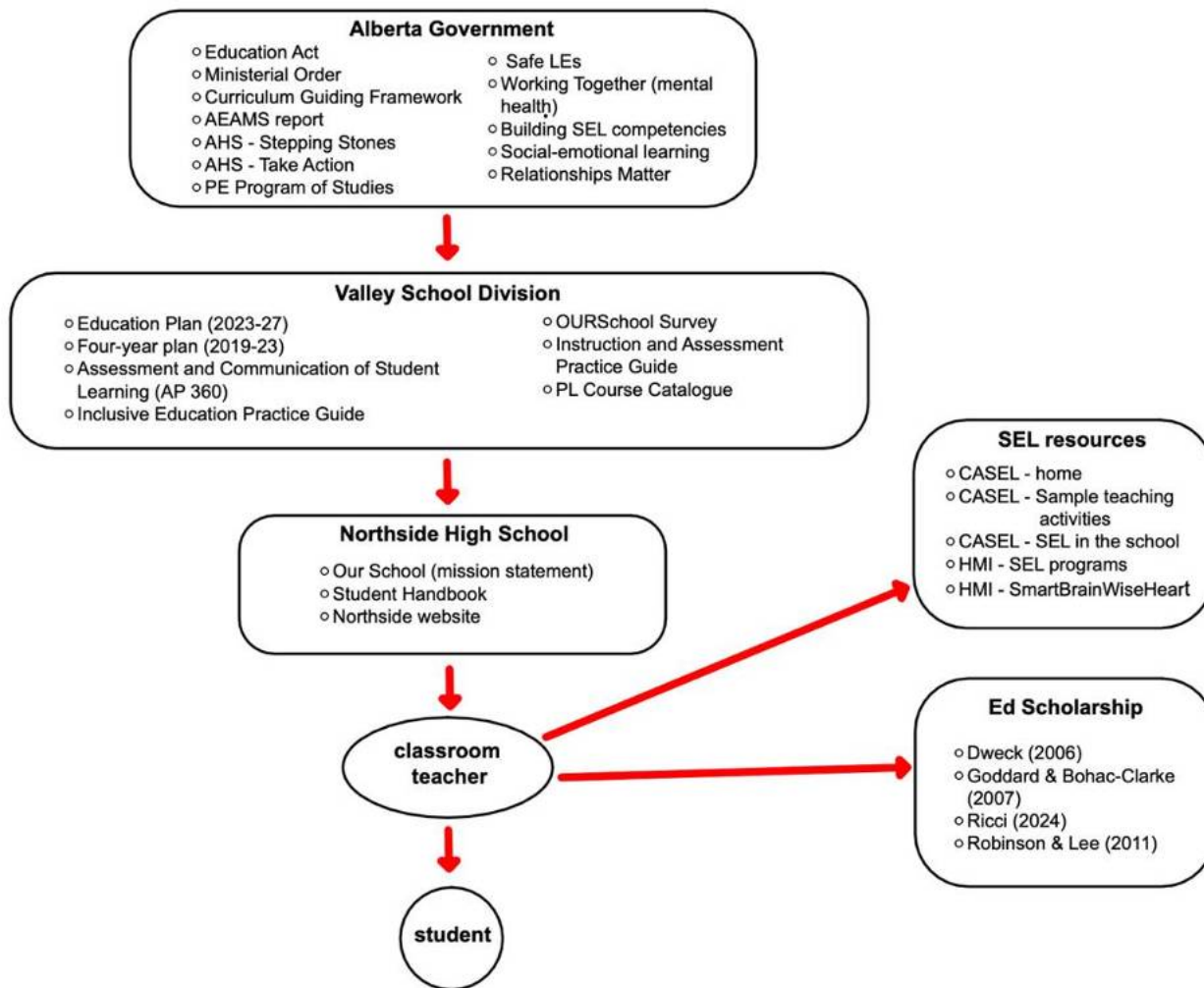
Upper Left (UL) (Individual subjective perspective)	Upper Right (UR) (Individual objective perspective)
<b>Zone 1 RQ:</b> What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Zone 5 RQ:</b> How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?
<b>Methods:</b> Semi-structured interviews (EG and AG) Student journaling (process)	<b>Methods:</b> pre/post surveys (SOS and MAAS-A)
<b>Themes:</b> <b>Social Awareness:</b> EI and ER increased Calm classroom and positive relationships increase coherence (EG/AG) <b>Anxiety Symptoms:</b> Cognitive impairment (EG) <b>Anxiety Situations:</b> Tests, presentations, peers (EG) <b>Course Feelings:</b> Positive, safe space, enjoyed HM biofeedback, recommend to others (EG/AG) <b>School Feelings:</b> Need teacher connections, better engagement (EG/AG) <b>Self-awareness:</b> Breathing practice contributed to increased personal growth and ER <b>Coping Strategies:</b> HeartMath sensor/app and breathing practice was very effective, still using <b>Coping Self-efficacy:</b> Increased confidence in stress management using breathing practice <b>SEL as a core:</b> EG/AG recommend	<b>Themes:</b> <b>Social Awareness:</b> EG slight increase in SA <b>Anxiety Sources:</b> EG significantly decreased (over time and compared to CG – interaction effect) <b>Anxiety Symptoms:</b> EG slight decrease in anxiety <b>Cognitive Interference:</b> EG slight decrease in CI <b>Self-awareness:</b> EG increased positive affect; increased coping self-efficacy (not significant) (AG significantly higher than both EG and CG) <b>Mindful attention:</b> EG significantly increased (over time and compared to CG – interaction effect)
<b>Zone 2 RQ:</b> What developmental levels are students operating at and how does this affect each individual worldview?	<b>Zone 6 RQ:</b> What changes are observed in the student's HRV measures after this program?

<b>Methods:</b> psychosocial inventories	<b>Methods:</b> HRV measurements from sensor/app (N=47)
<b>Themes:</b> <b>Behaviours caused by nature and nurture</b> EG, AG <b>Science is truth, explanatory</b> (EG/AG) <b>Mixed feelings about growing up</b> (EG) <b>Relationships, coping important for health</b> EG/AG <b>Inclusion/diversity important for connections</b> EG/AG <b>Schools/society need to be safe, inclusive, tolerant for all</b> (EG/AG)	<b>Themes:</b> <b>Significant increase in Average Coherence score</b> from Baseline to Time 2 for EG and McLeod
<b>Lower Left (LL)</b> (Collective intersubjective perspective)	<b>Lower Right (LR)</b> (Collective interobjective perspective)
<b>Zone 4 RQ:</b> How do the students collectively understand SEL and mindfulness with biofeedback within the culture of classroom and school? <b>Methods:</b> student focus groups and exit questions	<b>Zone 8 RQ:</b> How is this type of program affected and/or supported by school, division, and provincial systems and policies? <b>Methods:</b> text and document/policy analysis
<b>Themes:</b> <b>Social Awareness</b> – Increased ER for EG; emphasis on calm, coherent classroom (EG/AG); teachers need to attune to student needs <b>Stress symptoms/situations</b> – cognitive impairment during stress, tests/presentations stressful (EG/AG) <b>Feelings about course</b> – positive, beneficial, still using strategies (EG/AG) <b>HeartMath strategies</b> – effective, help to focus breathing, matched colours to emotions <b>SEL as an option</b> – preferred over core (EG) <b>SEL as a core</b> – preferred over option (AG) <b>Coping self-efficacy</b> – improved confidence in stress regulation due to breathing practice (EG/AG)	<b>Themes:</b> <b>Student Engagement</b> – previously low, looking for ways to increase engagement in the classroom <b>Mental and Emotional Health in the Classroom</b> – addressed by levels of government policies, but not necessarily disseminated into the classroom <b>Inclusive Learning Environments</b> – students entitled to safe, inclusive, welcoming learning spaces <b>Benefits of SEL Learning</b> – evidence-based programming already present in some curricula <b>SEL Implementation Challenges</b> – difficulty positioning SEL into pre-existing prescribed curricula <b>SEL Resource and Support Availability</b> – available resources, difficulty bridging the gap to teacher in class <b>Program Fidelity</b> – programs such as PBIS, needing to persevere into the second cycle <b>Growth Mindset</b> – implementing a growth mindset approach in schools and classrooms

Adapted from: Bohac Clarke (2019); Davis (2019); Esbjörn-Hargens et al.(2010); Wilber (2000a)

This section involved the analysis of thirty separate educational policy documents produced from the school, division, province, and field of social emotional learning pedagogy. While all the documents examined are legitimate and authentic, I am choosing to use pseudonyms for both the division and school documents. Thus, Valley School Division and Northside High School will be used for citations and references. Figure 39 displays the documents in a hierarchical structure according to the level of government or authority in the Alberta education system.

**Figure 39**  
*Hierarchical Map of Documents Analyzed*



The arrows indicate the transfer of knowledge – where there is a general flow of information in the form of policies and practices from the government to division to school to classroom teacher and finally, to student. The general assumption is that these documents with embedded policies and directives are sent down the chain to the teacher to use in her professional practice. The arrows extending out from the teacher indicate the necessary reaching out of the teacher to access additional resources such as SEL strategies and lesson plans, and relevant information from the academic scholarship in education.

To obtain the necessary data for this quadrant of research, the documents were read thoroughly,

and rich text was pulled out and examined in more detail. From there, the documents were organized into four categories according to their intent and target audience. Within each category, documents were further examined, and themes were developed. Theme extraction was accomplished by both me and AI (Chat GPT4 and DocAnalyzer) and then compared for commonalities. In many cases, AI tools generated too many themes, which had to be amalgamated and, in some cases, discarded altogether. Resulting themes were then examined for similar messaging as well as contradictions and gaps. In each category, and with each document, the student was placed at the centre, while I attempted to make sense of how the policy was in service of this most precious commodity. I also held each document up against a social-emotional learning pedagogy, to see where this focus was supported, enhanced, or in some cases, missed altogether. I was also interested in examining evidence of student engagement, inclusive learning environments, mental health in schools, and holistic student development.

Categories of consideration were as follows:

- Provincial Policies
- Division/School Policies and Practices
- Assessments and Measures
- SEL Pedagogy and Practices

### ***Provincial Policies***

This section focuses on documents produced primarily by the Alberta Government that relate specifically to Kindergarten to Grade-12 education in Alberta. These documents inform decisions about curriculum, teaching and leadership standards, and overall welfare of students as well as educators, caregivers, and other stakeholders. Documents used for this analysis include: The Education Act (2020), The Ministerial Order on Student Learning (2024), The Guiding Framework for the Design and Development of Kindergarten to Grade 12 Curriculum (2023), the current Alberta program of studies (2002), the Teacher Quality Standard (2020), and several Alberta Education documents focused on social-emotional learning and healthy learning environments. While these documents inform many areas



of education, I was mainly focused on the social-emotional learning policies that were present and outlined. I was able to home in on several themes that emerged upon close examination.

**Theme 1: Benefits of Social-Emotional Learning (SEL).** The policy documents examined in this category generally refer to SEL as being an integral part of education, and generally endorse a whole-school approach to the teaching and practicing of these skills and competencies. According to Alberta Education (2023), “Social-emotional skills need to be taught and can improve with opportunities to practice in different contexts and that social-emotional learning requires a long-term whole-school approach that involves families and community partners” (para. 2).

This statement from the Education Act (2020), “WHEREAS the role of education is to develop engaged thinkers who think critically and creatively and ethical citizens who demonstrate respect, teamwork and democratic ideals and who work with an entrepreneurial spirit to face challenges with resiliency, adaptability, risk-taking and bold decision-making” (Government of Alberta, 2020, p. 13), illustrates the importance of SEL competencies. The Ministerial Order on Student Learning (2024) describes a focus on the development of student character – as critical thinkers, open minded, adept in communication (verbal and written), conflict management and understanding of healthy relationships, empathy, self-reliant, tolerant, inclusive, and connected to community. Across these documents, there is evidence-informed support for the benefits of SEL in schools, including improvements in academic achievement as well as improved attitudes and motivation towards learning and fewer disruptive behaviours and reduced emotional distress (Alberta Ed., 2020, para. 3). These admissions reveal that these SEL competencies do need to be taught (Alberta Education, 2020), and that they contribute towards the healthy development of student character in terms of their motivation towards learning, engagement in schools – both with content and relationally, and increased prosocial behaviours (also conducive to learning and engagement).

**Theme 2: SEL Implementation Challenges.** While there is mention of SEL in each of these documents, along with the research-based benefits to students directly, there is a lack of concrete and practical methods for implementation provided to educators. As far as curricular components, there are very few places where SEL competencies are described and disseminated into outcomes. In the Grade 9 Health/PE, program of studies, one of the program rationale/goals is for students to “manage stress,” and “recognize and expand personal skills.” Additionally, “students [will] develop decision-making skills that build resiliency and self-efficacy, help expand strategies for coping and support informed personal health practices. Students [will] develop personal responsibility for health, learn to prevent or reduce risk, and have opportunities to demonstrate caring for self and others.” (Alberta Learning, 2002, p. 2). It is difficult to determine how or where these competencies will be taught and practiced within the typical physical education classroom. As mentioned earlier, practicing these competencies is essential to their subsequent embodiment. Anecdotally, from my interviews and focus groups with the Grade-9 students, when asked about these competencies in physical education, most could not think of any examples or learning opportunities, apart from a guest speaker who came in to talk about sexual health or the understanding of consent in relationships.

So, while it is clear that SEL competencies are beneficial and integral and that students are taught “responsible and wise decision making related to personal health, safety, and positive relationships to develop a better understanding of themselves that will allow them to make decisions, achieve goals, build resilience, and adapt to change” (Government of Alberta, 2024c), it is not as clear how these skills and competencies are to be effectively implemented and assessed.

**Theme 3: Mental and Emotional Health in Curriculum.** The Ministerial Order includes a call for the importance of student mental and emotional health. “All students will gain an understanding of mental health and mental illnesses and the factors that influence mental well-being, reduce the stigma and discrimination associated with mental illness, and equip students with the knowledge and skills

needed for early identification and intervention.” (Government of Alberta (2024a, para. 8). Likewise, the TQS document advises teachers to consider many student variables, including “emotional and mental health” (p. 4). One of the most thorough and comprehensive resources to assist educators in the area of mental health was developed by the Calgary Regional Consortium. Extensive research and collaboration with various mental health professionals came together to organize a resource to describe in detail children’s mental health, stigma, and the “promotion and prevention strategies for mental health and social-emotional learning are embedded in daily instruction and school-wide activities” (Government of Alberta, 2017, p. 7). This document recommends a thorough understanding of mental illness, adolescent brain development, and the need for students to feel cared for, respected, and understood, using people-first language to describe their mental health conditions (Government of Alberta, 2017).

Apart from this well-crafted and rich resource, the majority of the government mandates are relatively light on teachers’ responsibility for their students’ mental and emotional health – in fact, they generally just make brief reference to the fact it must be considered, but not how or in what context. A perusal of the program of studies for Grade-9 students shows a brief mention of mental and emotional health support in the Health/PE curriculum, but only really focusing on healthy relationships, awareness of unhealthy choices, illness prevention, and coping strategies (Alberta Learning, 2002). On the surface, it appears that this curriculum has the best intentions – however the means are not immediately obvious. How will teachers know how to develop self-awareness, social-awareness, decision-making/relationship skills, resiliency, emotion regulation, trauma recovery, and develop adaptive coping strategies? (In this Grade-9 health/PE curriculum, their example of a “coping skill” is “positive self-talk” (Alberta Learning, 2002, W-9.8). It is hard to imagine how physical education teachers will engage in an active process of having their class of Grade 9s practice positive self-talk! Without specific curriculum guidelines, exemplars, or classroom activity lesson plans, teachers are left to their own devices. A comprehensive set of SEL lesson plans embedded within the program of studies might provide teachers

with the needed tools to implement these elements.

**Theme 4: Inclusive Learning Environments.** The Education Act was recently revised to include a special statement about safe and caring learning environments. The statement reads: “WHEREAS students are entitled to welcoming, caring, respectful and safe learning environments that respect diversity and nurture a sense of belonging and a positive sense of self;” (Government of Alberta, 2020, p. 11). From here, inclusive learning environments that ensure students feel welcomed and supported are pervasive throughout the educational policy documents examined. There are additional resources provided by all levels of education (province, district, school) to help teachers create welcoming and safe spaces. In fact, the Alberta government put out a checklist designed to operationalize the ministerial order on safe and caring learning environments by focusing on physical appearance, social climate, success in learning, and home-school-community relations (Government of Alberta, 2015). Along with inclusive environments are positive and respectful teacher-student relationships, which are outlined and described in each of the documents examined.

**Theme 5: Student Holistic Development.** A recurring theme throughout these policy documents is the emphasis on the education of the whole child. Each document prioritizes literacy and numeracy, and in fact the Ministerial Order requires that literacy and numeracy are the “foundational building blocks” of learning – they need to be “pervasive across all subjects and grades” (Government of Alberta (2024a, para. 3). There is an emphasis on a well-rounded education, where “A strong foundation in mathematics and science plays a crucial role in preparing students for the challenges and opportunities of the modern world” (ibid., para. 7). Included with that are programs in the arts, music, dance, drama, understanding of culture, traditions, creative endeavours, an understanding of physical, mental, and emotional health, and knowledge of history and the world (Government of Alberta, 2021a). Interestingly, the “well-rounded education” is only possible if these alternative programs (also known as “options”) are in fact, included and chosen equally alongside the math and science “cores.” This

Ministerial Order (2024) is much more detailed and thorough than the one produced in 2020, with increased focus on the students themselves – as critical thinkers, open minded, adept in communication (verbal and written), conflict management and understanding of healthy relationships, empathy, self-reliant, tolerant, inclusive, and connected to community. It also mentions the importance of tracking health indicators and practicing self-care for proactive health attitudes and behaviours.

### ***Division/School Policies and Practices***

This analysis involves policies issued from the divisional (Valley School Division) and school (Northside High School) levels. The focus is on how the division has interpreted and prioritized provincial mandates and policy requirements. Some of these documents include the four-year plans (both previous and current) which outline the goals, outcomes, and performance measures across the division. Additional documents and resources include those around assessment, inclusive learning environments, and pedagogical practices such as multi-tiered supports and positive behavioural instructional supports. When analyzed together, several themes emerge. I will focus on those pertaining to student engagement, inclusive learning environments, student mental health, and SEL.

**Theme 1: Student Engagement.** The three main goals for the previous divisional four-year plan were: Connecting to passions; achieving student potential; and navigating as global citizens. Recent student opinion survey results indicate a drop in motivation, engagement, and interest in learning in schools within the division Schools, 2024b). The current four-year plan (2023–2027) focuses on literacy and numeracy skills, building future ready students, and creating inclusive, engaging learning opportunities (Valley School Division, 2024a). This third goal describes outcomes such as “Students are “happy, healthy, feel they belong and are safe” and “Students are self-aware, focused, and demonstrate perseverance and resilience” (p. 8). There appears to be a stronger push for student wellness and social-emotional focus in these guiding documents. There is equal weight (in goals) given to curricular

numeracy/literacy, students as critical thinkers and global citizens, and students who are regulated and safe. The connection of student engagement and students feeling happy, safe, are cared for is essential and will be a guiding principle in this school division for the next several years.

**Theme 2: Inclusive Learning Environments.** Going hand in hand with student engagement, is the importance of student learning environments being “welcoming, caring, respectful and safe” (Alberta Education, 2023) where students feel they belong and are connected relationally to their classroom and school community. The Instruction and Assessment Guide (Valley School Division, 2021) includes growth mindset research and the idea that learners need to feel emotionally accepted and safe in order to take risks necessary for growth. The four-year plan focuses its Goal 3 on “creating inclusive, engaging, healthy learning opportunities for all students,” with its related outcome as “Students are happy, healthy, feel they belong and are safe, and experience success in learning environments that are inclusive of every learner and celebrate diversity” (Valley School Division, 2024a, p. 8). This new plan includes the words “happy, healthy, feel they belong, and are safe” (p. 8) as being paramount to their educational experience. The performance measures described in this document include students, teachers, and parents in agreement around student safety, belonging, respect, fair treatment, and consideration of adaptations and accommodations for inclusivity. These measures are typically accessed through division-wide opinion surveys carried out each year and compared back to previous years as well as to national averages (e.g, the OURSchool survey conducted in June; Valley School Division, 2024b).

**Theme 3: Mental Health Support.** The documents highlight the need for additional budgeting and resources to be allocated to mental health and wellness, particularly with respect to the division four-year plan document. Increased targeted supports including AHS Stepping Stones mental health coaches, additional middle school counselling supports, and individualized wrap around mental health and addictions supports for secondary students is also outlined (Valley School Division, 2024a). Multi-

tiered supports are outlined in detail in the Inclusive Education Practice Guide (2023), with evidence-informed approaches and accompanying resources to support each level of implementation. At Northside High School, we have had four different Stepping Stones coaches in five years – all of them excellent at their job, and very effective at fostering relationships with students. However, this high turnover means that relationships are not continued from year to year. Additionally, the funding only allows for our coach to be at our school one day per week, thus making it incredibly difficult for her to establish meaningful relationships with our students. To her credit, this year she was able to be the advisor for our GSA, present multiple mental health presentations to our Grade-9/10 classes and connect with our more vulnerable students on a one-on-one basis. While it is often difficult to obtain measurement data as to the effectiveness of these mental health support programs, it is evident to me anecdotally that her contributions to our school this year made a difference in many students' lives.

**Theme 4: Social-Emotional Learning.** The direction that the division is taking with regards to student learning is focused on student engagement, meaningful and balanced assessment practices, students as global citizens and developing 21<sup>st</sup>-century competencies, and students who learn best when they are safe, cared for, and feel that they belong (Valley School Division, 2024a). While social-emotional learning is certainly implied within these goals and outcomes, SEL competencies are not explicitly addressed or described. A stronger focus on the development of self-awareness, social awareness, self-management, healthy relationships, and decision-making would help to provide some direction and movement towards the realization of the goal of student engagement and belonging.

### *Assessments and Measures*

These documents are a collection of student surveys and assessments done at the school, division, and provincial levels. Measures of student outcomes including social-emotional health, student engagement, teaching practices, academic assessments, goals, feelings of safety and belonging, high school completion rates, and others. Documents including the AEAMs Reports and OURSchool Survey

results for the division and school were examined.

**Theme 1: Student Engagement.** In all surveys analyzed, student engagement and interest in their learning at Northside High School have dropped significantly. In the Alberta Educational Assurance Measures (AEAMs) Report, there was a 10% decline in students “who agree that students are engaged in their learning at school” (AEAMS, 2024). In the OURSchool survey, 15% of our Grade 9s reported that they were “interested and motivated in their learning,” as compared to the Canadian average of 35%. These are dramatic drops indicate a need for increased student engagement, likely through the creation of safe and caring learning environments and relationship building.

**Theme 2: Safe and Caring Schools.** The AEAMs (2023) report revealed decreases (from 2021 results) in areas such as: “I feel safe at school” (dropped from 84% to 79%); “I feel welcome at school” (dropped from 85% to 81%); “My teachers care about me” (dropped from 81% to 79%); “At school, I feel like I belong” (dropped from 74% to 72%); “I am treated fairly by adults at my school” (dropped from 81% to 78%); “At school, students respect each other” (dropped from 67% to 58%); “At school, students care about each other” (dropped from 67% to 60%); and “Other students treat me well” (dropped from 81% to 77%). (p. 151). In the OURSchool survey, when students were asked about a “positive learning climate where are clear rules and expectations for classroom behaviour” (Valley School Division, 2024b, p. 8), Grade-9 students at Northside High School scored 5.5 out of 10, compared to the Canadian average of 6.2 out of 10. When students were asked to comment on whether they felt “teachers are responsive to their needs, and encourage independence with a democratic approach,” Grade-9 students at Northside High School scored 5.4 out of 10, compared to the Canadian average of 6.2 out of 10 (Valley School Division, 2024b, p. 8). These recent drops in feelings of safety and support are of concern and are best addressed through development of social-emotional learning programs with a focus on safe and caring physical and social learning environments.



**Theme 3: Social-Emotional Learning (SEL).** These documents do not explicitly ask students about SEL competencies, however the OURSchool survey does include a section of goal orientation and self-regulation. At Northside High School, 63% of Grade-9 students reported that they “set relevant, attainable goals and [could] exert deliberate and persistent effort to achieve them,” as compared to the Canadian average of 61%. Grade-9 students at Northside High School who agreed that they “have the ability to consciously control their emotions and behaviours and maintain focus on a task” is 53%, as compared to 57% for the rest of Canadian Grade-9 students (Valley School Division, 2024b, p. 4). Other SEL competencies such as social awareness, decision making, and relationship communication skills could be integrated into regular classroom practice to address these lower engagement and motivation for learning scores. It would also be helpful to understand why students feel less connected, engaged, motivated, and interested in their learning. It does appear that feeling safe, cared for, respected, and valued are of concern and could be contributing factors. Additionally, the AEAMS report indicates lowered peer and teacher relationships, which may cause students to feel disconnected from the learning community, and as such, their potential for engagement and achievement. Incidentally, through my interviews and focus groups, this is exactly what I discovered – when students feel safe, seen, and felt, they absolutely feel more connected to the learning and more deeply engaged in that class.

### ***SEL Pedagogy and Practices***

These documents are specific resources tailored to the understanding and delivery of SEL competencies. Derived originally from the CASEL platform, provincial and divisional documents have been created to help educators integrate the competencies into the classroom and school community. Appendix NN depicts the SEL competencies (from CASEL) in detail.

**Theme 1: Evidence-Based Benefits of SEL Instruction.** The benefits of SEL curricular components have been widely researched and documented. CASEL provides a comprehensive database of over 70 programs that meet the criteria (universal school-based program, appropriate comparison

group, significant main effects, positive effects on student behaviour) (CASEL, 2024a). Some of the impacts of SEL programs include increased self-esteem, interpersonal relationships, academic achievement, decision-making, goal setting, developing a positive connection to school, increased student engagement, reduced feelings of distress and dysregulation, healthy identity development, and positive mental health (CASEL, 2024b).

**Theme 2: Whole-school approach.** Each document analyzed expresses the need for a whole-school approach, where the engagement of all stakeholders, from students, teachers, school staff, parents and caregivers, and community members is required and involved in decision-making. CASEL (2024b) provides a framework to help teachers prepare specific lessons with intended competency outcomes and evidence of learning (Appendix NN). I have taken this framework and tailored it to the current practices and additional lessons that can be incorporated in the future to the PP9 course (Appendix Y). This document not only helps teachers plan activities within their classroom, it also provides ideas and examples for a whole school engagement, where other stakeholders can get involved. “Social-emotional skills need to be taught and can improve with opportunities to practice in different contexts, and that social-emotional learning requires a long-term, whole-school approach that involves families and community partners” (Alberta Education, 2023, para. 2). Some examples of what this might look like include teacher collaboration for literature projects, SEL common language that is present in signage and visible learning activities (plays, performances, speakers, for example), and professional development (Alberta Education, 2023, para. 6). It is evident from the research that schools that adopted a whole-school approach to SEL achieved higher overall academic scores, improved attitudes and behaviours, demonstrated greater motivation to learn, had fewer disruptive behaviours and reduced emotional stress (Alberta Education, 2023, para. 3).

**Theme 3: SEL Resource and Support Availability.** In order for SEL strategies and resulting student outcomes to be effective, there need to be flexible, developmentally appropriate, and evidence-

informed implementation practices. Teachers must be educated and prepared if the intervention is to be applied directly to the classroom, and program fidelity is to be assured. While a specific program may be implemented, teachers also require the flexibility within their classroom to vary the activities and teaching methods used. Consideration for culturally appropriate themes, as well as consideration for accommodations where needed are also essential to proper programming. While these documents are informative as to the importance and need for SEL, there is little direct support for easy implementation. The provincial documents that focus on SEL programming eventually lead the teacher to several large databases (CASEL, WWC) to find their own resources to tailor them to their classroom. The division does provide several evidence-informed programs for teachers to take advantage of – for example MindUp, Mental health first aid, Executive Functioning and SEL, Healthy Relationships, HeartMath workshops, Positive Behaviour Instruction and Supports (PBIS), Teen Mental Health, and ASIST were all provided to teachers as professional development workshops for the 2023/24 school year (Valley School Division, 2024). The PP9 course that I developed was built on the foundation of the HeartMath Institute's Smart Brain Wise Heart (SBWH) program. SBWH is an evidence-based series of interactive modules that empowers students (ages 9 to 16) to build resiliency and self-regulation skills (HeartMath Institute (2024c). This program helps adolescents gain control and self-efficacy over internalizing problems (eg., depression, anxiety) as well as externalizing behaviours (aggression, hostility, hyperactivity) through heart coherence guided practices and other engaging SEL activities (Kresovich et al., 2023).

A previous study with a psychology class at Northside High School utilized SBWH with Heartfocused (HF) breathing practices and found significant increases in social awareness, coping self-efficacy for test taking, and academic achievement (McLeod & Boyes, 2021). Programs such as this one provide classroom teachers with the starting blocks to then build and develop to suit the grade level, subject area, school and community culture, and timing of each course. Interestingly, a recent large

study with over 1000 Grade 9 students in Galveston, Texas found that there were no significant differences in resiliency, self-compassion, internalizing or externalizing behaviours (which were the outcome measures of the study) (Kresovich, 2023). There were, however, marginal improvements in resilience and self-compassion for the students who were identified with lower academic achievement as compared to their peers (Kresovich, 2023). The authors of the study highlight several possible reasons as to why these outcomes were suboptimal.

The study was conducted in the fall of 2021 thus schools were still dealing with the fallout effects of COVID. Additionally, 14 teachers were trained to deliver SBWH. However, one quarter of them did not cover all of the modules, some of the classes were combined physical education classes with over 75 students and taught in a gym, some teachers relied on the videos for instruction (thus limiting the interactive experience for the students), and data was collected solely from 12 different surveys, without any qualitative follow up from the students or teachers (Kresovich, 2023). While these large studies allow for randomization of groups and third-party “neutral” data collection and analysis, I would argue that the scaling up was its eventual downfall. Bringing SBWH elements into smaller classes with teachers who have already established trusting relationships with their students allows for a deeper and more meaningful engagement with the core concepts and interactions.

**Theme 4: Flexibility in Implementation.** As already discussed, the current proposed framework for curriculum development states that:

The curriculum sets out the content of what students are to be taught; it does not dictate how to teach. Teachers learn how to teach in their post-secondary teacher-preparation programs and through ongoing professional development according to research into best practices. Teachers need the flexibility to do what works best for their students in a variety of contexts.

(Government of Alberta, 2024, p. 17).

This endorsement of flexibility allows teachers to infuse and implement SEL competencies as they see fit in their relevant contexts. These documents focus on selecting a variety of teaching methods and strategies, as well as ensuring the accommodation of students with diverse learning needs. Alberta Education (2023) provides several suggestions of activities that could incorporate SEL competencies, including role play activities, think-pair-share, guided discussion, as well as literature projects and other reading opportunities in English classes.

**Theme 5: Implementation Fidelity.** When considering implementation, it is important to remember that change of this magnitude requires multiple stages of development. Goddard and Bohac Clarke (2007) describe an eight-stage integrated model of school change incorporated into a two-cycle process. Often, schools fail to move past the first cycle, thus making real change in education somewhat problematic and often difficult to achieve. According to the model, which the authors have linked to Wilber's four-quadrant integral paradigm, individuals in the system need to move through their own developmental levels before reaching out to involve inter-relationships and community (Goddard & Bohac Clarke, 2007). In cycle one, typically there is attention to the deficits and disabilities within the student community, warranting a need to examine supports to fix the immediate problems. However, if school systems can move past this first cycle, and extend outwards to engage community supports and facilitate student activism and action, the change can come from within, as students, staff, and other school personnel engage in purposeful social, authentic change (Goddard & Bohac Clarke, 2007).

Interestingly, this year, I joined our newly formed Positive Behavioural Instructional Supports (PBIS) committee, mainly to lend support and expertise from a social-emotional learning perspective. We were a small committee made up of four teachers, three administrators, and two division learning specialists. We met once a month at Northside High School to discuss our plan for the year. The focus was to make our school expectations visible and transparent, developed organically through separate student and staff focus group initiatives. Our division specialists wanted us to have community-based

positive expectations and operationalized values, such that anyone walking into our learning spaces would know what we stood for, how one should behave, and how our community of engaged learners functioned overall. It was a way to do away with the age-old “hidden agenda” of education, where some people know what the expectations are, but many do not – and it is generally the students and extended community who do not. So, we arranged several focus groups and conducted surveys to find out how we would define our school expectations, and then make them observable and measurable.

This was a much more difficult task than first envisioned, and at the end of the school year, we had completed our surveys and focus groups, analyzed the data we collected, but then were unsure as to where to go from there. If we stopped here at this point, we would essentially end up “stuck” in the first cycle of change and become potentially disillusioned. Goddard and Bohac Clarke explain that it is, in fact, “difficult to move to stage two due to high levels of transience among teachers and administrators, who as a result are always dealing with stage one issues” (p. 116). Thus, in order to effect change, we will need to reassemble our group and persevere next year, engaging and empowering our students, given that “human interactions are more robust drivers of educational change than are organizational structures” (Goddard & Bohac Clarke, 2007, p. 106). This model illustrates the need for change to come from within, and where a focus on student development with respect to self-awareness and management, expanding outwards to include social awareness and relationship building with responsible decision making integrated within. Thus, social change and renewal begin with SEL.

### ***Growth Mindset in the Classroom and School***

Given that cultivating a growth mindset for learning environments is part of the division’s current instructional strategy, I was curious as to how this might look in a classroom or school setting. The divisional instruction and assessment guide describes students and staff together adopting a growth mindset, “persevere when things are difficult, and understand that mistakes are a part of the learning process” (Valley School Division, 2023b, p. 5).

Ricci (2024) has been looking into growth mindset as integrated into the classroom and school culture. She recently conducted a study looking into student mindset and grade, and found that in kindergarten, none of the students agreed with the statement, “some people are smart, and some are not,” indicative of a fixed mindset (Ricci, 2024, p. 12). A growth mindset would involve the student believing that intelligence is transformational, and that abilities and talents can be learned (Dweck, 2006). As she continued to survey students the percentage with a fixed mindset started to climb (10% for Grade 1s, 18% for Grade 2s, 42% for Grade 5s, and 60% for Grade 6s) (Ricci, 2024, p. 12). Of course, in high school we hear students say, “I can’t do math,” or “I’m not smart like my sister,” or “I’m in the dumb classes” (when referring to the lower levels in streamed programming).

Ricci (2024) believes that through equal access to learning opportunities, deliberate cultivation of psychosocial skills such as perseverance and resiliency, student understanding of brain neural networks, and growth mindset praise and feedback, classrooms and schools can foster a culture of growth mindset (p. 14). Ricci (2024) also talks about creating a learning environment that is a “fear-free zone,” where students can make mistakes, fail, and not be judged – in fact the opposite would happen instead – the child would learn and grow (p. 178). As fear essentially shuts down the executive functioning of the student’s brain, being in a fearful space full of social judgement only leads to more failure, and as we often see in high school, avoidance and school refusal. In positive psych, one of the first things I told my students on the first day of class was, “there are no tests or exams in this class.” I could feel the large whoosh of air as they released their collective sigh all at once! In this class, mastery learning is also used, such that any student can improve upon a performance or project at any time and without penalty. And because learning mindfulness and social emotional regulation is generally brand new to these Grade 9s, the fixed stratification of ability is absent, leaving only growth and learning.

### ***Final Thoughts from LR Zone 8***

After an extensive and thorough analysis of documents from the province, division, school, and

other supporting learning sites, it appears that while there is recent focus on the importance of student wellness and connection to themselves and others, there is much work to be done in this area. Recent student opinion surveys conducted at the school level reveal disturbing downward trends in student motivation, engagement, feelings of safety and belonging, and self-regulation (Valley School Division, 2024b). As teachers, we are governed by professional organizations to ensure quality teaching and learning standards for our students. These standards of professional care are delivered to us in the form of the Education Act, Ministerial Order on Student Learning, Teacher Quality Standards, as well as a plethora of supporting documents, research reports, and practices to guide us in our classrooms. While curricular content is generally explicitly described and disseminated, areas that pertain to the whole child and their embodied environment of learning are somewhat scant. Given that recent research supports the active teaching of SEL, providing safe and inclusive learning environments, and possibly most importantly, the sense of connection and belonging students feel with their teachers and each other – it is incumbent upon all of us as educators to fulfill these student needs. When students feel supported and safe, they allow themselves to trust (themselves and others) and can then reach out to make connections and take the risks they need to take to learn and grow to achieve each of their potentials.

## **Conclusion**

This extensive study was conducted at a mid-sized high school over the 2023–2024 school year. The Integral model allowed for data to be collected from four different ontological perspectives, with both an inside and outside view for the two quadrants addressing the individual experience. The UR quadrant found a significant decrease in the PP9 students' perception of anxiety sources and situations, indicating a more adaptive way of appraising stressful events in their lives. PP9 students also demonstrated an increase in social awareness, positive affect, and coping self-efficacy, while decreasing anxiety symptoms and cognitive interference (compared to a control group and over time). PP9 students reported a significant increase in mindful attention and focus (compared to the control group and over



time), likely as a result of their daily five-minute heart-focused breathing with the HeartMath sensor and app biofeedback to guide them (given that the CG did not do this practice). Individual biofeedback scores collected throughout the course revealed a significant increase in HRV from the beginning of the course to the end, providing evidence of the effectiveness of just five minutes of heart-focused breathing practice at the beginning of every class. When asked about these changes in beliefs and attitudes, PP9 students overwhelmingly pointed to the breathing practice and calm classroom environment as important for regulation and control over stressful situations. Students spoke about new ways to calm down and found the course to be extremely beneficial in their lives. From a developmental perspective, the PP9 students appear to be operating at an orange and emerging green level – as they spoke and wrote about the importance of science, rules, governance, and getting along in society. Comparatively, the alumni students indicated their maturation towards green, as they commented on equality, inclusion, and tolerance as being even more important than a one-size-fits-all, rule-following society.

When students assembled into focus groups, their individual comments became intermingled and further enhanced through the collective sharing of meanings and ideas. More enthusiastic support for the style and benefits of the course, elements within it, and common experiences reflected together came through in their lively discussions. The final piece to the puzzle was a policy analysis to determine how this type of programming has been operating thus far and what the future of SEL and mindfulness curricular components might look like. It seems this work is on the vanguard – with research indicating success in helping students regulate, increase prosocial behaviours such as social and self-awareness, decrease feelings of worry and stress, and decrease cognitive distortion (which in turn, improves academic achievement). Next, Chapter 5 will tetramesh themes from each zone such that each theme can be studied from a variety of ontological perspectives. From there, future directions and recommendations can be examined to help guide educators towards a future with full SEL implementation across the grade levels.

## Chapter 5: Interpretation of Findings

### Introduction

A recent longitudinal study by Statistics Canada (2024) has revealed that 21% of Canadian youth rated their mental health as “fair” or “poor” in 2023, as compared to only 12% back in 2019. Of those 12% in 2019, the majority (62%) continued to rate their mental health as “fair” or “poor” four years later (Statistics Canada, 2024). Thus, many more of our students are struggling with their mental health, and factors such as school and relationship stress, continued worry of future pandemics, social media, and climate change fears may be part of the increased stress and worry that our youth are experiencing. Additionally, students were asked about their optimism towards their return to school last September. In 2019, almost half (49%) of all students reported looking forward to school, whereas in 2023, over half of those students no longer felt that way (Statistics Canada, 2024).

This decreased enthusiasm and engagement in school has shown up in a few different ways in this study. Division and school-wide surveys asking students about their engagement and optimism towards school have shown recent declines. While this data reveals trends in student beliefs, another way to understand how students are feeling about their role and purpose in this educational system is simply to ask them. The students in this study spoke about increased school stresses and worry for performance and assessments, however, they also recognized the benefits of positive relationships with teachers and peers, as well as inclusive, calm, and coherent learning environments, as were as their overall individual and collective experiences in the PP9 course. The Integral methodology used in this study enabled me to gather data from six ontologically distinct perspectives. Each of these areas brings in new information, like threads of yarn, out of which six different themes have been woven. These themes are like patterns in a final tapestry of knowledge about student mental health concerns and strategies offered within the classroom to support them. These themes align harmoniously with my initial six research questions and tetramesh in multiple, interconnected ways across each of the six

zones being examined. The research questions and themes generated are illustrated in Table 62.

**Table 62**

*A Comparison of Research Question to Relevant Theme*

Research Question	Theme
1. What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?	<b>Anxiety Sources and Symptoms</b> – Students experience anxiety and know what it feels like, where they experience it, and how to regulate it
2. What developmental levels are students operating at and how does this affect each individual worldview?	<b>Self-awareness</b> – AG recognize growth and development since Grade 9 and are moving from (ego/ethnocentric) red/orange to (worldcentric) green/teal developmental levels
3. How do the students collectively understand SEL and mindfulness with biofeedback within the culture of the classroom and school?	<b>Social awareness</b> – Students understand emotions, regulation, positive relationships with peers and teachers - Creating a calm, inclusive, coherent classroom promotes increased student engagement
4. How do student attitudes and behaviours about their own stress and emotion regulation change after learning SEL/mindfulness with biofeedback?	<b>Coping Strategies</b> – Students learn to reduce stress and worry through heart-focused breathing using the sensor and app - EG students improve their focused attention through mindfulness practice compared to CG students
5. What changes are observed in the student's physiology after this program?	<b>Self-efficacy</b> – Students increase heart rate variability scores (coherence) through continued five-minute daily practice - Students continue to use breathing practice (after the course) and feel confident in their ability to manage stress and regulate emotions
6. How is this type of program affected and/or supported by school, division, and provincial systems?	<b>SEL in the Curriculum</b> – Educational policies support and encourage SEL and mental health awareness in the classroom - SEL curricular components are lacking in K–12 programs - SEL programs like PP9 are beneficial for all students, and especially for those with anxiety and dysregulation

Note: Students refers to both the EG and AG

**Theme 1: Anxiety Sources and Symptoms**

*Anxiety sources*

**Vignette 6: So far...not good??**

**Friday, Sept. 8, 2023**

The third day of class with the first PP9 (and what would turn out to be the most difficult) class was not turning out the way I had envisioned. According to my meticulously planned and organized lesson on learning how to sit silently for five minutes while focussing attention on the breath, my classroom should be a place of peace, calm, and high relational coherence. As I opened one eye from my own practice and looked around my somewhat noisy and disruptive classroom, I observed many students poking, prodding, kicking, and outright talking to each other. A few decided they would just get up and walk around – others decided it was the right time for toast. This was not going well – and I feared the worst – that these students would prove to be unwilling, disinterested, or downright unable to learn how to breathe and focus for five minutes. I ran several scenarios in my head – most involving pulling the plug on my research and having to admit total and utter failure in a beloved practice I so fully believed in and embodied. I decided to give it a few more days to see if I could somehow calm these students down and convince them that this practice might even help them in some way.

**Anxiety sources – EG.** Anxiety sources involve situations, places, and spaces where students experience stress and heightened worry – typically as it relates to their perception of evaluation or judgement. For example, students were asked to report on their levels of anxiety in situations such as tests and presentations. There was a significant difference between the sources of anxiety between the EG and CG at Time 1, with the EG reporting that they perceive situations such as tests, presentations, and peers as more threatening and stressful than the CG. Information gathered from school records and the interviews revealed that 24 out of 46 (52%) of the EG students are currently dealing with some form of anxiety issue (some with anxiety diagnoses, others describing experiences with panic attacks and social anxiety). Typically, the prevalence of mental health issues (including anxiety and depression) is closer to 25% for Canadian teens (Canadian Institute for Health Information, 2024). While the EG began the course with higher overall anxiety, they reported a significant decrease (– 6.93%) in anxiety sources from Time 1 to Time 2 whereas the CG showed a slight increase (+1.46%), providing evidence that strategies and concepts learned in the PP9 course helped the EG understand the nature of these stressors and manage them in a more nuanced, and less catastrophizing way. Students in the EG discovered that stress and anxiety are important physiological responses to novel situations that matter – they alert us and tell us to get ready. Students learned that stress (in these types of situations) is not toxic or dangerous, and understanding that the symptoms we experience are mostly hard-wired in to help us, as opposed to trying to harm us. After some initial discomfort and uncertainty, students learn that what they previously perceived to be terrifying and threatening, now become interesting and curious – allowing them to feel more rational and calmer while navigating through each experience. The difference in reported sources of anxiety between the two groups at Time 2 indicates that in fact, learning about these concepts in PP9 did help the EG students understand their stress and how these situations affected them. This gave them more of a take-charge, proactive perception, as opposed to their previous reactionary, out of control approach that they had been so used to in the past.

While most students described tests, math class, fluctuating friend groups, parents, teachers, and performances as being most stressful for them, Paige talked about the course as a way to get comfortable putting up her hand to answer a question in class. She said, “I never answer questions in my other classes ’cause I don’t want to like get it wrong and have somebody have to correct me – it’s like embarrassing. I don’t know – I just never get anxiety in this class so it’s actually better for me.” Paige was able to ask and answer questions without feeling unsafe, judged, or criticized. For her, this source of anxiety was reduced in this environment, providing her with the confidence to then try putting up her hand to answer questions in her other classes. Students like Paige often feel like the school system is designed for students who excel in the core subjects (math, science, social, English) and are proficient in the rigorous assessments given to measure not only individual learning and understanding, but as a type of sorting system, where only the top students will be “accepted” into colleges and universities.

When students feel excessive anxiety or worry about their place in this highly competitive system, they are flagged as *less than*, broken, or dysregulated, and in need of treatment. As seasoned educator Parker Palmer (1998) stated, “we are distanced by a grading system that separates teachers from students, by departments that fragments fields of knowledge, by competition that makes students and teachers wary of their peers, and by a bureaucracy that puts faculty and administration at odds.” (p. 36). This *us-versus-them* approach to education with its implicit barriers is quite likely the reason that our students’ level of engagement has dropped so dramatically over the past several years. Our students may feel like they are not on our team, or, as Palmer (1998) put it, “the win-lose form called competition...[where] one party emerges victorious while the other leaves defeated and ashamed” (p. 38). The fact that these young students reported high levels of school stress due to constant assessments is indicative of a system that is contributing to our students’ declining mental health. When our students “arrive in the classroom alive and well become passive consumers of knowledge and are dead on departure when they graduate” should be a wake-up call to us all (Palmer, 1998, p. 42).

**Anxiety sources – AG.** By contrast, the EG and AG were almost identical with respect to their level of perception of anxiety sources – which is not surprising, given the higher levels of diagnosed anxiety within each group, as compared to the general population. The sources of anxiety that they identified as problematic varied however, according to their interview and focus group discussions. While the Grade 9s mainly talked about school stresses (tests and presentations) and peers, the alumni students focussed more on “adulting” stressors such as driving, having a job, and preparing for university and the “real world.” Thus, the increased confidence in their perception of handling any stressor that comes their way is important and relevant – even when the specific stressors are continually changing as they move through the various stages of adolescent development.

### *Anxiety symptoms*

#### **Vignette 7: The stuff of nightmares**

**Monday, Sept. 11, 2023**

Today was hard. My Grade 9s came into class extremely disruptive, restless, couldn't focus, and were unable to do breathing for even 1 minute. They were giggling uncontrollably and seemed unable to sit still. I had to continually address inappropriate behaviours – jumping up to go get toast, burping, laughing, throwing Play-Doh – essentially all of the elements of my August teacher nightmares! I felt terrible, like a failure, and wondered if my work is going to just fall flat. Maybe this group can't be regulated?? I emailed a few parents (the main disruptors) expressing my concerns and went to bed restless, unable to sleep, and dreading the next day.

**Anxiety Symptom Descriptions.** Both groups of students were quite articulate when it came to describing how stress made them feel. Most described feeling sweaty, shaky, nauseous, heart and breath racing, and not being able to think clearly, causing them to blank on tests and presentations. The focus groups gave the students the opportunity to discuss these symptoms collectively and realize that they are not alone in their experiences of stress. Even though many of the symptoms “felt bad” as Leon said, they were able to realize how normal and common these bodily manifestations were. Peer relationships were also mentioned by several students who discussed having to navigate friend drama, causing them to feel anxious and worried (as Tamara stated when her “whole friend group just exploded!”).

For the EG, anxiety symptoms decreased over time ( $-6.48\%$ ), while the CG increased slightly ( $+2.03\%$ ). The EG was significantly higher in anxiety than the CG at Time 1, however there was no difference at Time 2. This shows a measurable change in attitude and behaviour with respect to their own anxiety symptoms, likely as a result of strategies such as heart-focused breathing learned in the course to help manage stress. As Denise noted, "...right now I might not be in the green zone but I can bring it back down...[by taking] the deep breaths and using the Heart monitor."

One specific anxiety symptom was cognitive interference, where the EG reported a decrease ( $-3.5\%$ ) over time, as did the CG, although less of a decrease ( $-2.7\%$ ). Elianna described it as "getting overwhelmed with things... can't think straight... [and] forget things really easily like if I'm trying to think of something or remember something." Denise said she "couldn't focus on anything at all" and many students, like Willow talked about "overthinking about the subject that I'm stressed about." Leon put it best with, "it's just like a bad feeling." When students learn that their cognitive confusion and feelings of drawing a blank are caused by anxiety and not their lack of school content knowledge, they can start to move away from a fixed mindset of "I just can't do math" or "I suck at tests." Instead, they learned to recognize and observe the way their bodies were responding to stress (something we discussed and practiced in the course), and then use the mindful breathing to further regulate. The breathing practice helps to calm down the breath, heart, and in turn, the mind, allowing the prefrontal cortex to come back online and help with focus and attention. This decreased cognitive paralysis can then free up their mind to problem solve and critically think of solutions that were not previously available to them. As Connie realized, "I feel like when you slow down your breathing it lets your brain think for awhile and it lets it process everything that's happening."

**Course Self-Selection for Anxiety.** The significantly higher anxiety symptoms and sources reported by the EG as compared to the CG at the beginning of the course (Time 1) indicate that some students likely self-selected into this course that was designed (and advertised) to help students with

social-emotional regulation. To find out if this was the case, I asked many of them in their interviews if they chose the course themselves. Many did, and for the reasons mentioned above. When I asked Marie if she chose the course, she replied with, “I chose it and I was excited to do it – ’cause I was talking to my dad about it and he said it would be good for me to just know about my brain and be able to cope with stuff. So I think it was really good that I chose it.” Lucy said, “I chose it. ’Cause it helps with school and it helps even if you don’t think you have anxiety and stuff, it’s good to be aware of it.” Simon said, “I thought it sounded interesting – just to learn more. And my mom is always big on like breathing and stuff, and [it seemed like] there would be more tips and stuff.”

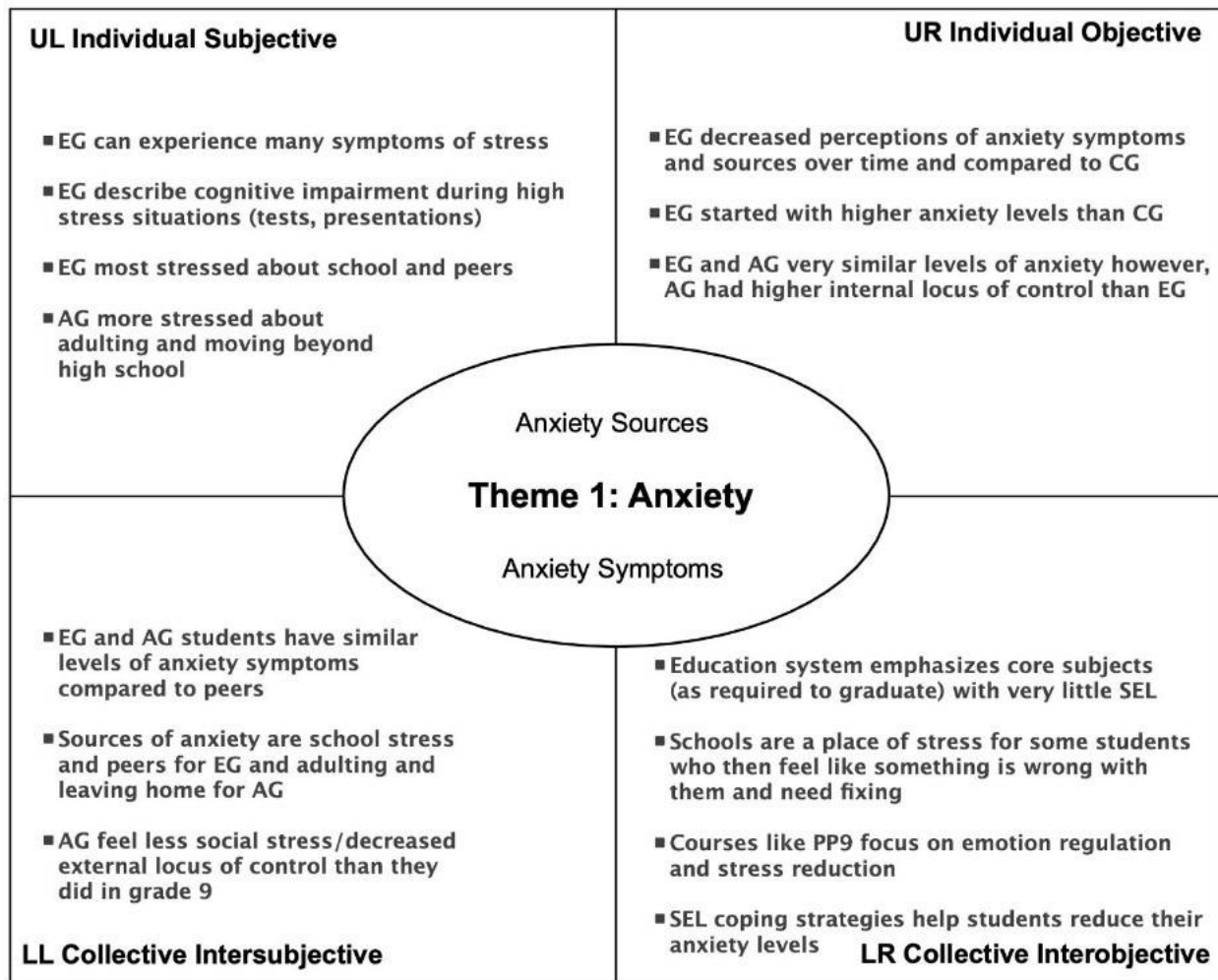
Internal locus of control means a belief that you have control over what happens to you. While EG did not show any significant change in this measure, their interview comments indicate that they had thought about their anxiety, what causes it, and that a class such as this might be beneficial for them to try. These are small steps towards taking control of their thoughts, emotions, and actions. The alumni group did report much higher levels of internal locus of control indicating that their growth and development from Grade 9, along with the strategies and tools they learned in the course likely contributed to this understanding of their own thoughts and behaviours. Given that the SOS revealed almost no difference in internal locus of control between the EG and CG and across time, it is probably more of a developmental process that takes time and experience. Developing a higher internal locus of control is positively correlated with an increased ability to self-regulate and control thoughts, emotions, and behaviours (Flores et al., 2020). Thus, teaching students to observe and recognize how they are feeling and what they can do when they are feeling anxious, irritable, frustrated, or confused, does help them increase their self-awareness and internal locus of control.

**Anxiety Symptoms Changes – AG.** When asked to reflect on their Grade-9 self and then their current self, the alumni students mentioned feeling “small” (Kimberly) and “terrified for the whole entire Grade-9 year!” (Alyssa), and even a little “awkward” (A.D.). Forty-two percent described school



stress as their number one concern back in Grade 9. When they were asked to think about their current selves, most felt stress from being overwhelmed (with too much to do and not enough time) and worry about their future and where it would lead. As Ellis, said, “I’m just scared about graduating ’cause I don’t want to be apart – apart from my family” and Shannon worried about deadlines – “Meeting deadlines and like staying on top of things, but also trying to balance other social factors like work and friends.” All of the alumni students were able to use the space (both temporal and psychological) from Grade 9 to realize their personal growth and increased confidence in taking on stressful situations. As well, they had encountered more events – both pleasant and unpleasant, and thus had the benefit of experience in their back pocket. As Madeleine stated, “I mean I’ve been through a lot of different experiences that have shaped me into the person that I am. I don’t want to go into detail – but yeah! Like I’ve been through a lot and I’m happy to where I am right now.”

The alumni spoke of their personal growth as an overall lowered reliance on what their friends thought and more of how their own thoughts, beliefs, and actions led to either their success or failure. The student can learn to first recognize what anxiety is (and is not) and learn and develop strategies to alleviate symptoms themselves – learn how to self-regulate and not rely on their outside environment for their internal feelings. In other words, developing a higher internal locus of control, where like Stella, for example, realized that she needed to focus less on her peers and more on her own internal compass. Lindsay came to this realization as well, evident in her statement, “I [now] have more of a voice, like I’m willing to stand up for myself more, compared to Grade 9.” This realization that these alumni students are in control of their own thoughts, decisions, and ultimately consequences of their actions shows an increased internal locus of control. Figure 40 illustrates the multiple perspectives that describe anxiety sources and symptoms.

**Figure 40***Theme 1: Anxiety Sources and Symptoms Map***Theme 2: Self Awareness****Vignette 8: One small step...****Wednesday, Sept. 20, 2023**

Somehow the students made it through the full five minutes of breathing – many are getting excited about getting 95% green, or even 100% green – and a few even want to jump to Level 2, encouraged by seeing their own progress. This biofeedback and tuning in to something changing in their own nervous system is really what it's all about! They are already calming down, listening better, focussing even for just a few minutes at a time.

I asked if any wanted to present their “Who are You” project – a couple of students did. Pablo wanted to present his just to me. This was pretty cool – this is a kid who was so disruptive last week and claimed he never chose this option – and rarely made eye contact with me. He claims he hates school and just lives to play hockey. He has clearly had a rough educational background and thus very little confidence in school-related things. He came up to my desk with his computer and showed me his slides – no writing – just pictures. I was able to pause on each slide and ask him extra questions – about his family, his hockey, the new house they

are building – and he opened up and seemed to even enjoy our conversation. After awhile, a few other students came up and seemed to want to join in. Pablo seemed excited about this and opened up even more. These are the moments we look for – quiet, meaningful moments where we can connect with kids authentically and genuinely. These 15 minutes that I spent with Pablo today were so incredibly important. Hopefully this will help build my relationship with him so that I can be another safe person in his life that he can turn to.

### *Self-awareness*

Self-awareness can be thought of as “the abilit[y] to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts” (CASEL, 2024, para. 1). This means how each student perceives their own individual self as well as how they relate to their world. Thus, their outlook on the world can be regarded as optimistic and positive, or more pessimistic and negative. This outlook is manifested as a feeling or affect that the student expresses both inwardly and outwardly. How the student sees herself in the world, and the attitude she shows up to school with everyday also affects how she is seen and treated by those around her.

**EG Self-awareness.** According to the SOS, the factor representing positive affect is associated with feelings of peace, calm, happiness, and overall content, whereas negative affect describes feelings of sadness, irritability, low mood, and even anger. The EG reported a significant increase (+6.86%) in positive affect by the end of the course, whereas the CG decreased slightly (−1.6%). Both groups reported almost identical measures of negative affect, with almost no change from Time 1 to Time 2. These findings indicate that the EG have discovered new ways to bring positivity into their lives, however regard for life’s negative aspects seems more fixed and has a stickiness to it. For the EG students, learning about how to calm down, discover and practice ways to self-regulate and manage emotions increased the overall feeling of positivity. As Amber stated, “[if] your breathing’s slowed down, you’re more relaxed, which slows down your heart rate which then calms your mind.” Connie stated, “I feel like when you slow down your breathing it lets your brain think for awhile and it lets it process everything that’s happening.” It’s clear from these comments during their interviews, that these students understand how breathing practice helps them calm down and regulate their emotions.

**AG Self-awareness.** The AG had significantly higher positive *and* negative affect scores, indicating that they have developed strategies to reduce stress and calm down, but have also experienced more stress and negativity, likely through higher stakes testing and other life stressors. For example, Hannah’s perception of the purpose of school assessments is “[T]he math Diploma’s hard. It’s meant for you to pass, but not meant for you to do well.” The impression that these students have is not one of “we’re all in this together,” but it is us against them (the school, the system, the Alberta government) and we just have to somehow get through it and get out on the other side. When asked about her feelings about the school system, Grace said that “[it would be better] if they didn’t focus so strongly on the significance of test-based grading.” Again, the perception of “them” versus “us” likely reduces student engagement and trust in both the school system and staff who implement these measures. It is definitely hard to fully engage in a system that you believe is out to get you!

**Self-growth and Development.** Both groups thought that growing up meant more responsibility, taking on bigger roles, and losing some of their childhood innocence. Grace thought she “grew up too fast and had to live through too much.” Both Grade-9 Carly and Grade-11 Anna felt that it was a loss of innocence. When asked what growing up is like for her, Carly wrote, “Letting go of innocence. As you grow up there is more pressure to be a certain way. Pressure for good grades, pressure to fit in and to be liked. When I was a kid, I was so excited to finally be older and grow up, but now that I am older, I want nothing more than to go back.” Anna answered the same question in the DPS, with, “Losing your innocence and a part of yourself. Growing up is being corrupted by societal views and pressures.” Self-awareness therefore comes with the student seeing themselves less as a dependent child in need of guidance and control, and more of an independent adult, ready to move forward on their own. These students look forward to this with both excitement and trepidation – the world has changed significantly in the past few generations, with more uncertainty about the future alongside a seemingly limitless carousel of choices to be made.

## Self-management

### Vignette 9: Wellness Friday – A Total Game Changer!

Friday, Sept. 22, 2023

It was Wellness Friday today. Given that this class is last period every Friday afternoon, it seems fitting that I have (un)structured it to be free play, conversation, and time for connection (ABYP – Anything But Your Phone!). The students came in excited for class with many just wanting to start “puzzling” right away. Students have formed new friend groups – it’s interesting how they organically align when given a calm, positive environment to feel safe enough to reach out and connect. As I looked around my peaceful classroom, I saw a few groups of puzzlers, one group playing magnetic hangman, another group playing old school “Operation”, three students making yarn “friendship” bracelets, a few others colouring mandalas, and a few students constructing farm animals out of Play-Doh. I smiled and breathed my first sigh of relief.

Self-management can be thought of as “the abilit[y] to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations” (CASEL, 2024, para. 1). In our PP9 class, we spent time learning to recognize our own and others’ emotions, read faces and gestures, and practice bringing high-energy/draining emotions down to lower, more peaceful levels. While seemingly intuitive to an adult, learning to read and manage emotions turned out to be something that the students both enjoyed and got better at.

**EG Self-management.** When students were asked about coping strategies for emotion regulation, the EG reported a slight increase (+6.80%), while the CG trended downwards (−5.14%). Learning about the breathing practice, along with several other strategies in PP9, helped the EG find ways to cope with stress using techniques they deemed to be successful. Goleman (1995) suggested that students can and need to be taught emotional regulation and that we “can’t just leave the emotional education of our children to chance” (p. xxiii). In PP9, students learned that there aren’t just black and white (happy/sad) emotions, but a rich granularity that was explored in class. As Victoria stated, “I used to just know when I’m angry or when I’m sad or when I’m happy but there’s like a lot in-between.”

While all students can benefit from a course teaching how to recognize and regulate emotions, the students in this study with autism spectrum disorder (ASD) indicated that they did struggle with reading others’ faces and emotional states, and that this course did help them with that. Coleman

mentioned needing these skills “so I don’t become a threat” and Patrick described previously “losing control” and “doing unexplainable things...like head-bashing.” After the course, he told me, “I think, yeah, it (the breathing) helped pretty much I haven’t had one of my bad lose control moments...in like two months.” Additionally, students like Coleman and Patrick can learn these skills alongside their peers, who are also practicing how to read emotions and regulate. While the ASD students might need a bit more scaffolding and practice, the stigma of singling them out as somehow problematic, or socially inappropriate is lessened and they can feel more included in social interactions, such as in a classroom.

**AG Self-management.** The AG reported significantly higher coping strategies, however, many commented on first learning about how to cope in the PP9 class, and then refining these techniques throughout their high school years. In their interviews, the AG were able to use the temporal space to reflect on themselves as Grade-9 students. Many talked about feeling “really small” and “terrified for the whole Grade-9 year” and “not having any friends.” Many were able to articulate their growth in areas such as managing their stress, moving through and overcoming personal traumas, dealing with people in their lives, and navigating through their pathway towards adulthood. Madeleine and Maddie discuss difficult things in their lives that have shaped them into the strong women they are today, while Alyssa talks about “discovering part of herself” and recognizing the importance of boundaries and self-protection, particularly when it comes to social relationships. Many talked about being brave, standing up for themselves, not backing down from challenges, and being OK with the person they have become.

### *Developmental Perspectives*

#### **Vignette 10: Two Steps Forward...One Back**

**Monday, Sept. 26, 2023**

Last period class – they don’t do well with this time slot. They started out dysregulated and took over half the period to reset. I thought we would try a focusing activity: Learning how to tie a full Windsor knot – the kids seemed pretty lost, as most had never tied a tie before. They seemed keen on learning but had a lot of trouble focusing – some gave up, some persisted, but most were unable to persevere through the entirety of the task. Frustrated and clearly done with the tie-tying activity, a group of students decided to go over to make more toast. They put the buns in the toaster and burnt them – now class is disrupted because the whole room smelled like smoke! I made them leave their “toast” there, sit back down and then

proceeded to explain how to know when it's a good time for toast and talking to your friends, and when to sit and listen to the lesson. I switched up the lesson and had them draw and colour the Chinese symbol for "listen." Seemed appropriate!

The Developmental Perspectives Survey (DPS) provided individual subjective knowledge from the outside, or Zone 2 of the UL quadrant. With this structuralist approach, one can “look for interior structures and stages in the psyche and in culture” (Wilber, 2006, p. 54). I was curious to see whether it would be possible to determine the general developmental levels of consciousness and worldview that these students were operating at – and whether there might be significant differences between the younger (EG) students and older (AG) ones.

**School Norms and Expectations.** Both groups exhibited a strong belief in science as truth and explanatory, with the AG significantly higher than the EG. One of the main tenets of education is that learning subjects such as science, math, English, and social helps to explain events and phenomena of our world – past, present, and future. Content in school is presented as fact, and students are conditioned behaviourally. Positive reinforcement appears in the form of good grades, teacher praise, university acceptance, academic awards, and scholarships. Negative reinforcement of having poor grades means post-secondary doors close, and punishment for truant and disruptive behaviours result in suspensions from class and/or school. When students were asked about governance and control in the classroom and school, the Grade 9s felt strongly that punishment should be used more frequently, noting that some of their classes were chaotic and sometimes “ruined” by unruly students. The alumni, on the other hand, felt less resolutely about widespread punishment, feeling instead that students should be able to self-manage and figure out for themselves how to get along in the world. This brings the alumni from the orange, one-size-fits-all perspective, to the pluralistic, diverse, and more inclusive green level or development. For example, Amy thought that there should be “more rules put in place to protect teachers and kids,” whereas Stella felt that “schools would be better if learning was directed more by kids.” This contrast in belief of how students should be managed illustrates the rigid orange approach

from the Grade-9 student (Amy), compared with the less oppressive, more autonomous green system envisioned from the Grade-11 student (Stella).

Students who have made it to Grade 12 have, for the most part, bought in and mastered these skills, looking to game the system to get to the next level. The upside to this, of course, is that students trust in the system, the teachers, knowledge being delivered, and process of learning and assessment. Despite the flaws in the system, having people in the organization who are on board and cooperative is beneficial when it comes to supporting students along their journey (as long as we collectively agree on what that journey is). In this sense, *if* the education system is operating at an orange level, meaning based in a neoliberal, capitalistic, science-focused, individualistic society, then this is what students see as being the dominant or “*normal*” narrative. It is the soup that they are swimming (or drowning) in. And we, as educators, have had to amass any available life rafts and flotation devices to help keep them afloat! Gabor Maté (2022) described this “normal” state of our current culture as a myth, implying that everything is fine, but in fact, what was “previously aberrant becomes normal enough that it passes beneath our radar” (p. 6). Maté (2022) proposed that the “antidote to the hypothesizing normality is *authenticity*: finding meaning in one’s inner experience, unobscured by societally promulgated fictions” (p. 497, emphasis mine).

**Inclusion and Equality.** The Grade 9s and alumni students responded quite differently when it came to topics of inclusion, tolerance, and equality. The Grade 9s were more likely to believe in broad, universal rules and expectations for all, despite any differences in culture, race, ability, age, or otherwise – thus landing them developmentally in the orange level. The alumni, on the other hand, scored much higher on the factor related to a belief in tolerance and equity, appreciating exceptions to rules, accommodations for those who did not fit the norms, and an expansion of their worldview to include others not like themselves. This indicates a shift into a green, and in some cases, towards a turquoise level of development. Inclusivity, and by extension, inclusive classrooms, is one of the main tenets of



education in this province. Explicit teaching about diverse people, cultures, and ways of life helps students broaden their worldview to allow for new and different ideas and perspectives. This difference in worldview with respect to inter-subjectivity may be due entirely to maturity, as the alumni and Grade 9s were quite distinct in their perspectives on this topic (no Grade-9 CG to compare).

However, courses such as this one, as well as others in social sciences, can help students to move from egocentric and limited black and white (red/orange) worldview towards one that can hold multiple perspectives at the same time, allowing for nuances (green). In fact, several Grade 9s mentioned that they did not really know what inclusion meant or how to describe it. Alumni students, like Madeleine, were much more granular, for example “Including everyone, no matter race, gender, disability, and mental health struggles.” To refer back to Kegan’s (1994) work, adolescents begin to move into a third-order consciousness as they open up their worlds to take on the perspectives of others and diversify their worldview. Kegan (1994) believed that this will only happen when there is sufficient challenge to their ways of thinking with proper support and scaffolding. He argued that contrary to a fundamentalist or “back to basics” approach to pedagogy where facts and content are emphasized, a humanistic or “whole child” approach that focuses on developing the minds of students and recognizes the evolving orders of consciousness might serve them better overall (p. 53). Thus, providing opportunities for students to engage in perspective-taking, and hold multiple viewpoints together at the same time while working through a difficult topic is key for this development of conscious awareness. Paulo Freire described a type of critical consciousness as “conscientization”, meaning supporting our students to be open-minded, challenge and question their current situation and role in society, and wrestle with a variety of perspectives that might be different from their own (Davis & Francis, 2022).

**Societal Perspectives.** In terms of their societal perspective, the Grade 9s focused more on a peaceful and harmonious society where everyone would get along and there would be no wars or conflicts. This simplistic, almost utopian view of the world is common in younger students, who

typically have less information and experience about how the world works – including the history, political systems and pressure points within. Given that these students have had less time and exposure to social studies classes than the alumni students, particularly the Grade 12s, this does make sense. As Lucy stated, her perspective of society is “one where everyone’s nice to each other.” The alumni, on the other hand, focused more on the injustices and inequalities and how society could be more inclusive and tolerant of all walks of life. As Hannah stated, society should be “one that treats everyone equally and gives everyone fair opportunity while maintaining liberty and freedoms to do what they please and how. A good society would support people and include everyone no matter the circumstance.”

A few students from each group made comments about types of political systems that should be considered, however, again, the Grade 9s showed a more basic, less contextual and rich understanding of the complexities of social and political structures. Tamara simply said, “I’ve heard socialism works well,” whereas A.D. stated, “The best kind of society would be a less limiting one, meaning less political corruption in nations that could help to better the world and people all around, less focus on overall power and personal issues instead of national issues would benefit individuals and nations alike.” Clearly, A.D. has had access to more information about how societal systems work and has thought more deeply about it. This quadrant clearly teases the Grade 9s and alumni apart, with the 9s operating at the orange level, and the alumni, with their new knowledge and experience (through school, families, friends) are moving towards the green level, as they try to reconcile how to ensure our world is inclusive and fair. Schools and educators who provide opportunities for students to “negotiate understandings by collectively interrogating how different assumptions can lead to different conclusions,” in other words, from a Democratic Citizenship Education practice (Davis & Francis, 2022, p. 172), help to shift this perspective out of the orange and into the green. As teachers, we can model critical thinking practices and challenging assumptions such that we empower our students to “develop senses of efficacy within a task and control over their own learning” (Davis & Francis, 2022, p. 173).

**Vignette 11: These Times, They are a Changin'****Friday, Oct. 20, 2023**

There has been an almost palpable energy (morphic field) shift in my classroom since the beginning. Back in September, I would greet them on edge, personally stay fully entrenched in the red zone while doing our five-minute breathing and be ready to play “whack-a-mole”. Gradually, as I cultivated a separate individual relationship with each student as well as small groups of students, their trust and respect for me and my room began to increase and strengthen. Now, when they come in, I have the lights dimmed, meditation music playing (to set the mood), and they know what to do – go get their bins, take their sensors out, make toast/hot chocolate if they wish, and then sit at their seats until everyone is ready. We do the five-minute breathing together – I lead them in and gently have them focus on their breath. A few still struggle to concentrate and not get distracted, but most can do it. I can even teach the class a short lesson – still very short because their attention span is so very small. I try to pack each class with engaging activities for them to do, and this seems to work. The Friday Wellness day is so good – they look forward to it and really embrace it. They love the unstructured time, and they are now able to handle the responsibility of choosing their own adventure and engaging with an activity and with each other – without their phone.

Jon Kabat-Zinn (2003) described mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 145). For my students, teaching them how to pay attention to the present moment by focusing on their breath was new to them, and as it turned out, something they could (and did) learn effectively in a relatively short amount of time.

**Awareness and Focused Attention.** The MAAS-A instrument revealed a significant increase (+11.87%) in acting with attention and mindfulness for the EG, indicating that practising for five minutes every day can actually rewire the brain and increase focus and attention. The CG on the other hand, reported decreased levels of acting with attention over time (−4.47%), indicating that these skills and strategies to help with focus and attention were not taught specifically in their other classes, and therefore these skills do not just develop naturally. This Grade-9 cohort of students were born into this world in 2010 – along with the iPhone 4 and its front-facing camera, which, according to Jonathan Haidt, “changed the social life for everyone...[and] many adolescents (and adults) lost the ability to be fully present with the people around them” (p. 35). It is this distraction from devices and limited attention spans that we are now seeing in our youth, prompting Haidt (2024) to refer to the period from

2010 to 2015 as “the Great Rewiring of Childhood” (p. 35). While the smartphones of today may be changing the neural connectivity of our children, Goleman and Davidson (2018) provide ample scientific data collected from the brains of “meditation masters” revealing “a neural signature showing an enduring transformation” (pp. 282, 232). While most of us will never achieve the ten thousand hours of silent meditation practice these monks have acquired, Goleman and Davidson (2018) recommend that after only two weeks of mindfulness practice, our brains rewire in such a way that we mindwander less, become more attentive and focused, and increase our working memory. Teaching students how to focus on the present and pay attention to just one thing helps them develop new neural circuits which ultimately strengthens their ability to sustain their focus. According to Richie Davidson, children who have practiced focused attention, empathy, and self-regulation can literally rewire brain circuits to respond to stress in prosocial and less maladaptive ways (Goleman, 2008). Dan Siegel (2017) described the self-regulation of our minds as arising as the neural circuits wire together through our embodied and relational experiences, creating an integrated subjectivity. Or to put it more simply, “where attention goes, neural firing flows, and neural connection grows” (Siegel, 2020, p. 161).

**Focus on the Present.** Paying attention to the present moment involves tuning into real-time bodily sensations, such as paying attention to the movement of air coming in and flowing out during breathing. This is how I describe the process to the Grade 9s, as I gently lead them into their five-minute session each day. This practice helps students focus on the present moment, so that they do not get caught up in circular thoughts in their mind taking them to the past (rumination) or future (anxiety). The EG reported a slight increase (+10.2%) towards present focus while comparatively the CG reported virtually no change (+0.27%). This is important, given that the EG reported higher levels of anxiety symptoms at Time 1 (compared to the CG) and thus, are likely more prone to rumination and future worry.

After taking the PP9 course, when students feel pulled to ruminate about the past or worry about

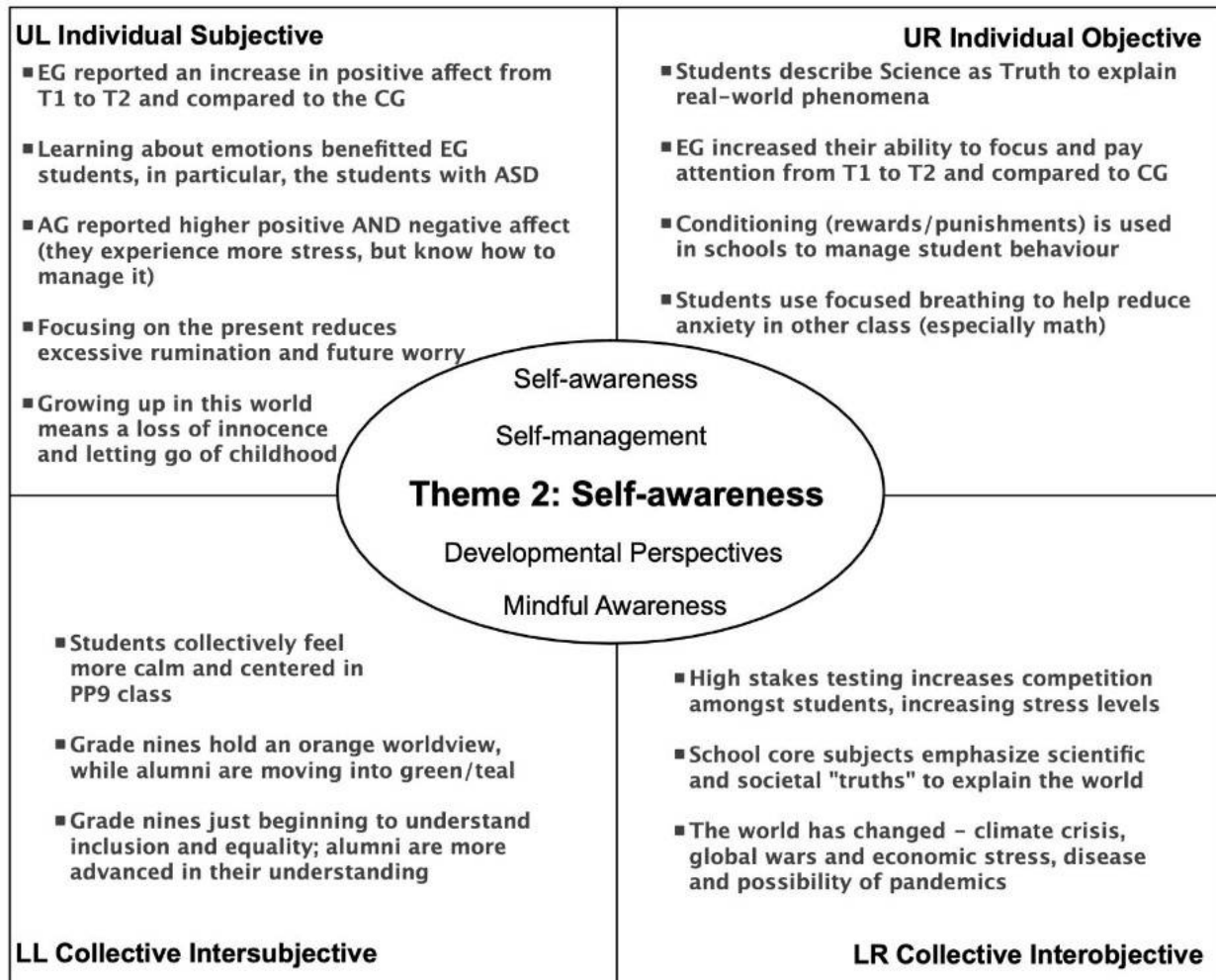
future events, they can use their breathing strategies to focus only on the breath in the present moment – thus using a bottom-up approach to change their physiology and ultimately ground themselves. For many students, this mindfulness practice was brand new, as they had never been asked to focus on any one particular thing (such as the breath) for several minutes, such as we did every day. Jill noticed that her “focus has gotten better since this course – especially for math.” She notes that the breathing exercises have helped her in a course she had been struggling with and now she feels the focused breathing has helped her “do better on tests than I did beforehand.” Landon learned to just focus on what is in the present moment, “on what is happening right now, and that helps a lot.” And Malcolm absolutely nails the definition of mindfulness when he describes it as, “Just being in the moment not worried about anything that’s happened or that will happen and sort of being peaceful and not letting your mind race to other places.” Carly mentioned “being aware of your surroundings and paying attention to small details.”

**Mindfulness in the Classroom.** In order to develop neural pathways conducive to focus and attention, students require intentional instruction and repeated practice, such as the mindful focused attention on the breath done in PP9. For example, Landon stated, “before I came to the classroom, I was thinking about all the tests that are coming up – but after the breathing, I’m just mainly focused on what’s happening right now – which helps a lot.” As Raisa said, “I think it has helped me like understand like how to better focus and how to be in the present.” Not only did these students become better at focusing their attention, but they became aware that they improved in this area, helping them to realize that they are in control of their thoughts and how they direct their attention. Children who have practiced focused attention, empathy, and self-regulation can literally rewire brain circuits to respond to stress in prosocial and less maladaptive ways (Goleman, 2008).

Several students commented that they were able to pay attention in their other classes better after learning these mindfulness techniques. Jacqueline noticed that having math class immediately after PP9

helped her feel calmer, and “like way better going into my test, so I took it way better.” Malcolm, Naomi, and Sienna also mentioned high levels of math anxiety, and that using the focused breathing before a math test was extremely beneficial. Given our current cellphone and social media pull on these students’ attention and focus, there is truly no better time than now to incorporate these techniques into daily learning such that it becomes part of each student’s classroom practice. Haidt (2024) has advocated for “phone-free and play-full schools” and social-emotional learning through free play and engagement in the *real* world, as opposed to the digital one (p. 253). Johan Hari (2022) described a societal trend of “stolen focus,” where our ability to pay attention and sustain focus is decreasing rapidly. He described this as an “attentional pathogenic culture”, where we are living in an “environment where sustained and deep focus is extremely hard for all of us, and you have to swim upstream to achieve it” (Hari, 2022, pp. 11, 12). Gabor Maté (2024) described mindfulness practice in relation to helping those with diagnosed ADD as requiring “time and effort need[ed] to be devoted to the cultivation [of attention and presence] each and every day” (p. 294). He reminded us that a “brain used to decades of inattention and disorganization will not overnight reorganize itself” (Maté, 2024, p. 294). While he referred to adult ADD and a lifetime of neural patterning, helping students organize neural pathways for increased focused and attention should be somewhat easier, as pathways being shaped, pruned, and modified throughout adolescence.

Figure 41 illustrates the multiple perspectives that describe the theme of self-awareness.

**Figure 41***Theme 2: Self-awareness Map***Theme 3: Social Awareness***Emotion Regulation*

<b>Vignette 12: What have I learned?</b>	<b>Wednesday, Nov. 1, 2023</b>
<p>At one point early in September, I questioned everything – my skill and competence as a teacher, the worthiness of this course and research project, even the idea that maybe teaching students learn to breathe and focus might not work – so really, everything! I was worried, anxious, scared, and doubting myself. Maybe this is how my Grade 9s felt on their first day of high school? I thought maybe I was a fraud and that this just wasn't going to work – I even thought about trying to remove some of the most problematic students from my class because they were so disruptive and came in with so much negative energy. Maybe if I could "get rid" of a few of them, I could salvage the course and research project! Somewhere around the third week in September, I sat with myself, reflected deeply, and had a reckoning. I thought – these are exactly the students I've been reading/writing about – the externalizing behaviours (both boys and girls, actually) are signs of anxiety, fear, worry, stress, anger, and frustration. I need to push through, stay the course, keep doing what I'm doing and at least <i>try</i>. So I did. I started to see small improvements – some students telling me they looked</p>	

forward to this class, they loved it and wanted to keep doing it all year (with the exception of a few of the boys). I started to focus on the students who it seemed this class was really helping – hoping to take away at least some small wins. And then, around the end of September, a shift in the energy started to happen. Not everyday – but most days. They started to respond more positively to my requests. They weren't so combative and surly. They started to work *with* me as opposed to constantly *against* me. I was able to accomplish more in the lessons – actually teach them some important concepts about their bodies and minds to help them with their anxiety and emotional regulation. They started listening – and so did I.

I only have nine more days with them – while at one point I was counting down the days, I now find myself sad that the term is almost over. I think that I could help them even more – now that I have their attention. I wish I could measure the morphic field – I can feel it – I know the students can feel it. At one point last Friday, the mechanics teacher came in to find a student. He looked around the room and said, "What class is this?" – I replied, "Positive Psychology" – and he said, "It's incredible – I see why you call it that." I was touched – and as I looked at my students quietly talking to each other, laughing, and engaged in their "wellness," I was filled with pride and satisfaction – also reassurance that I am on the right track and absolutely this is the thing these students need right now.

Emotion regulation involves the internal and external processes that notice, monitor, evaluate, and respond to emotional reactions such that one can move towards and ultimately accomplish one's goals (Thompson, 1994). In PP9, students had the opportunity to learn about emotions in a variety of different contexts, including seeing them as granular and nuanced (as opposed to "good" or "bad") such that they can be recognized in themselves and as outward expressions from others. For many students, it was the first time they have thought about emotions, both from evolutionary as well as current and functional perspectives. To see whether students who had taken the PP9 course increased their understanding of emotions and emotion regulation, the SOS survey, individual interviews, and focus groups were conducted and compared to the CG.

**Changes in Social Awareness.** The SOS included several questions about the students' perception of others – for example, the impact of others' judgement and opinions on them, their willingness to conform to others' ways and behaviours, and their ability to read and understand other people's emotions and social cues. The EG did report a slight increase (+3.90%) in social awareness, whereas the CG did not (0%). The AG was 9.62% higher in social awareness than the EG at Time 2, however significantly higher than the CG (+14.87%) at Time 2. This could indicate continued



development in social emotional learning concepts and strategies initially acquired in PP9. The course provided the EG with some strategies for reading others' expressions and emotions and learning to trust one's own intuitions and determination (internal locus of control), as opposed to those of their peers. When comparing internal locus of control, the DPS revealed a significantly higher (+17.7%) internal locus of control for the AG as compared to the EG. This means that the AG rely more strongly on their own intuitions, decisions, and actions, as opposed to external sources such as parents and peers who have a heavier influence on the younger, and more externally oriented Grade 9s.

**Emotion Awareness.** The interviews and focus groups provided the opportunities to ask students who had taken the PP9 course specifically about reading and regulating emotions, which were concepts taught and practiced throughout the course. Most responded with confidence in reading emotions in others and recognizing the importance of this skill for forming and maintaining relationships. As Hudson stated, "Sometimes yeah, I'll catch myself doing something like with my body when I'm mad or something then I just need to like calm down and stop doing it." The alumni students were able to recognize how being able to regulate their emotions helped them connect more easily with their peers and teachers, providing better support for establishing and maintaining relationships, one of the SEL competencies. Stella attributes the increase in social awareness to some of the types of classroom activities and learning structures. She stated, "...it was easier to become friends with those people because we were sharing our thoughts and feelings – and that's something that Grade 9s don't usually do – so maybe that had a part of it." Clearly, Stella could see her Grade-9 self as just beginning to read others' emotions to foster relationships once the trust and respect had been established.

### ***Classroom Coherence***

When the classroom involves a sustained and emotionally connected learning practice that is repeated, the class develops deep "learning that reaches into their hearts as well as their minds, that lifts their vision to a new horizon and gives them insights they will draw on for years to come" (Bache, 2008,

p. 63). Creating and fostering a safe, caring, calm environment in a classroom is reinforced at all levels of educational policy. The Ministerial Order on Student Learning reinforces the student's right to "learn in an *inclusive environment* where all students feel valued and where multiple perspectives are encouraged and respected" (Government of Alberta, 2024a, p. 1, emphasis mine). Teaching and learning in an *inclusive environment* are considered an essential pillar of both the West Valley School Division and Northside High School's four-year plans. The PP9 classroom environment was intentionally created and developed to be inclusive, welcoming, safe, and encouraging human connection.

**PP9 Classroom Coherence.** When asked about their affective experience in the PP9 course, students in both the EG and AG described feeling calm, relaxed, and connected. Many, when interviewed, would close their eyes and imagine being back in the room. Their body would physically relax as they sighed deeply, dropping their shoulders and smiling. They mentioned many of the things that made them feel that way – from the constant supply of toast, tea, and hot chocolate – to the soft music, fish tank and plants, aromatherapy, natural light, soft chairs and weighted blankets, consistent, mutual respect, and a roomful of kindness and caring. In fact, 86% of the EG noticed that the classroom was a calm, relaxing space where they felt safe and cared for. Many mentioned that it felt different from some of their other classes, and that they looked forward to coming into the space and connecting with the people and positive energy within. Contrast this with the alarming trends outlined in the AEAMs and OURSchool surveys, where there have been significant decreases in student attitudes around feeling safe, supported, cared for and respected by teachers, and feeling like they belong. Students just want to feel seen, listened to, and understood – and that is what they say truly matters and has relevance.

**Embodied Affective Memory.** Over the past three years, the PP9 course has been taught in three different classrooms, meaning each grade of the AG experienced the course in a different space. The common denominators were the teacher (me), and the course (created by me). In fact, Hannah mentioned, "I don't know if it was you, or the environment, but even now, like you have switched

rooms, but it's still such a calming environment in here." She later said that she attributed the calm environment to something I had done and wanted to model that once she became a teacher herself. I do not believe it is any special superpower that I possess, but instead, the knowledge (from the data I have collected and analyzed) of what works and why. My students have explicitly told me how much it meant to them to have the opportunity to experience a class such as this, and their affective memory as a result, runs deep. As a quick aside, and update to this work, my current Grade 10s (last year's Grade 9s) come into my classroom all the time – some who aren't even in any of my classes! Often they will walk in, sigh, and state, "I love this classroom." Last year, I was not sure if the intentional classroom coherence that I had set out to achieve would be appreciated, or even noticed by my students. I now know that students (and humans in general) are intuitively aware of the energy in a room full of people – both positive and negative. As Darius said, "I liked having all those plants everywhere and kind of the smells and it doesn't feel like you're in a classroom." His comment intuits that classrooms are typically sterile, boring, possibly even stressful places where one could not possibly feel calm or peaceful. Even Tegan said, "It felt like – Zen almost? Like the lighting...more natural light from the window – it seemed like a safe place, almost, if that makes sense?" Stella reflected with "I remember feeling very relaxed – your classroom was kind of a safe space compared to like everything else." And of course, Harper, who felt like "my soul learned from it."

I do wonder about the "compared to everything else" that several students mentioned – it seems that there are some spaces that students do not feel that they can be themselves and be comfortable. During the focus groups, students enjoyed talking about the classroom atmosphere, with FG2 taking some time to talk about how the class was "not like any of the other classes" and a "break from normal classes." If this class is calm, relaxed, positive, safe, and "not normal," then what is happening in their other classes? It seems that all classes can infuse elements from this course to help students feel that sense of belonging and connection that is needed before any learning can take place. The Education Act

(2020) is very clear when it states, “students are entitled to welcoming, caring, respectful and safe learning environments that respect diversity and nurture a sense of belonging and a positive sense of self.” Not only do our students crave these learning spaces, but we as teachers have a legal obligation to provide this for each of them, every day, everywhere in our schools.

**Inclusive Safe Spaces and the Synergy Zone.** As mentioned, the AEMS and OurSchool reports do mirror that, with only 36% of our Grade 9s feeling they were “intellectually engaged and find learning interesting, enjoyable, and relevant,” as compared to the Canadian average of 58%. This low engagement score could be due to course content, teacher personality or style, peer relations, or cultural factors – but it could also be due to low classroom coherence established in each course, classroom, and learning space. This is not to say that teachers are solely responsible for student engagement, as there are so many competing factors that we as educators navigate every day, however, knowing the benefits of a coherent classroom and how to achieve one can point us in the right direction.

Zadina (2023) described a “Synergy Zone”, a type of ideal classroom focussed on “brain synchronization and positive emotion with heart engagement” (p. 1). In fact, the emotional climate of the classroom does affect the well-being of the student – including their feelings of engagement, attention, connection, and enjoyment (Zadina, 2023). According to Bandura (1999), it is the entire person who thinks and feels, not just the brain. Zadina (2023) invited educators to shift our attention from the foreground (curriculum, content, individual behaviours) to the interactive totality of the whole – with the whole being greater than the sum of its parts. According to Zadina (2023), self-regulation is essential for school (and life) success, however stress, trauma, and other negative environmental factors negatively impact this important ability. Teaching our students how to self-regulate through mindful breathing and the self-generation of positive emotions done with the quick coherence practice, can shift thoughts, feelings, and behaviours away towards positivity and enjoyment (McCraty & Childre, 2004). The Synergy Zone was what Dana felt (and still feels) every time she walked into my classroom – “it’s

like comforting going to a place where it was nice to be at...I *still* like going in there!” A.D. felt the collective coherence when he said, “this is the time where [everyone] kind of just absorbed that energy. So, yeah, I think it was really good energy in there. It wasn’t stressful at all.” If we are trying to increase student engagement in the classroom, we need to first establish a “really good energy” so that our students can come to a “place where it [is] nice to be at.”

I want to end this section by circling back to my first PP9 class that I taught in first term – and the dramatic shift in classroom coherence from beginning to end. As mentioned, this class brought chaos, dysregulation, disengagement, and quite frankly, dislike for the course and likely for me as their teacher during those initial classes. It is entirely possible that no one felt completely safe in that classroom – including me! As Porges (2011) told us, when people feel safe, the nervous system communicates via the vagus nerve to the heart and breathing to slow down, relax muscles and release tension, connect the face and voice to help attune positively to others for connection and support. It turns out, that the reverse is also true – I helped my students slow down their breath and heart, relax their muscles and lean into a calm, quiet, and peaceful state – which (after several repeated sessions of this practice), enabled them to quiet their collective nervous systems, feel calm, safe, and cared for, and able to reach out for social connection. Porges (2019) suggested that teachers who are authentic, co-regulate with their students, and foster strong relationships will provide a sense of safety and trust with their students. My first instinct was to try to remove a few from the class to reduce the overall disruption. In the end, I trusted this valuable scientific physiological research I had been doing and decided to keep them all and build them back up from the bottom to the top – to a place where I could connect with them on a whole new level.

### ***Relationships***

**EG Relationships.** When students feel safe and cared for, they are much more likely to reach out to make new social connections. While the level of social awareness for the EG did increase over the

term, they still mentioned struggling to make and maintain social relationships. Mandy described feeling hyper aware of her classmates looking over her shoulder and judging her in her other classes, to the point that she was so worried about others, she could not get her work done. In PP9, she felt comfortable – both with her friends and with me, her teacher. She said, “when I was in your room, I had a bunch of my friends in your room, I felt comfortable, and like I liked *you*, I liked having you as my teacher which helps a lot. Cause like, when I don’t like my teacher, I just like don’t really want to be there!” Denise also mentioned the positive connection with the teacher as the starting point before any learning could take place. As teachers, we can model positive relationship and communication skills. Students learn this implicitly, but also explicitly, as we discuss and practice in class active listening skills, the importance of eye contact and body language, and acting with kindness and expressing gratitude.

**AG Relationships.** The AG, having had many different teachers in their high school experience, were able to reflect quite openly about the relationships they had with teachers in the past. Most described their favourite teachers as those who took the time to notice them and support them – not judge or blame, but meet them where they were, helping get to where they wanted/needed to be. Sadie, who had some struggles with a learning disability, wished teachers would just check in with their students individually so that maybe “[her learning disability] wouldn’t [have] been as bad as it [was].” During the focus group, the AG discussed teachers who were supportive and helpful – making their experience in that class positive and engaging. They talked about mutual respect, and the fact that “you have to care!” (Stella). At the end of the conversation thread about relationships, Stella had an epiphany – she said, “I was just thinking – I know all these courses are so important - but it's not the *class*, but it’s the *people*, it’s the *relationships* you take. That's what I take away. It’s like learning how to interact in a community, how to be a member of a community or learning how to navigate relationships.” This realization she came to was that while learning content and knowledge in these classes is important, the

people and connections formed in each situation are even more valuable. Without these deeply connected bonds, there is no sense of community and no feeling of support and care for each other. Student engagement without meaningful relationships would of course be much lower. As Gabor Maté (2024) stated, “The warmth and satisfaction of positive contact with the adult is often just as good as a psychostimulant in supplying the child’s prefrontal cortex with dopamine. Greater security means less anxiety and more focused attention” (p. 126). When finding ways to help children with ADD, he advocated for teachers who are “encouraging instead of intimidating” such that the child feels safe, cared for, attuned to, and attached (Maté, 2024, p. 126).

**Focus Group Dynamics.** The focus groups provided a unique insight into the way students typically think about their role in school. Generally, there is a type of hierarchy within each classroom, where the dominant teacher has the answers and subordinate student does not. Thus, classroom conversations often flow from teacher to student and back to teacher again – rarely from student to student (in a large class discussion). Students quickly adopt their place on the hierarchy when there is an adult present (for the most part) and do not necessarily try to disrupt this “natural order” of how school is done. In the Grade-9 focus groups, it took some time initially to disrupt this flow with the teacher as the “hub” of conversation. Figures 37 and 38 (in Chapter 4) illustrate the conversation flow with each focus group. There is a notable difference with the older, alumni students, where there is much more interaction between students. For the Grade 9s, they needed to be reminded that there were no “right” or “wrong” answers, and everyone’s thoughts and opinions would be heard, respected, valued, and considered to be equal. Students and teacher were on equal footing, with equal opportunity to contribute. It became very clear to me almost immediately that these students have very little experience in this type of setting, however, they must have had some practice throughout their high school career since the alumni were quite adept at this format (compared to the Grade 9s) (see Figure 38). The Grade 9s

answered the questions and put forth their ideas, but they were hesitant to go beyond what resembled a teacher-student-teacher-student type of interaction.

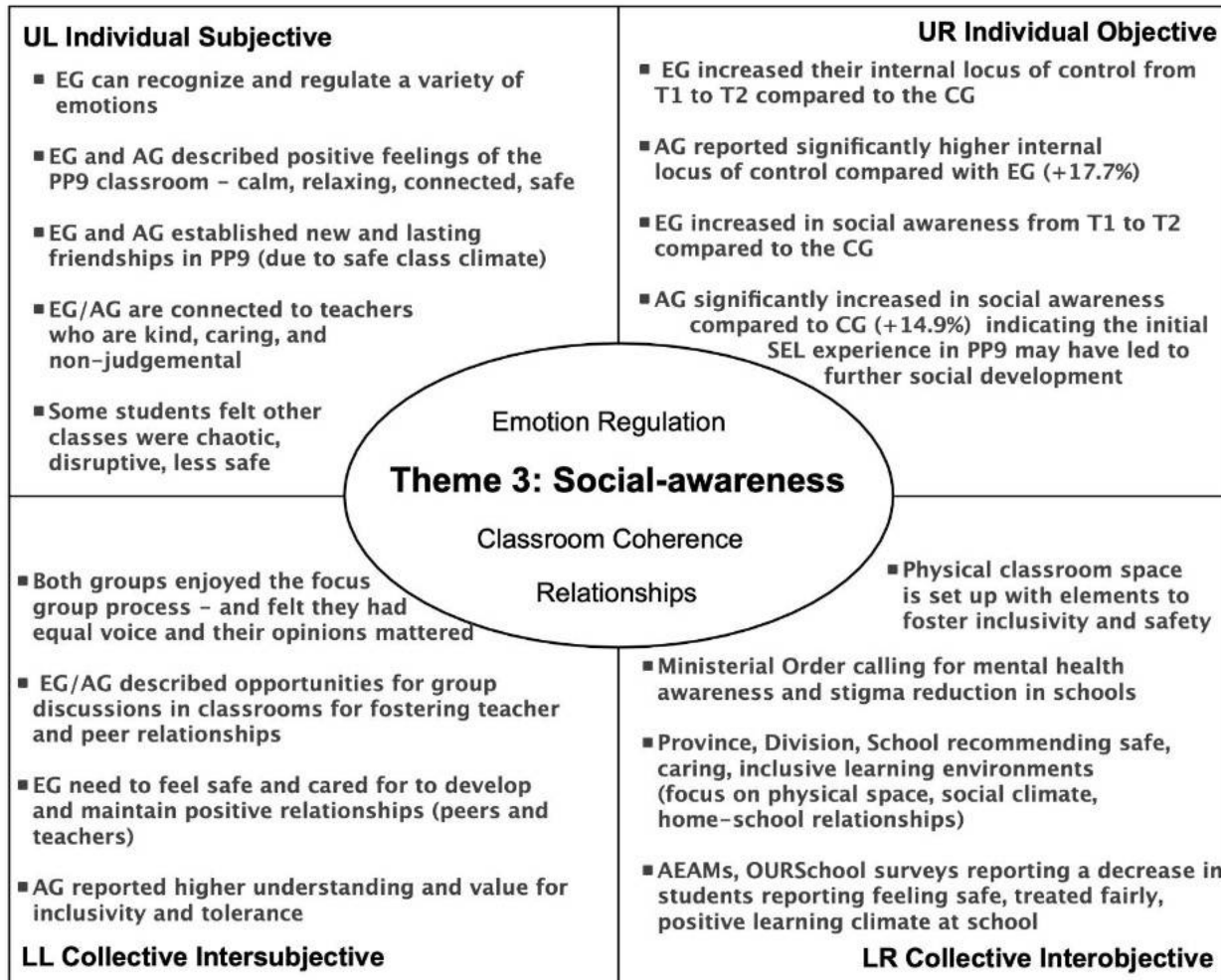
The AG was quite different right from the start – allowing me taking a back seat to let the students contribute freely and openly, building on each’s ideas. These experiences are incredibly valuable for students – having the opportunity to put forth ideas and opinions in low stakes, low risk (academically at least), generative discourses. Of course, when I asked FG1 if any of their teachers provided them with opportunities like this one, Nigel simply answered “Just you.” These communication and relationship skills can be built through modelling and practicing these group sessions without evaluation stress or worry. Students need to feel that their ideas are worthy and the risk of saying them out loud need to be met with the reward of taking that social risk, allowing them to feel confident in their contribution to effect their world around them. Taken a step further, Davis and Francis (2022) describe Freire’s *dialogic pedagogy* as “one in which all claims and assertions are considered critically within the collective, so their truth-value is a matter of the soundness of the thinking rather than the status of the speaker” (p. 183, emphasis mine). In this way “inclusion signals the right for each individual to be respected and involved, regardless of traits, abilities, or needs” (Davis & Francis, 2022, p. 179). The democratizing architecture of the focus group provided students with the opportunity to participate on equal footing and feel both respected and involved. Additionally, the students quickly learned that listening to their classmates’ comments could unlock a memory or new idea for them, helping them engage and contribute to the ongoing conversation. Learning how to read faces and emotions, listen carefully to what others are saying, and think about ways to add new ideas to construct intersubjective stories are SEL competencies best acquired through active participation. Our “relational” minds form by self-organizing within and between the entanglement with others, where we ourselves become changed by the interaction, from which emerges a state of connection and trust (Siegel, 2017). This transformative relationship is essential to student engagement and embodiment of deep learning.



Findings from Cibriano and colleagues (2023) suggest that “students in classrooms and schools that participate in SEL programs are more engaged, have better quality relationships with their teachers, and demonstrate increased prosociality” (p. 2). Figure 42 illustrates the multiple perspectives that describe the theme of social awareness.

**Figure 42**

*Theme 3: Social Awareness Map*



#### Theme 4: Coping Strategies

This section addresses the coping strategies learned and practiced by the EG every day while in the PP9 course. The central strategy was the Heart Focused (HF) breathing practice with the HeartMath sensor and Inner Balance app used to provide biofeedback. Low HRV (the measure displayed by the

sensor and app), “corresponds with low efficiency of autonomic control and an increased vulnerability to stress” leading to increases in rates of anxiety and depression (Siepmann et al., 2022, p. 274). Given this well documented conclusion, finding ways to help students increase HRV through mindful breathing improves autonomic nervous system flexibility, thereby “reducing the activity of the adrenal sympathetic system and the consequent stress response” (Ruiz & Seco, 2024, p. 2). The EG students practiced five minutes of HF breathing every day using their sensor and app to measure their HRV (coherence). This turned out to be the most effective strategy for students to reduce stress and worry and increase attention and focus.

### ***HeartMath Biofeedback***

#### **Vignette 13: Second Class, Not Like the First**

**Friday, Dec. 1, 2023**

What a difference in energy this group brought right from Day 1! While it is a much larger class (31 students as compared to 23 last quarter) – these students are keen, positive, cooperative, and generally on board with the content and delivery of this course. They have jumped right into Heartfocused breathing and are quickly learning how to stay focused and use the app to monitor their coherence. They are very engaged and interested during classroom lessons and activities, giving me the space to have larger class discussions and explore more topic areas. They come to class excited to learn, and leave class just as excited, but more focused and calm.

**Heart Rate Variability (HRV).** Heart Rate Variability (HRV) is a measure of the beat-to-beat rhythm of the heart and is bidirectionally influenced by the vagus nerve, responsible in part for the parasympathetic “rest and digest” nervous system effects. Given that respiration directly affects HRV (heart rate increases with inhalation and decreases with exhalation), it can be maximized by slow, deep breathing (Ruiz & Seco, 2024). When breathing is slowed, HRV increases, engaging the parasympathetic nervous system and dampening down the adrenal stress response (normally stimulated by the sympathetic nervous system). Biofeedback provided by the colourful mandala wheel on the Inner Balance app provides students with real time HRV data, allowing them to “see” their inner physiology and regulate from the outside in.

**EG Biofeedback and Buy-in.** The coherence number (synonymous with HRV) was the measure the students manually recorded each day to see their progress in real time. There was a 23% increase in average coherence score from the baseline to data accumulated from the second half of the course. A few of the students thought that maybe it was a “scam” or “no way was that going to work” or “just not very accurate.” As Devin pointed out, “[at first] I thought it was a little bit pointless, but I could tell that it was working a little bit and it would like calm me down.” Many were excited to learn how the technology and practice worked, with Oaklynn stating, “I thought it was really cool, I’d never seen or heard of anything like it before and I thought that it was really interesting that it could track my heartbeat from where it was connected to my ear... I thought that was pretty interesting!” The focus groups gave the students a platform to talk about their focusing techniques, their current levels, scores, badges, and progress with the sensor. The conversation was not competitive or judgmental, but engaged and excited, a sharing of ideas and tips for those who might need them. Many students, like Jacqueline, started out more red than green, but “towards the end I definitely got better!”

**Coherence Improvement and Age.** Not only did the EG improve their HRV scores, but the AG described “getting better” at the practice while they were in the PP9 course as well. The alumni students reported “knowing” when they were in the red or green zone and how that related to their physiological state. In the focus group, Hannah described this feeling as “...doing it so much, I was able to integrate it self-consciously and do those breathing activities without even consciously thinking about what I needed to do without even needing the sensor.” The alumni described not really understanding how or what they were feeling before the course, but after practicing with the sensor every day and connecting the biofeedback metrics with their inner physiology and emotional state, could then regulate using the breathing practice as needed. In fact, Stella mentioned how the sensor and app acted almost as an emotional barometer for her, allowing her to really see how she was presenting herself to the world. She

stated, "...if I did my heartrate and I was in the red zone, I would be like...why am I feeling so – like elevated almost? I was able to recognize that and be able to take it down."

My own practice increased by 17.39% from baseline of Quarter 1 to Time 2 of Quarter 3. While I did improve my coherence through consistent, repeated daily practice, it should be noted that my Time 2 average coherence score (1.62) was significantly lower than my students' average score (2.42). It should also be noted that according to a study done by Voss and colleagues (2015), HRV decreases with age, likely due to hormonal changes, aging of cardiac tissue (in particular loss of sinoatrial (pacemaker) cells), and arterial changes. Given these findings, I believe it is even more essential for someone in her late fifties to try to maintain high HRV through this practice. My students (who began with little to no mindfulness training) rapidly surpassed me (someone who has been practicing these techniques for close to 10 years), in coherence. Overall, many found it to be quite easy, with some moving up to Level 2 almost immediately, while still maintaining high coherence scores. Thus, teaching and practicing these mindfulness skills is not taxing for these students, and in fact, very rewarding for them, as they can see their progress almost immediately, allowing them to stay motivated and engaged.

**Benefits of Biofeedback.** The real-time biofeedback metrics provided through the sensor and app do help reinforce their behaviour, at least in the early learning phases. Likely helping this initial eagerness to engage with the app is prior experience with digital games where "levelling up" is associated with rewards, and subsequent "small hits of dopamine" (Haidt, 2024, p. 130). Students do enjoy these apps where they feel like they are being rewarded, but in this case, the reward is not accumulating points, levels, or badges, but instead seeing themselves in the green zone. Students were able to articulate their understanding of how the sensor measured their nervous system physiology. Many understood that by breathing slowly and deeply, and focusing on just the breath, they could get into the "green zone," which meant the rest of their body was connected and coherent. When asked what "coherence" meant, Paige simply stated, "Coherence is like when your mind and your heart and your

breath is like all on the same pace.” The brilliance of the biofeedback is that the student has real time data representing their inner physiological state, providing them with the reinforcement that they are in fact, calming down when they see they are in the green zone. As Alice stated, “I found that it let me like know *how* I was feeling and that when I'd breathe, I like could know that I'm calming down.”

Particularly when students are first learning about the power and effectiveness of mindful breathing, it is an essential tool to convince them that what they are doing (focused breathing) actually *is* making a difference, and actually *is* calming them down. Once students have spent time practicing with the sensor and app (as in this course), then they can *feel* when they are anxious or calm and can decide to stop and breathe when they feel they need to.

#### **Vignette 14: Oh, My Heart!**

**Thursday, Dec. 7, 2023**

I had only been teaching one of my positive psych classes for just over a week, however had been practicing HF breathing at the beginning of each class for five minutes with the sensor and app. One day, after my class came in, got their bins, toast and sensors, they sat down, ready to begin their session. I remembered I had to drop something off in the office so I let them know we would just start when I got back. Of course, I ended up taking a bit longer than intended, and I began to worry that my class would be hanging off the ceiling when I returned. I hurried back to my classroom, suddenly concerned that I could not hear any noise from down the hall. When I peered into my room, I saw my students all silently breathing, sensors connected, many with their eyes closed, quietly easing into a mental, emotional, and physical place of calm. I quietly went to my desk, plugged in my own sensor, and joined in the collective coherence.

#### ***Strategies Learned from the Course***

**Mindful Breathing Practice.** While some of the students commented on previous experience with a few coping strategies, the majority of the EG had not learned any, nor had considered the fact that they might even need some. Seventy-seven percent of them described the breathing practice as their favourite strategy, with 75% continuing to use the breathwork beyond the course. As Isabel stated, “After doing it every day, it’s just like a nice feeling, and I just recognize it and it’s good.” Many mentioned using the breathing for tests, presentations, sporting performances, and sleep. Lily said, I would try to slow [my breathing] down even more and –especially at night cause sometimes I have

trouble sleeping. But since positive psych, I have not had any problems.” Students with ASD like Patrick, Coleman, and Ellis (alumnus) felt that the continued use of the breathing practice helped them stay in control over their emotions and bodily reactions. This became like a superpower for these students, where in the past their physical outbursts would often require removal from the classroom and school. All three students expressed confidence in using the breathing practice to stay in control, helping them with their own sense of well-being and maintaining their social connections.

The AG also spoke of continued use of breathing practice, with every one of them describing their continued use in a variety of situations and contexts such as test preparation and school stress, sports performances, work, peer groups, family, and some practicing daily to enhance overall well-being. They loved telling me how their practice has evolved – with some using box breathing, to longer meditation sessions, incorporated into other practices like yoga, and one (Hannah) who continued on with the HeartMath sensor. The tendency for continuation of the breathing technique can be attributed to the general ease and convenience of use (no equipment is necessary and it can be done without anyone else noticing) and the noticeable change in physiology as the body calms the mind from the bottom up. As Nadira points out, “I mostly remember HeartMath – just ’cause it was like every day. Just like five minutes where I could just like relax.”

Given that the Education Act (2020) states that the “role of education is to develop engaged thinkers who.... face challenges with resiliency, adaptability, risk-taking and bold decision-making” (p. 11), and that “promotion and prevention strategies for mental health and social-emotional learning are embedded in daily instruction and school-wide activities” (Government of Alberta, 2017, p. 7), there seems to be a deficit as to what these coping strategies actually are. Courses that infuse SEL practices, like regular mindful breathing practices, help students learn and embody coping strategies that they can take with them and continue to practice years later. The intentional addition of wellness practices and

coping strategies for stressful times ensures that “the emotional education of our children is [not] left to chance” (Goleman, 1995, p. xxiii).

**Additional SEL Strategies.** The PP9 course that I developed several years ago was initially built using the HeartMath Institute’s Smart Brain Wise Heart (SBWH) program as a foundation. SBWH is an evidence-based series of interactive modules that empowers students (ages 9 to 16) to build resiliency and self-regulation skills (HeartMath Institute (2024c). Elements of SBWH were infused throughout the PP9 course, along with units on emotion regulation, personality theories, sensation and perception, anxiety and stress management, coping strategies, and memory and study skills. Importantly, every single class started with five minutes of HF breathing with the sensor and app providing the biofeedback. Appendix NN provides an outline of the lessons and activities taught in the PP9 course.

The EG and AG were given the opportunity both in interviews and focus groups to reflect on this course and its impact for each of them. I wanted to get a sense of whether they found a course like this effective and relevant for them, but also which *elements* were particularly useful and beneficial. A recent large meta-analysis by Cipriano and colleagues (2023) (and a follow-up to Durlak’s 2011 original SEL program meta-analysis) looked at 424 studies from 53 countries that reflected 252 stand-alone universally based SEL programs. The researchers found that compared to control groups, students who participated in SEL programs “experienced significantly improved skills, attitudes, behaviors, school climate and safety, peer relationships, school functioning, and academic achievement” (Cipriano et al., 2023, p. 1). Of course, the caveat to this are the multiple factors relating to context, school and community climate, delivery models and components, and program fidelity. Importantly, specific targeted and sequenced SEL competencies, delivered in classrooms by trained teachers and allowing for student practice and mastery yielded significantly higher results than those delivered by “outside school personnel” (Cipriano et al., 2023, p. 14). The study also examined SEL components infused into academic programming and found that they did *not* yield the positive outcomes to the same extent that

the stand-alone SEL programs were able to accomplish. This is an interesting finding, given that one of the things I have been considering is whether small pieces of this course could be implemented into regular academic courses. This was outside the scope of my study however this evidence supports the stand-alone classroom delivery of SEL programming into a specialized course (such as PP9). Students therefore receive more of an immersion into SEL competency practice, providing a more authentic experience overall. The study by Cipriano (2023) found a partial dose response to the delivery of SEL components – whereby there were unable to report that more content equals more positive targeted outcomes but did report that full coverage of all of the SEL competencies would yield significantly higher positive outcomes than those programs that did not (p. 14).

As previously mentioned, this group of Grade 9s had significantly higher anxiety (24 out of 46, or 52%) than the general population (21%) (Statistics Canada, 2024), and many self-selected into this course. The EG reported a 6.8% increase in coping strategies after completion of the course, whereas the CG decreased their coping strategies by 5.1%. There was a measured behavioural change from beginning to end of the course, in the sense that the EG students could calm down and regulate when needed. Further evidence of this comes directly from the HeartMath biofeedback HRV data, where the EG students experienced a significant increase in HRV from baseline to Time 2. Students commented on “help[ing] them calm down and reset” (Simon), learning “anxiety tools and grounding tools [being] very helpful and [worth] hang[ing] onto for quite awhile” (Alice), and “just a place where people can feel safe” (Raisa). The carryover of their emotion regulation and calm practice was also interesting. Many students mentioned that when they had PP9 before math or science, they noticed that they could pay attention and focus better. Malcolm commented that “after positive psychology, I felt a little more peaceful... and less distracted during the day. I could get more stuff done.” Some students thought every class should start with five minutes of breathing – something Alice thought would “give [students] more confidence in their courses.” These positive feelings were even more amplified during the focus groups,



with students contributing their favourite elements of the course and adding new perspectives and personalized experiences for each. Students were able to come together as a community of learners, who had both individual and collective experiences in this class. Lily said, “I thought it was great – I always looked forward to it – and just like every day I would learn something new about how I can help with stress and stuff like that!”

Other strategies that students talked about included learning to read emotions in others, learning about personality types and how that can be used to increase intra- and interpersonal awareness, investigating sensations and perceptions, learning how to manage anxiety, and helpful memory and study skills. Many also commented on learning about the brain – the different parts and what they do and how the brain wires up, continuing to change throughout our lives, affected bidirectionally by our thoughts, feelings, and interactions with the world. Students learned how this wiring and rewiring is also bidirectionally affected by the heart and breath. Grace remembered that, “when you’re anxious it activates your amygdala – like the part of your brain that thinks its stressed and you’re not really supposed to critical think” but that when we would “connect the HeartMath so we breathe, so we can slow our heart rate, so that our mind thinks clearly and we can feel better about our tests.” Paige described the “endless scrolling on Instagram like a brain-rob” and Alice noticed that when she’s in the “red [zone]...your brain’s jumping all over the place!” Connie discovered that, “when you slow down your breathing, it lets your brain think for awhile and lets it process everything” and Sadie felt that learning about the brain helped her understand her mental health diagnosis with more clarity.

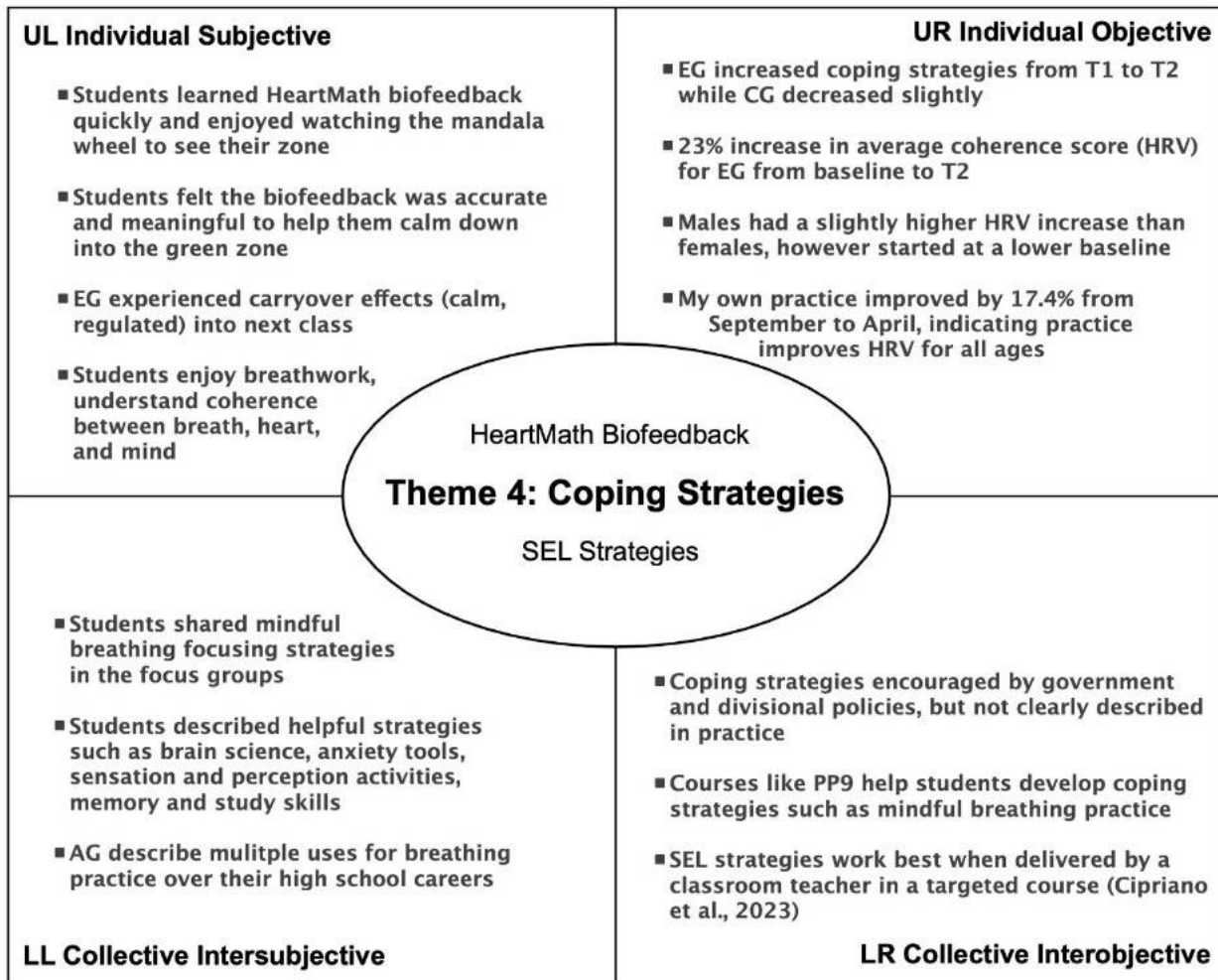
Ninety-one percent of the EG students stated that they would recommend this course to others and 85% said that they enjoyed the course overall. These students found it to be worthwhile, with several mentioning that it was something they were not getting in the rest of their school experience. In FG2, Julia stated, “One of the main reasons I did it was because a lot of my friends that did it like in the

first quarter really recommended it to me.” Devin followed that up with, “I think that every student should have the ability to take this course [to] learn how to breathe correctly.”

Figure 43 illustrates the multiple perspectives that describe the coping strategies learned in the course.

**Figure 43**

*Theme 4: Coping Strategies Map*



### Theme 5: Self-efficacy

Self-efficacy describes an individual’s belief of their ability to enact specific behaviours to effectively manage the situation that they find themselves in (Bandura, 1982). In the context of this study, coping self-efficacy means that the student has a deeper understanding of their own sources of anxiety and their reactions to those sources and now have the confidence in their ability to handle stress and know what to do when they encounter it. This course was designed to help students understand stress,

how it affects them, and how it can be effectively managed. Students learn effective techniques to regulate their bodies and minds from the bottom up, allowing them to feel more in control of the situation as opposed to a more dysregulated, unprepared, reactionary state. Previous studies have shown significant increases in self-efficacy and positive affect after taking a SEL strategy-based course such as PP9 compared to control groups (McLeod & Boyes, 2021; Ouweneel et al., 2013).

#### **Vignette 15: Their First Rodeo**

**Thursday, Jan. 25, 2024**

As I work through my second batch of student interviews, what I notice is that students are generally pretty nervous at first – they offer very limited answers, not a lot of confidence, and clearly not used to this type of format. As I start chatting with them, reminding them of our experience together in the course, some of the things they enjoyed, they start to loosen up, relax, speak more freely, offer new insights. This relationship and trust piece is exactly why I am conducting these interviews as opposed to a third party, arms-length RA. The arms-length part means the loss of direct connection – and meaningful experience that my students share with me. Also, I am able to ask specific, targeted questions of what it was like in the classroom during their class, and what *their* experience was like for them. An RA with no knowledge of what we did in the course and what it felt like to be in the room, would not likely be able to bring about the same rich discourse I was able to have with each student. For example, I'm asking them about their thoughts/feelings about breathing practice at the beginning and then progressing through the course – which is incredibly valuable knowledge but not something a third-party observer might look for.

Looking back from my experience with my first few interviews, I have found my interview skills have improved immensely. I am starting to understand better what I am trying to uncover – for example, the student's feeling and real experience of what the learning process was like, their understanding of the HF breathwork and its benefits, a noticeable self-reflective insight into change as a result of being in the course, and any extra additional tidbits that might arise. Some students seem to require very little entry in, whereas others required a large amount of scaffolding to help them articulate their experience.

#### ***Confidence in Stress Management***

**Coping Self-efficacy.** The belief that you can handle the stress that comes your way because you have learned and practiced some new coping strategies and can see their beneficial effects is psychological *gold* – for both Grade 9s and alumni. A convincing 82% of the EG students felt that they were better able to manage their stress after taking the course and learning the techniques and strategies. Kate noted that her “[confidence] definitely increased because of positive psych because of the breathing strategy and like knowing that like emotions like you just have to like feel them and then you can like go

on accept them.” Nigel thought that he wasn’t “super, super good at it yet” but that he felt “pretty confident ... and I know when I can calm myself down.” And Lily felt better, stating “Yeah, I’m not like worried to be stressed out ’cause I do know how to calm myself down, like just take a few breaths and sit down for a second and just reconnect.” When students first recognize how their body is feeling and responding, where and what the external stressors are, and how they will next act to control themselves in their situation, they gain confidence and control – thus, increase their self-efficacy. This course has helped students like Patrick, who now felt that his bad “lose-control moments” were no longer happening as a result of learning the breathwork; and Mandy, who hadn’t had a stress-related nosebleed since taking the course. For Isabel and Jade, it was the breathing that helped them calm their nerves during sporting events.

**Stress Management.** The Grade-9 students reported feeling more confident and less worried about things like tests and presentations (Malcolm, Paige), nosebleeds (Mandy), outbursts (Coleman, Patrick, Pablo), panic attacks (Jade, Denise), sports (Isabel, Alice, Simon), difficult horses (Jacqueline, Jill), feeling overwhelmed (Oaklynn, Leon, Janelle), peer drama (Dana, Tamara), language barrier (Zahara), social situations (Raisa, Willow), and needles (Lily). As Lily said, “I’m not like worried to be stressed out ’cause I do know how to calm myself down, like just take a few breaths and sit down for a second and just reconnect.” Simon said, “it helped me calm down and like reset...I wasn’t bouncing off the walls as much.” Alice mentioned “I think the [anxiety and grounding] tools we learned are the big ones...they’re *very* helpful and I’ll hang on to those for quite awhile.” When I asked FG3 how many of them now know how to calm themselves down, all of them raised their hands. They looked at each other and giggled – they came to the collective realization that they had just acquired a new superpower that was most definitely going to help them get through the rest of their high school experience!

For the alumni students, their self-confidence in managing stress was even more pronounced. When asked whether they felt more confident now in their ability to handle the stress that came their

way, all of them described knowing what to do in times of dysregulation. For this group, their go-to was the breathing practice, the same one they learned in the Grade-9 course. As mentioned, they had the extra benefit of having gone through many more situations – some smooth, many difficult – and learning to build and maintain the plane as they flew it! As Kimberly said, “I think I feel confident in my ability to take on any stressors... as long as I can take a challenge or an adversity like that and take what I know and have learned about myself and try and apply those to whatever the conflict might be.” As I was listening to Kimberly describe these feelings to me during her interview, I could hear the confidence in her voice, see it in her face, and feel it in the energy she was emitting. This second-person perspective of walking beside my student and aware of our collective interaction, enabled me to be like mediator, “steeped in the domain of experiences under examination” (Shear & Varela, 1999, p. 10).

**Stress-is-enhancing Mindset.** Stress (when tolerable and not toxic) can be beneficial for students, as it provides a challenge to which the student may “face [them] with resiliency adaptability, risk-taking and bold decision-making” (Education Act, 2023, p. 13). According to Crum and colleagues (2017), stress mindset theory involves appraising stressors as challenges and stress is considered to be enhancing, producing adaptive physiological responses and approach-oriented behaviours. In comparison, when stress is perceived as a threat, the physiological fight/flight/freeze response typically involves maladaptive behaviours, often leading to a negative cycle of increased stress and avoidant responses. Stress mindset means that the individual believes that have the resources, skills, and understanding of what the stress is for and how to manage it – in other words, self-efficacy. The fact that the EG students decreased their situational anxiety and reported better self-management and regulation indicates the development of a stress-is-enhancing mindset. Crum and colleagues (2017) found that individuals who were taught a stress-is-enhancing mindset produced higher levels of DHEA and lower levels of cortisol (higher levels of DHEA is associated with neuroprotective properties, while higher levels of cortisol correlate with neurotoxic properties (Farooqi et al., 2018). The stress-is-enhancing

mindset group also had higher positive emotions and greater cognitive flexibility than the stress-as-threat group (Crum et al., 2017).

In line with promoting the development of a stress-is-enhancing mindset, Valley School division recommends students and staff adopt a growth mindset, to “persevere when things are difficult, and understand that mistakes are a part of the learning process” (Valley School Division, 2023b, p. 5). Students need to be able to learn in a “fear-free zone,” where they can feel safe making mistakes and feel OK being uncomfortable and confused with the learning of new content and skills because they know they are supported and made to feel less-than (Ricci, 2024, p. 178). Davis and Francis (2022) described “growth-mindset” learners as ones who “continue to improve,” whereas “fixed mindset” learners “stall in their development” (p.117).

Lily summed up her new-found confidence with “Since Positive Psych, I have not had any [panic attacks] – I have learned how to control it more...I do my breathing for like five minutes and then I’m like calmed down.” Increased self-efficacy after practicing mindfulness and self-regulation can also help develop a growth mindset for tests and other high stakes assessments. In a recent study (at Northside High School), students who received a classroom-based intervention combining SEL and study skill strategies along with HF breathing techniques using the HeartMath sensor and InnerBalance app reduced feelings of test anxiety and worry, increased test-taking self-efficacy, and improved academic performance (McLeod & Boyes, 2021). Carol Dweck (2006) has recommended teachers help students understand where their challenges lie, support them as they process difficult concepts and tasks, and encourage their growth rather than judging their failures. Additionally, standardized testing and norms-based grading reinforces a fixed mindset, where students believe they are fixed on a curve calibrated to degrees of success and failure. When teachers embrace a growth mindset style of assessment, students can move beyond the “tyranny of now” towards the “power of yet,” encouraged to reflect on their progress (Dweck, 2014). In fact, one of Dweck’s favourite growth mindset gurus was esteemed

basketball coach John Wooden who, after losing a game, would gather his players and tell them, “You may be out-scored but *you will never lose*” (Wooden, n.d., as cited in Dweck, 2006, p. 200, original emphasis).

### ***Continued Use of Strategies***

#### **Vignette 16: One Student Returns**

**Friday, Mar. 8, 2024**

Denise popped her head into my Wellness Friday PP9 class today. Immediately she said, “Oh, I miss this place!” She asked if she could come and do a puzzle with me (I was in the middle of doing a puzzle with colourful cupcakes) and I told her to check with her teacher. She did – and returned a few minutes later. She came in and sat down at the puzzle table with me and sighed deeply. I watched her sink into her chair, big smile on her face as her body remembered how she felt in this class. It was absolutely incredible to see her typically anxious and tense body completely relax and melt into the chair. She immediately began chatting and putting puzzle pieces in place, full of stories to share with me. It was such a beautiful moment – I silently told myself “*This* is why I do this.”

**Evidence of Continued Practices.** When asked whether they were still using the breathing practice (even after the course was finished), 75% of the EG students reported that they were. Many wanted to tell me how they were using the breathwork, and how it was helping them control their stress and worry. Chloe described using the breathing “during confrontations” and that it would help her be “more mindful of like how other people feel about what I’m saying.” Lily mentioned that using the breathing practice has helped her sleep, whereas before the course, her constant anxiety loops would keep her awake at night. Students mentioned using the breathwork before tests and presentations, high stress sports like gymnastics and volleyball, and overall staying focused and on task in class. A recent study from Alberta involving 24 Grade 5 students who participated in five minutes of HF breathing every day for four weeks found that HRV increased significantly from baseline to post intervention, with almost 40% indicating they would continue to practice the breathing (Bearden & Oostrom, 2023).

Another study by Bothe, Grignon, and Olness (2014) found similar results, concluding that “an elementary school-based short (10 minute) daily stress management intervention can decrease symptoms of anxiety, and improve HRV, a measure of relaxation...ultimately help[ing] [the children] cope better

with everyday stressors” (p. 62). Additionally, these positive effects continued at a long-term follow up the next school year (Bothe et al., 2014). While there are several studies involving the benefits of classroom-based mindfulness practices for elementary students, longitudinal studies with adolescents are much harder to find. This is likely due to the curricular constraints that I have alluded to throughout this dissertation. In Alberta, the high school curriculum is outcome-based, with specific, detailed criteria outlined for each course. While teachers are required to teach all of the required curricular outcomes to the best of their ability, they are not required to add elements outside of the curriculum – nor are they directly provided the resources to do so. Adding a daily breathing practice would certainly be beneficial in a high school classroom, however, is often seen as “adding to teachers’ plates” and “not having enough time to cover all of the curricular outcomes as it is.” These are sentiments that I have heard from my colleagues over the years – and while I do not blame them, I do wonder how the mindfulness and SEL practices will ever find their way into high school classrooms. At any rate, the lasting effect of this breathing practice is corroborated with the alumni students who unanimously described how they have continued their breathing practice that they learned in Grade 9. Many described using it daily to stay regulated and centered, while others described the benefits of focused breathing for tests, presentations, or sporting events. Stella talked about the breathing being the “number one thing that stuck with me the most” and to “start with your body itself and with your breath” and that “I still use it to this day....it really helps me.” A few of the students, like Lindsay have continued to use the breathing to do tests. For Madeleine, she simply stated, “I have anxiety so [the breathing] really helped me a lot.” Melissa echoed this, but then adds the breathing practice as the specific way she will manage her stress as it arises, “...breathing was like the biggest thing I took out of it. It was like how to calm myself down cause breathing can work like any time, so I’m just used to it and I know what to do to calm down now.” So, in response to my earlier questions – Are there lingering positive effects from this course that can stick with these students as they move through their high school experience? – my answer is,

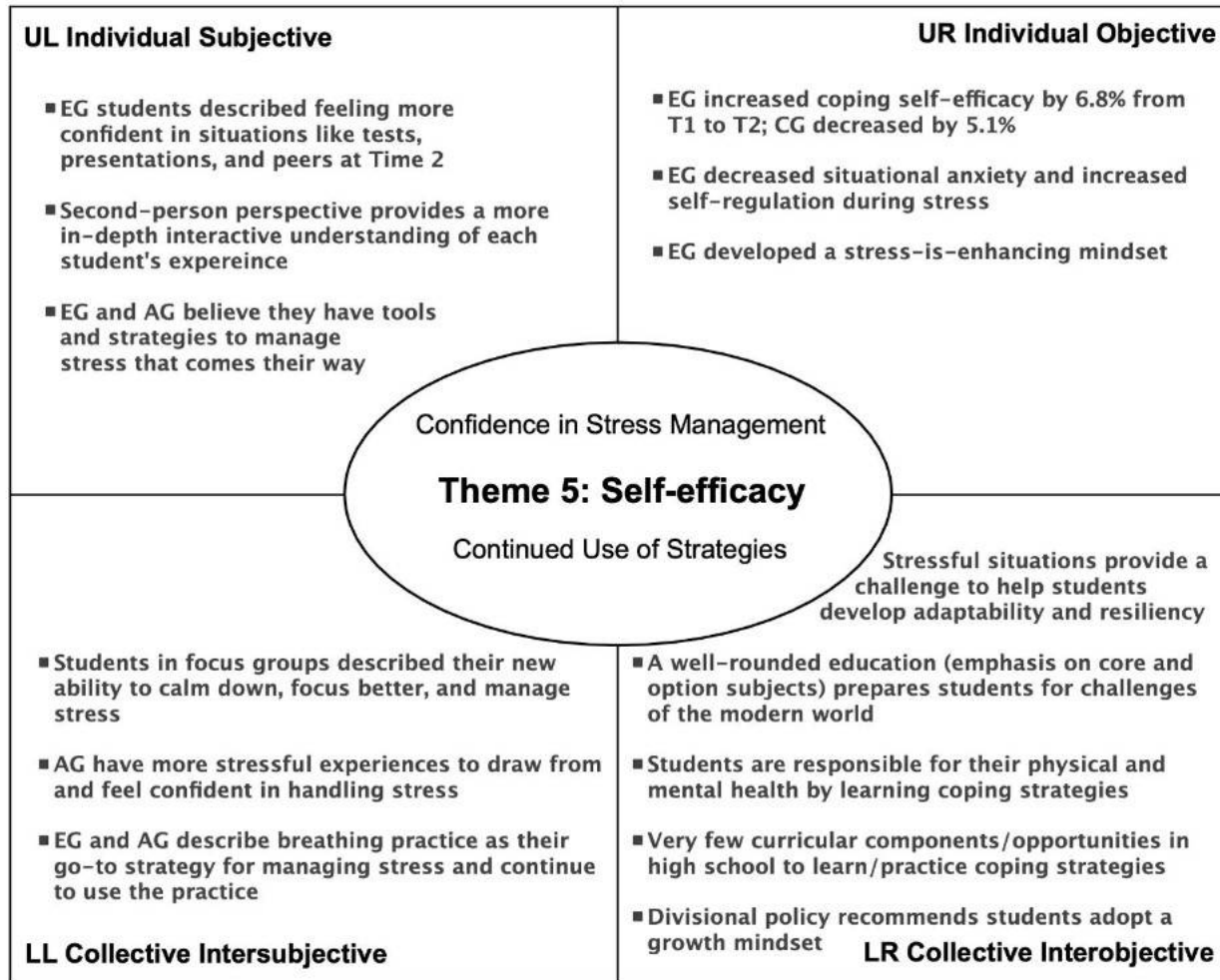


overwhelmingly, yes! At least it has been for these 24 students who took the time to let me know how impactful these regulation skills and strategies have been for them throughout their high school years.

Figure 44 illustrates the multiple perspectives that describe the coping strategies learned in the course.

**Figure 44**

*Theme 5: Self-efficacy Map*



## Theme 6: SEL in the Curriculum

According to Alberta Education (2023), "Social-emotional skills need to be taught and can improve with opportunities to practice in different contexts" (para. 2). The Education Act (2020) recommends students be given learning opportunities to "face challenges with resiliency, adaptability, risk-taking and bold decision-making" (p. 11), and the Ministerial Order on Student Learning (2024) prioritizes the development of student character, emphasizing an understanding of healthy relationships,

empathy, self-reliant, tolerant, inclusive, and connected to community. Given these strong directives from the highest level of policy making in this province, it would seem incumbent upon schools to ensure that programs with SEL components are developed and implemented. While many of the elementary schools have embraced SEL programming (including our K–4 feeder school, who offer the MindUp program to their students), high schools have largely been left out of the picture.

### ***Course Positioning***

**SEL Course Delivery Model.** Currently, the PP9 is offered as an option course, where Grade-9 students are required to take a total of six, quarter-long option classes. Students at Northside High School are offered a wide variety of options at the Grade-9 level, including band, construction, mechanics, art, drama, outdoor pursuits, creator studios, foods, leadership, sports performance, and mechatronics (Northside High School 2024 Grade-9 handbook).

The Grade 9s discussed the pros and cons of this course being an option versus a core in their focus groups. Tamara felt that, “I think it works well – like this class as an option – but it should be an option in more places – like in middle school, it would have helped me and other people I know and like in other schools as well.” Other students mentioned that it should be available for everyone, but if it was a core, then some students “might ruin it for everyone else” (Janelle). Several described students who were “forced” into certain classes and did not want to be there – often actively generating chaos in the classroom. Many of these Grade 9s actually seemed to exhibit a protective quality, where they felt that something really good had been created, but that it was potentially susceptible to destruction by disruptive students.

The alumni students were asked this question in their individual interviews, which provided more time for each to consider how this program might best be delivered. As well, they had the high school experience of having just taken quite a few cores and options to base their opinion on. Most (67%) believed it should be offered to all Grade-9 students, claiming social emotional skills are already

taught in elementary grades, “so why should you stop?” (Lila). A few talked about seeing people with anxiety and dysregulation, thus thinking that a course like this could benefit them in a classroom where it feels safe, open, and nonjudgemental. Some mentioned the benefit for test preparation and learning how to combat anxiety and worry when presenting in front of classmates. Several thought that pieces of this course (in particular, the breathing practice) could be implemented into courses such as CALM or PE. The other third (33% of the AG) felt strongly that keeping the course as an option would work best – citing possible issues with students who are “forced” into the class and do not want to be there. Anna compared her experience of being “forced” into PE class by stating, “I think forcing things on people makes them resent it. Like I *hated* gym and I was counting down the years.” Elianna and Lindsay both thought that students who *chose* it would *want* to be there and not take away from the nice, calm feeling in the room. This discrepancy between the Grade 9s and alumni provide further evidence for their red/orange, egocentric (what works best for *me*) and green/turquoise (what works best for *us*), respectively. As Grade-11 Evan said, “if one person’s not calm, you can *feel* it in the room...[and] one person’s going, this is stupid, I’m going to cause chaos with my friends the entire time instead.” On an interesting side note, Evan said that he did not initially choose the course and did not even want to be in it. He stated, “I think at the start of the course, I was *that* kid! But then I saw the actual effects of it, and I went – oh! This actually works, this is *not* stupid!” Evan also thought that this course was important because it provided opportunities to dismantle some of the lingering stereotypical “mental health is a weakness and should be not be talked about” types of narratives.

**SEL Course to Reduce Stigma.** Bringing all types of students together to discuss mental health and wellness can provide benefits for everyone, while also helping to break down the stigma of struggling with mental health or having a mental illness diagnosis. As Anna said, “You feel like it’s a safe place to learn about anxiety when we’re all talking about it together and we’re all just sort of like, nobody’s being singled out, nobody targeted – but we’re all like, if you’re feeling anxious, try this.”

Most of the alumni felt that the course should be offered as a core, where *all* Grade 9s would take it and (ideally) benefit from the emotion regulation and coping skills offered. All of the alumni students felt that the course was useful and helpful for them, and that they would recommend it to all Grade 9s.

### *School Reflections*

#### **Vignette 17: Unpacking the Pain**

**Wednesday, May 1, 2024**

Sienna, a strong academic student and very much a deep thinker, came in for her scheduled semi-structured interview with me. At first, she seemed to struggle to get the words out, had trouble remembering parts of the course that she definitely knew well and seemed quite nervous and anxious talking about stress. I sensed this immediately, and tailored her questions such that I wouldn't probe too deeply and just let her guide the conversation as she felt comfortable. At the end of the interview, she got her gift bag, left and seemed fine. After a few minutes, I went out into the hall and saw Sienna with another student and it was quite obvious she had been crying. Immediately I suspected it was from the interview – so I approached her and asked her if she was OK. She said some of the questions brought back some painful memories (of bullying which she does discuss in the interview). So, I brought the two girls into my room, got them some treats, sat Sienna in one of the comfy chairs at the back of the room while Denise made hot chocolate and toast for both of them. She calmed down right away and I had a chance to talk to her a bit more. She seemed almost fully recovered – and said that it happens all the time and not to feel bad for allowing her to bring it up. She said she typically unpacks all of it in her therapy sessions every week and said that it's always emotional for her. After several minutes, she and Denise went back to Math class. I offered further support to Sienna – by way of a counsellor or other help here at the school. She declined – said she was fine.

**Student Reflections.** While the PP9 students were extremely positive about the course, they had mixed reviews about school in general. In many cases, they described feeling unseen, disconnected, disengaged, and somewhat disillusioned. A few students commented on being bored in class, not enjoying the lessons, finding some of their other classrooms noisy and disruptive, and not feeling connected to their classroom community. The AEAMS and OurSchool survey reports mirror these comments, with significant reductions in engagement, interest, and motivation towards learning over the past several years. Students also reported feeling less safe, less school-wide respect, and less supported compared to the national averages. These trends are concerning – especially since these decreases are compared to national averages, so COVID cannot be blamed entirely for these changes. What is going on in this school and division? Again, interviews with my students point to both positive and negative experiences at school, with the positive ones centering around feeling seen, safe, and a sense of

belonging. Equally important is a sense of connection to the physical environment, the people within it, and the content being delivered. As this study has shown in multiple ways, explicit (and implicit) teaching of SEL strategies and concepts has a significant, positive effect on students' perceptions of stressful situations, ability to focus and pay attention, and feel confident to know how to calm down and regulate when feeling stressed or anxious.

**Educational Policies and Student Responses.** The current four-year plan for both the division and school focuses on three pillars:

1. Literacy/numeracy
2. Future-ready students
3. Creating inclusive, engaging learning opportunities

Housed within the third pillar is the importance of safe and caring learning environments, where students are “happy, healthy, feel they belong and are safe, and experience success in learning environments that are inclusive of every learner and celebrate diversity” (Valley School Division, 2024a, p. 8). Measurement of this outcome involves widespread division surveys (the AEAMS and OurSchool, for example), however, these only address the general, overall feelings the students have – likely resulting in them choosing less favourable responses given perhaps only a few negative experiences. My interviews and focus groups with the students provided a more in depth and nuanced understanding of their school experiences, indicating discomfort and disengagement with some spaces, climates, and staff; while feeling safe, comfortable, engaged, and enthusiastic in others. Thus, there is not a blanket low level of engagement, but instead pockets here and there. These widespread surveys certainly do not do a good enough job of finding these “pockets”, instead are geared to highlighting general trends up or down. The issue becomes where are the trouble spots and on the flip side, which programs/pedagogies are actually working in terms of meeting this goal?

**Educating the Whole Child.** The current Ministerial Order (2023) places a larger focus on the education of the whole child – from literacy to numeracy, but also open-minded, able to communicate

effectively, understand healthy relationships, empathetic and tolerant, and practice self-care such that they are being proactive when it comes to mental wellness. This is important, as it often feels like we are only engaging the left-brains of these students, ensuring we assess outcomes and products related to reading, writing, analyzing, and computing. So, while there are still large gaps in these policies, (for example, where even more emphasis could be placed on the education of the creative, artistic, self-aware and healthy individual), there appears to be increasing recognition for the education of the whole child – as opposed to the focused attention and education of only the left hemisphere of their brain. Often policy makers, develop educational programs with a tendency towards a “septic focus,” which Sir Ken Robinson (2001) defined as the idea that “leads schools to think that some subjects are more important than others” (p. 86). Robinson (2001) believed strongly in an education system that was not based on a hierarchy of subjects, but instead provided children with a well-rounded, whole-body approach. He called for a paradigm shift – a “need to revisit the economic and intellectual assumptions on which we educate our children...[and] it is time for a more fundamental revision of our expectations about what education is for” (p. 91). Maté (2024) concurred with this sentiment stating, “On the social level, the denial of arts education simply helps foster a culture of consumerism rather than of self-expression ...blocking an essential channel for emotional growth and creative outflow” (p. 218). To me, it seems that these programs, which, according to research in educational psychology, are beneficial for the development of the whole child, tend to get axed if there is no direct pathway to a career, job, or way to monetize. Maté (2024) described our current school systems as “cash-deprived” and that “[c]hildren are being altered to fit the schools, rather than schools being organized to meet the needs of children who, due to their life experience in this society, have needs and personality traits that call for greater flexibility and creativity that most institutions of learning are currently able to offer them” (p. 311). As Denise said, “it was just such a calm environment – like it wasn't like you were pressured or something – like obviously you still had to do work but it wasn't like such hardcore work like English, social, math,

or science would be.” Naomi thought this class was a “good break from normal classes,” which is troubling on many levels – including why this class is not considered “normal” and the fact the students feel they need a break from certain other classes!

### ***SEL Programming in the Curriculum***

#### **Vignette 18: Follow up with Sienna**

**Thursday, May 2, 2024**

I followed up with Sienna the next day. I had gone out and purchased journals and gel pens for the Sienna (and Denise too, since they were usually together). I went to their Math class (during my prep) and found a very angry and hostile substitute teacher essentially yelling at the class telling them they were never going to be able to find a job in the “real world” at the rate they were going! I poked my head in and told her I was looking for two students – at which point every single student put up their hand and collectively said, “Pick me!” – some were begging me to pull them out of class! I pulled Denise and Sienna – who seemed extremely relieved – and gave them their gifts. Sienna was overwhelmed with gratitude – repeatedly saying she was fine and everything was fine! The girls really appreciated the gifts and I think maybe even made their day! I felt better but was still concerned about uncovering the hurt Sienna has been experiencing, but relieved that I did what I said I would do according to my ethics guidelines – to make sure she was getting the supports she needed and then following up with her.

**SEL in the Alberta Curriculum.** A thorough investigation of the Alberta Education programs of study reveals a light touch for SEL components in Grade-9 PE and CALM. The skills that are mentioned (decision-making, resiliency, self-efficacy, coping strategies) are not operationalized into classroom practices typically, leaving many teachers wondering how to implement activities that will address these competencies. Students informed me that any instruction related to mental/emotional wellness typically involves a guest speaker, who might provide content in a one-directional, transference of knowledge to the students. As we now know, correspondence or transference of knowledge and the psychological turn brought about a shift towards and embodiment of knowledge and understanding (Davis, 2021b). Thus, it hardly seems prudent to wind back the clock and assume that knowledge is objective and simply handed to the student in a bank-model type of deposit (Freire, 2005). It seems that these mental and emotional health competencies would be just “talked about,” perhaps by guest speakers, or large-school presentations, but not put into practice. How will students develop these

competencies if they are not embodied and internalized? There needs to be time and space created within the curriculum for students to practice social and emotional learning, and this curriculum is mainly focused on the acquisition and occasional practice of physical skills. Very few courses provide mental health awareness explicitly, and as a result, teachers may feel unprepared or uncomfortable introducing these topics into their classroom. To circle back, the Ministerial Order emphasizes the need to gain understanding of mental health and reduce associated stigma, so this is an important component of teaching and learning in this province. It is just not clear how it will find its way into each student's regular school day of classes.

Evidence from my study reveals that the embodied, fully engaged, and active practice of SEL skills in the classroom, such as learning how to make decisions, effective listening and communication practice, emotion regulation through focused breathwork, and exposure to a variety of self-care and coping strategies is highly effective for the development and mastering these skills. Additionally, government documents (Ministerial Order, TQS, Alberta Education policy documents) encourage teachers to promote mental health awareness and stigma reduction through “strategies for mental health and social-emotional learning [that] are embedded in daily instruction and school-wide activities” (Government of Alberta, 2017, p. 7).

**SEL Implementation.** According to the Alberta government, “Social-emotional skills need to be taught and can improve with opportunities to practice in different contexts, and that social-emotional learning requires a long-term, whole-school approach that involves families and community partners” (Alberta Education, 2023, para. 2). While an abundance of research supports this recommendation, the next step is effective implementation. Educators need access and training with programs that use SEL evidence-informed practices, as well as specific, targeted entry points into current curricula. A large study conducted in Texas by Kresovich and colleagues (2023) evaluated emotional resilience, self-compassion, depressive symptoms, and academic achievement in students who had taken the SBWH



course compared to a control group who did not. The study team did not find any significant universal changes in target outcomes – in part, because the teachers did not have enough training with the program elements and some of the classes were too large for the embodied practice necessary for significant positive change. As well, the study was hampered by lingering COVID effects and teacher illness, resulting in only partial program fidelity. The study team concluded that there were small changes, providing a “promising glimpse into the potential of SBWH programming for empowering youth with emotional skills” (Kresovich et al., 2023, p. 13). They did recommend, however, that “[m]ore research is urgently needed under optimal conditions to assess the universal implementation of the program” (p. 13). While teacher sickness and extenuating factors certainly would disrupt some of the generated rapport with the students and subsequent continuity of the program, it would be impossible to conduct this study in a school with anything other than “optimal” conditions. However, minimizing these disruptions would likely improve the success of the program implementation.

Courses such as PE, CALM, and other options can implement activities and lessons involving emotion regulation using a simple breathing practice, decision-making, communication skills, social awareness, and self-management practices. Other courses, including the “core subjects” (math, English, social studies, science) could tie these practices into content-based lessons currently being delivered. For example, teaching emotion reading, effective communication, and collaboration skills in a debate format in a social studies class. Math class would certainly benefit from some focused breathing and other relaxation techniques, as recent research has shown that math anxiety is on the rise, and that increased math anxiety is negatively correlated with math performance (Zhang, et al., 2019). Many of my students told me that math terrified them, and that math class was one of the places where they felt the most school stress. Jill said “...in math – I'm just trying so hard to focus but it's just so difficult sometimes!” and Sienna noted that “it (brain shuts down) seems to happen a lot when I do my math tests.” You can almost hear the desperation and frustration when Jacqueline said, “Math especially because I try so hard

and I don't do good – like I don't know how to fix it?” Fortunately, these students at least know how to calm down before taking their math assessments.

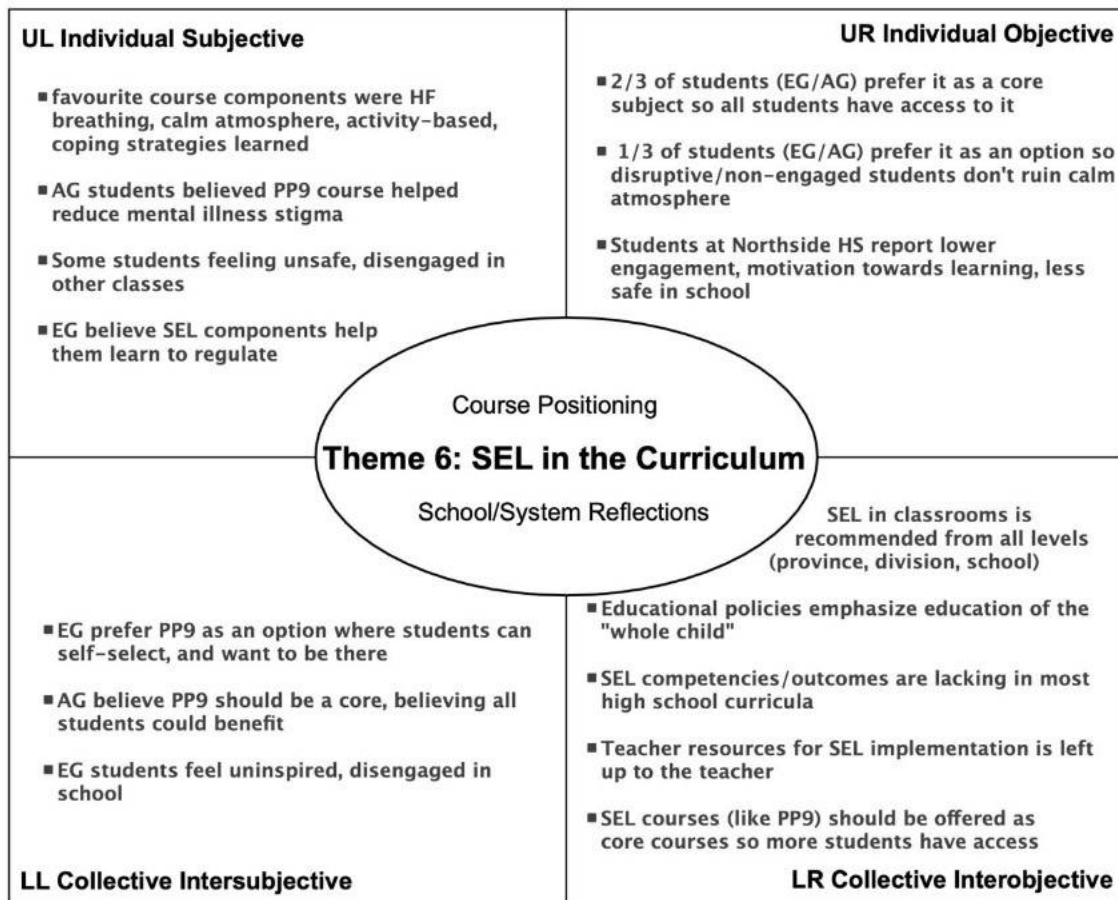
Finally, to address the earlier studies looking to pinpoint which SEL competencies were most important for effecting social-emotional change, CASEL recommends four main elements represented with the acronym SAFE: (CASEL, 2024, “SEL in the Classroom,” para. 4)

- Sequenced – connected and coordinated activities to foster skills development
- Active – interactive, activity-based learning to help students strengthen skills
- Focused – dedicated time and attention to developing self and social skills
- Explicit – direct, targeted teaching of specific social and emotional skills

**Teacher Support for Implementation.** When teachers are looking for ways to incorporate either small elements of SEL into existing programs or put together stand-alone programs, it is important to recognize that change in educational setting can be difficult, and that fidelity of implementation is essential. Teachers need support – from professional learning opportunities (workshops, conferences, online resources) to easy-to-implement classroom-ready resources, such as the ones offered in SBWH. Additionally, patience – to ride through the uncharted territory of how these new practices will land with students (and parents) is required. Often, the initial run through may not elicit direct results or seem to have made a difference. SBWH provides teachers with actionable lesson plans, background resources, and importantly, a program evaluation tool to assess student learning and acquisition of concepts, strategies, and skills. This allows teachers to reflect on the pieces that worked well while also possibly needing revisions or modifications to suit the clientele and culture of that class and school.

Goddard and Bohac Clarke (2007) recommend a two-year cycle, (with inter-related substages) with the change coming from within the system, once educators and students are empowered and engaged in the process. One practice currently being implemented in the Valley School Division is the Positive Behavioural Instructional Supports (PBIS) initiative. While many schools within the division have already generated and operationalized their school expectations, our school began this process in this school year. I immediately joined the working committee and enjoyed the process from staff and

student focus groups to survey data collection and analysis, and planning implementation. This school-wide multi-tiered system of supports and services is intended to provide positive support for staff and students. When implemented with fidelity, the school community is aware of expectations and responsible behaviours, thus improving social-emotional and academic outcomes and reducing “exclusionary and punitive discipline practices, and school staff feel more effective” (Valley School Division, 2021). Extolling the virtues of teaching the “whole child” (Ministerial Order, 2023) places the policy makers in the pluralistic, worldcentric, and inclusive green level. However, by the time we get to the boots on the ground (that is, in the classrooms), an individualistic, competitive, egocentric orange level continues to prevail. Moving the needle is much more likely to happen from the ground up, with a classroom community of learners who come together in a safe, supported, and caring environment. The paradox, however, is that without adequate supports and resources provided to schools and educators from “the top,” creating these safe and inclusive spaces from the bottom is incredibly challenging and can even be discouraging. It also places the onus on classroom teachers to “fix” all that is wrong with the education system – a task far too daunting for even the most seasoned among us! According to a recent study conducted by the ATA, 40% of teachers surveyed reported considering leaving the profession at the end of the school year, citing workload intensification, lack of inclusion supports, moral distress, culture wars, and parent issues (Gill, 2023). The CBC recently reported that more than 30 percent of new teachers are leaving the profession within the first five years (Wong, 2024). These statistics are alarming to me – someone who has a deep love for this profession and has spent all 34 years of it in the classroom with the students. The next and final chapter will address some recommendations, possibilities, and hope for the future of our students and our profession. Figure 45 outlines themes involving SEL in the curriculum.

**Figure 45***Theme 6: SEL in the Curriculum***Conclusion****Vignette 19: A Surprise Visit****Tuesday, June 4, 2024**

One day, in early June, Pablo dropped by. I knew that he had made the WHL draft as I had been following it the previous day. He was picked 69<sup>th</sup>, in the third round, which, according to our hockey academy teacher, is very impressive! He was absolutely beaming – a huge accomplishment for this kid! I thought it was interesting that he stopped by – possibly wanting to see if I knew or remembered because we had talked about the draft way back in September. He seemed happy when I engaged in a conversation with him – he told me he's going to another city next year to play AAA until he turns sixteen – and then out to Washington to play in the Bigs! I hope that even our short time together in the Fall helped him feel safe and connected – and now more confident to go out and spread his wings!

***Students Understand Their Anxiety***

Students experience stress and anxiety and describe feeling shaky, sweaty, confused, frustrated, worried, and unsure of what might happen next when stressed. Situations where Grade-9 students feel

the most stress include school assessments and peers, whereas the alumni students worry about graduating and what their future will look like. School stresses arise from the continual evaluation, competition, and ultimate sorting of students – which might seem innocuous or reasonable to an adult, but for students, is often experienced negatively, impacting their entire identity, and rife with stigma and judgement. Students who do not feel safe and supported start to worry about failure and feeling “less-than.” This can lead to fear, avoidance, and disengagement from the stressor – school. On the other hand, students who feel safe, seen, and cared for can shift towards a stress-is-enhancing lens, where challenges are met with curiosity and motivation to set goals and figure out how to accomplish them. Students in PP9 learn that anxiety is an important emotion – it gets us out of bed and makes us sit up and pay attention to things that are new and potentially threatening. Students learn that anxiety is essential to well-being and when we begin to feel anxious, it is likely that it is because we care.

### ***Students are Self-Aware***

Students learn strategies to help them self-regulate, engage with peers and teachers to help form and navigate through relationships. Skills to help with this are active listening, reading nonverbal body language, self-regulation and management, holding multiple perspectives, and learning how to manage anxiety. They learn that the breath, heart, and mind are intrinsically connected and that the best way to free up their overly stressed and confused prefrontal cortex is to breathe slowly and deeply, allowing their parasympathetic nervous system to dampen down heightened arousal, sending calming signals up from the body to the mind.

The AG exhibited a much higher internal locus of control than the Grade 9s (EG and CG), meaning they believe that they are in control of their actions and can effect change on their external environment. This is likely the result of being older and more mature, having had more experiences from which to self-reflect and see how their actions and reactions are interrelated. They described not feeling the same peer influence or pressure to conform that they felt back in Grade 9. They felt more

comfortable and confident with their own ways of handling situations, believing that they were in control of the situation as opposed to being a product of it. The EG did, however, express a new self-awareness about how to calm down and regulate when faced with stressful situations. Their experience in the PP9 course provided them with opportunities to engage in discussions with classmates, work on projects and activities, and practice their HF breathing to help them calm down and focus better.

### ***Students are Socially Aware***

The EG students had the opportunity to practice HF breathing for five minutes every day for 12 weeks. This sustained practice resulted in a significant increase in social awareness, which translated into students being more adept at reading others' (and their own) emotions, understanding how to listen and communicate with others, and how to regulate and calm down. Students described being more in tune with others, and feeling comfortable in a safe, regulated, and coherent classroom where they felt safe and supported enough to reach out and form new relationships with peers and teachers. The students recognized the importance of mutual respect and being heard, benefitting from classroom opportunities like focus groups, where they could express opinions in an equal, round-table format as opposed to a teacher top-down hierarchy.

### ***Students use Coping Strategies***

The mindfulness practice that the EG students engaged in involved paying attention in the present moment to the breath in a kind, nonjudgemental way. This simple practice, repeated every day for the duration of the course, increased the ability of the EG students to focus and pay attention. Many described being more alert, able to pay attention better, and write tests more easily in their other classes after learning and practicing mindful breathing. The EG also increased their ability to remain in the present moment and not get as drawn into past rumination or future worries. Being able to stay focused on the present moment improves overall mental wellness, and decreases tendencies towards anxiety, depression, and other negative mental states.

The breathing practice likely would not have been as effective without the ability for each student to monitor in real time their inner physiological progress. The HeartMath sensor and Inner Balance app provided the feedback needed to initially hook the students, where they genuinely enjoyed matching the breathing wheel and trying to stay in the green zone. Students increased their autonomic nervous system flexibility, measured as heart rate variability (HRV) by 23% from the beginning to the end of the course. Given that HRV is negatively correlated with age, younger students start off with higher readings and find it relatively easy to adjust their breath and calm their mind to stay in high coherence. They learn quickly and easily, enjoy the process, and rely on the biofeedback (at least initially) to provide the information about their emotional state. Eventually, they can just “feel” when they are in the green zone because of the embodied learning and memory that the body holds. When students feel agitated, frustrated, or sad, they understand how to use their breath in a relatively short amount of time to reset and bring their high energy, draining emotions down to a place where they feel calm and coherent. Even my HRV increased over the course of the year, providing some evidence that this practice is beneficial for everyone – and given that it is also a measure of cardiac health, an essential practice as we age.

### ***Students Increase Self-efficacy***

Students described feeling empowered and confident in their ability to manage stress when it came their way. They described many of the strategies learned in class as beneficial and ones they would hang on to, however they overwhelmingly described the breathing practice as the lasting tool that would help them regulate when they needed to. They spoke with confidence and surety, believing in their newly acquired practice to help them weather the “storm and stress of adolescence,” an expression coined by Stanley Hall over a hundred years ago (Casey et al., 2010). The expression remains controversial however, adolescence does remain a developmental period characterized by physical maturation, hormonal changes, emotional fluctuations, cognitive and identity changes, increasing

external stressors, and “the most common time of life for psychiatric illness to emerge” (Casey et al., 2010, p. 225). While most adolescents manage to weather these storms, there are some who struggle. Many have experienced earlier trauma, which “has the power to change the central nervous system...it alters the way we assimilate memory and leaves us highly reactive to any stimuli that mirrors, however unconsciously, the original experience” (Hübl, 2020, p.15). Because of this, some students may experience difficulty with mindfulness, where their mind and body might be where the trauma lives. One student mentioned that she did not enjoy the visualizations I did with them because her mind would wander off to places she did not want to go. She preferred to focus on the wheel and try not to think about anything. I provided a variety of options for students during their breathing practice – some preferred to close their eyes, others focused on the wheel. They were always in control of their practice and how it was unfolding for them – able to stop their session at any time. The very wise Thomas Hübl (2020) provides reassurance for courses such as this one when he wrote, “Self-healing, contemplative, and relational practices area taught, and learners become skilled very early in the power of presence. Schools become places where wisdom, not just information, is acquired and where courage, bravery, and compassion, are empowered” (p. 209).

### ***SEL in the Curriculum***

An option course that helps students regulate, teaches mindfulness, boosts positivity, social awareness, coping strategies, and focussed attention seems like the perfect offering to Grade 9s. In our school system, these students have the difficult task of navigating the physical and emotional transition from middle school to high school, all the while trying to not stand out but instead somehow fit in. PP9 provides students with strategies and tools to boost self-confidence in managing school and relationship stress. Learning how to breathe, focused on the present moment in a sustained and repeated practice, improves working memory, attention, mood, concentration, and overall well-being. When we all stumbled through COVID a few years ago, we repeatedly heard, “We’re all in this together!” While this



became old and tired, and many of us tuned it out, it is absolutely the case in education. Truth be told, I modelled my coherent classroom after learning about Chris Bache's (2008) "collective [morphic] field [which] is an exquisite network of living intelligence in which we are already suspended... evok[ing] warm feelings of togetherness, emotional content that draws people together, [and] strong personal involvement focus on a group goal involving a deeply engrossing theme" (pp. 65, 87). Bache (2008) describes this as a "recipe for good teaching" (p. 87), and I whole-heartedly agree!

The next and final chapter will provide implications for this study, along with recommendations for the province, school divisions, schools, teachers, and students. Following that will be a final reflection from my researcher journal – except this time not from my classroom experience but instead from my journey as a researcher.

## Chapter 6: Conclusions and Recommendations

### Vignette 20: Grad 2024 – Time to Practice What I Teach

Friday, June 28, 2024

On June 20, I was asked to emcee the Grad with a colleague – one week before the celebration. We were given no script, but told to write it, introducing several dignitaries and speakers, with a few bits of comic relief in between. We sat down for a few hours during exam week and crafted our speaking parts. We enlisted the help of a few grads to help us with the comedic parts and felt prepared and ready to go for the big day.

Minutes before the grads arrived into the hall (we were already up on stage, ready to begin the proceedings) I became incredibly nervous. I looked around the hall – at the 1500 faces of parents, friends, and relatives looking back at me – and began to wonder if, in fact, I would be able to do this job at all. I reached for my water bottle, but my hands were shaking so badly, I couldn't pick it up – even with both hands! I steadied myself on the podium and made a conscious decision to right this ship. As I watched the 200 gowned grads come in, music playing, quietly moving around the entire hall, weaving through the isles and into their respective seats, I felt myself start to settle. I took several deep breaths and tried to imagine myself moving into the green zone. Once, there, I calmly told myself that the grads were also nervous – worried about tripping up the stairs to receive their diploma and that my seeming anxious demeanor was certainly not going to help. I steadied myself, and in my mind, created some space between the audience and me, and felt myself go deeper into a calm, serene, state of green. I felt somewhat dissociated in that moment, but at the same time completely tuned in as I watched the grads, my students – whom I had come to know and love for the past four years – continue to march in. At that moment, I knew that I was going to be OK and felt refreshed and ready to begin.

### Context for this Study

I shared this personal vignette from the graduation ceremony as a reminder of how real the feelings of anxiety, stress, and worry truly are. For my students, just working up the courage to raise a hand in class for the first time can feel like as terrifying as speaking in front of a thousand people. The fear of looking and sounding ridiculous and subsequently failing miserably in front of people you care about is real and certainly not lost on me. I think the difference between paralyzing fear that results in avoidance and shut down, and feeling really uncomfortable and very scared but able to push through might lie in the presence of a positive morphic field – along with a built-in toolbelt stocked and ready to go. Whether it is in the classroom, or a room full of a thousand people, the human connection feels tangible. Einstein once described particles physically distanced and energetically entangled as a “spooky action at a distance.” Sheldrake (2024) described our minds as possessing both internal (brain

biochemistry) and external fields of our mind, extending beyond our bodies. We feel each other feeling us, and as such, have a profound effect on each other. What better place to ensure that this field is operating smoothly and coherently than in a classroom full of young minds!

The COVID epidemic may be mostly in the rearview, but the anxiety epidemic is now ramping up – with one in four youth experiencing mental distress and dysregulation. I believe that as humans we are wired for connection, and it seems that real human connection is getting more and more difficult to obtain. As Dan Siegel (2023) stated, “Besides the infectious disease, climate, marginalization from hegemonic cultures, mis/disinformation, attentional addiction from ever expanding wealth segregation and competition, and finally, a sixth epidemic – that of increasing isolation from each other – and the emergence of ourselves with separate identity – our “solo self” (p. 8). In order to mitigate this epidemic of lost connection, we need classroom coherence, emotion regulation, and relationship building more than ever. Competing with our pursuit of helping students rewire for connection are social media and digital enterprises, malevolently hacking our children’s focus, attention, engagement, and mental well-being (Haidt, 2024). The recent provincial cellphone ban during school is a step in the right direction and (anecdotally) seems to be showing some early promise for reconnection and focus. As parents, teachers, and humans who care about kids, we need to “end the [phone-based] experiment [and] bring our children home” (Haidt, 2024, p. 293).

Currently, the PP9 course is offered as an option, where Grade-9 students can self-select into it but also have many other options to choose from. Should it be a core class? This was a question I posed to my students – Grade 9s and alumni. The younger students thought it should remain as an option, citing worries of losing the special calm, coherent, and almost magical environment that they felt with “students who wanted to be there.” I certainly do not disagree with them – however I now know that this “magical” energy field is not *magic*, but real *energy* that sometimes takes time and patience to cultivate, particularly when the active ingredients are overly active and not quite aligned – yet. On the other hand,

the alumni felt quite strongly that this should be offered to everyone, that it is important to break down and dismantle mental health stigma, open up conversations, improve school relationships and culture, and that the benefits for each of them were powerful, positive, and long-lasting. Researchers and policy makers alike are sounding the alarm over dysregulated students and the need to cultivate inclusive, safe, and regulated learning spaces so that our students will become more motivated and engaged in their learning. I agree – however, I only see traces of these policies operationalized at the high school level, with teachers such as myself implementing regulation practices from the ground up. This is not sustainable – we are losing colleagues to frustration and burnout at an unprecedented rate. As Parker Palmer (1998) wrote, “The darkness around us *is* deep. But our great calling, opportunity, and power as educators is to shed light in dark places” (p. 13, original emphasis).

### **Implications**

One thing that surprised me initially was the sheer number of my students who had DSM-5 diagnoses. Among them were various types of anxiety disorders, ADHD, ASD, OCD, PTSD, learning difficulties, and other disruptions to their social, emotional, cognitive, and in some cases, physical well-being. Several told me they were already going to therapy, had regular therapist visits, and have family members or friends struggling with mental illness. The Grade-9 and alumni cohorts who participated in this study did have overall higher rates of anxiety compared to the general population, which turned out (for some of them) to be the reason they had chosen this course.

Another surprise was that the EG students significantly increased their ability to focus and pay attention after only 12 weeks of daily mindful breathing practice. They also became more in tune with the present moment, and less distracted by future worry or past regrets, compared to their classmates who did not receive the mindfulness practice. It seems apparent that the EG students experienced a rewiring of their brains for stronger neural connectivity for focussed attention. When students were asked to reflect on this practice and how it impacted them both in the PP9 class and beyond, many

described feeling calmer and had better control of their thoughts and emotions. Many noticed that their focus in other classes also seemed to improve and the lessons were going more smoothly for them – even math tests which terrified them prior to taking this course. The first group of Grade 9s came in with extremely low self and social awareness. They displayed very low attention spans, were extremely dysregulated, and could not sit still for more than a few seconds. They were completely addicted to their phones and could not seem to put them away – even after repeated requests and reprimands. Despite moments of feeling pure and utter despair, I persevered with my plan – to help them eventually help themselves. At the time, I would not have believed that just five minutes of mindful, HF breathing every day would actually make a difference and help these dysregulated puberty-teetering adolescents calm down, engage in a prosocial and positive way, and enjoy the experience.

Finally, I was surprised at how much the students enjoyed and looked forward to the five minutes of breathing practice. I saw it in their faces when they came to class, and they told me explicitly in their interviews how much they loved starting each class with the breathing. The alumni students remembered how it felt most of all, and many smiled and even *looked* relaxed as they recalled their practice from Grade 9. It was also incredibly heartwarming to hear that every one of them mentioned still using the regulation practices learned in that class to navigate through stress in their lives.

## **Recommendations**

### ***Recommendation 1: For the Province***

Continuing to promote the education of the “whole child” while honouring the extent to how that will be operationalized is an important consideration. It is clear there are provincial mandates recommending the consideration of important ingredients necessary for a well-rounded education, including teaching students to be open-minded, able to communicate effectively, understand healthy relationships, empathetic and tolerant, and practice self-care such that they are being proactive when it comes to mental wellness (Ministerial Order, 2023). While I agree with this whole-heartedly, I feel that

by the time the programs of study make their way to the schools, the content, knowledge, and skills, focused on numeracy and literacy are dominating over other competencies, such as those mentioned above. There is a clear emphasis on providing support for student mental health and stigma reduction, with the need for “strategies for mental health and social-emotional learning [that] are embedded in daily instruction and school-wide activities” (Government of Alberta, 2017, p. 7). Government policy also calls for “inclusive environments,” where classroom community of learners can come together in a safe, supported, and caring environment (Ministerial Order, 2023).

Bringing in classroom teachers to help develop student-centered and social-emotionally focused courses such as PP9 would provide the necessary supports to help teachers who want to implement these strategies but are unsure as to how. Resources that have been developed need to be disseminated and distributed, such that the wheel can be tweaked and retooled, but not reinvented. Option courses need to be promoted at the high school level – such that students are not told to take them “if they have room in their schedule,” but instead they are encouraged to seek out options that can open them up to new and innovative experiences. Students at this age need to be able to try on new hats, find out what they like and don’t like, and explore challenges in a safe and supportive, co-regulated system.

### ***Recommendation 2: For School Divisions***

School divisions need to continue to support and provide resources for inclusive, safe, classrooms. While funding is often tight and resources somewhat scarce, implementing sensory-minded features – such as softer lighting, bulletin boards, posters, coloured walls, healthy snacks, and a variety of classroom furniture (for example, the removal of the 19<sup>th</sup>-century student desk-chair units and replacement with tables, modular furniture, standing workstations, etc.). Feeling safe, cared for, and comfortable truly needs to start with the physical space and classroom components.

The four-year plan for Valley School Division is comprehensive – with emphasis on literacy and numeracy (a must if one is to function in the current society), future-ready students (which to me, means

they can regulate and function socially in this world), and build inclusive, engaging, learning opportunities (focused on inclusive environments to promote engagement and motivation). A continued focus on stress-is-enhancing, or growth mindset is essential. From the perspective of the teacher in the classroom, however, this actually means providing a safety net for students to “fail freely” without judgement or lasting repercussions. Currently, high stakes testing and outcome-based assessments essentially rank students and then sort them into streamlined programming. While there are some benefits to this practice, if students then feel judged or pigeonholed, they often (by default) adopt a fixed mindset, believing that they “suck at school.” The Valley School Division’s current reassessment practice, where students can redo a predetermined number of assessments in each course helps students adopt a growth mindset, giving them the opportunity for development and improvement of concepts, processing, and skills. Thus, they can escape the “tyranny of now” and flourish in the “power of yet” (Dweck, 2014).

While the division-wide student opinion surveys (AEAMS, OURSchool, etc.) are important and effectively the most practical way to access the thoughts and opinions of as many stakeholders as possible, additional data collection measures are also needed. It is evident from my study that while trends in areas of engagement, motivation, and feeling sense of safety and belonging while at school are declining throughout this division, there are areas of positivity embedded within. A more granular approach, with a smaller sample size can address specific areas of concern, as well as areas of strength and effectiveness.

A beacon of hope at the Valley School Division is the rollout of the PBIS initiative. This is an evidence-based framework whereby a team of Division “coaches” provide “at-elbow support in classrooms supporting teachers to design and implement classroom expectations, routines, structures, and responses to behaviour” (Valley School Division, 2021, para. 4). In our school, the PBIS coaches have conducted staff and student focus groups, worked closely with a small team of teachers on the

committee (I am one of them), and interviewed students to get a personal, up-close understanding of the climate, concerns, and specific culture of each school in the division. Currently, our school is entering into the second year of multiple year cycle program.

### ***Recommendation 3: For Schools***

While school-wide implementations such as PBIS can be quite effective and do have strong evidence-based backing, fidelity is imperative for effective outcomes. This school-wide program involves awareness and implementation of features that promote safe, caring, comfortable, welcoming, and inclusive environments. Thus, school-wide SEL is the goal and PBIS is the framework to bring about the necessary changes. As Bruce Perry (2017) stated, “What works best is anything that increases the quality and number of relationships in a child’s/youth’s life. People, not programs, change people.” Thus, this program will only be successful if the staff and students are included in the planning process and provided with resources to co-construct and build safe, inclusive, warm and caring classrooms. Morphic fields within inclusive spaces do not emerge out of a vacuum, instead they arise autopoetically and are co-created from the inter-connectivity of the people in that space.

To encourage and boost positivity and engagement, the school can continue to support and offer a diverse array of option courses for students – particularly the Grade 9s and 10s, who benefit immensely through the exploration of a variety of learning styles and subject areas. A continued focus on courses like PP9 (as well as other psychology courses currently offered) to deliver SEL and mental wellness components such as mindful breathing, self-awareness, social awareness, relationships and communication, decision making, and regulation.

### ***Recommendation 4: For Teachers***

These are tough times that we as teachers are currently finding ourselves in. Our students have unprecedented levels of mental, emotional, and learning disorders, all of which are finding their way into our already crowded classrooms. We often feel alone and unsupported, wondering how we can



remain in an emotionally exhausting and taxing career. Teachers, there is hope – but we still have a long way to go. We are currently teaching a cohort of students who are craving human connection. They have just spent a few of their childhood years isolated from their friends and activities as the world lived in fear from the global pandemic. And now, they are being pulled into cyberspace, rewarding them constantly for their distractibility and compromising their relationships with real people in physical spaces. We need to meet our students where they are and connect with their hearts. We need to see them, listen to them, ask them what they are thinking and how they are feeling – and support them where possible. They have incredible stories to tell, we just need to listen.

Take some time to construct a safe, warm space to teach and learn in – provide as many soft edges (blankets, pillows, etc.), scents, live things (plants, fish are easy enough), natural light (if possible), and keep the noise level low and calm. Encourage students to be brave while taking care to ensure personal and group safety by co-constructing classroom guidelines, focused primarily on mutual respect and care for all. As teachers, we can model positive relationships and fair treatment of everyone in the room. We need to remind ourselves to care for our students fairly and benevolently – not as equals, but as autonomous self-determining individuals with thoughts, feelings, and beliefs that might be different from your own.

Where possible, find ways to integrate SEL components into academic courses. For example, in group work, focus groups, think-pair-shares, journal reflections, and occasional student check ins. Sometimes a casual “hi” in the hallway can be all that is needed that day – for your student and for yourself. Encourage your students to take safe risks – with the safety net and scaffolding that you have constructed and are holding for them. Help them set goals and work towards them – there is nothing more rewarding than seeing the “lightbulb” go off, followed by the massive grin and feeling of relief, that they now know they are on the right track and are going to be OK. Remember to connect with your community of colleagues as well. Share resources, ideas, tips and tricks with other staff members. It is

not a competition – it is a collaboration and interwoven community of supportive and caring professionals. As teachers, we are all in this together and having each other’s backs is the glue to keep the community strong and coherent. Finally, enjoy the ride! Like anything, it is what you make it – and when made with love, dedication, and passion, the rewards will be worth every second.

### ***Recommendation 5: For Students***

To my dear students – you have come a long way. You arrived on scene dysregulated, unfocussed, stressed, and worried about high school and making a good impression. You learned that just five minutes of quiet, deep and focused breathing every day is all you need to reset your confused and chaotic mind and body. You now know that those few minutes every day can rewire your brain so that you can focus and pay attention better, feel calmer and relaxed, be a more supportive friend and family member, and believe you can handle whatever stress comes your way! Heart focused breathing can be practiced anywhere, anytime, anyplace. From first thing in the morning to get your day off to a good start, to finding little pockets throughout the day to reset and refocus, and then at the end of the day to help you unwind, decompress, and help with your sleep.

Try to take as many options in your high school career as you can fit into your schedule. Try things you don’t think you’ll be good at – take a risk and if you “fail,” get back up and try again! Remember to speak up and challenge those around you. You matter, you have a voice and an opinion – let others know (always with kindness) what you think and how you feel. Remember others may think and feel differently from you – and that’s OK. Listen and learn from them and appreciate their differences instead of dismissing them. Take risks socially – put yourself out there and make some new friends. Embrace those group projects – they can be fun and you never know which relationships become lasting ones. As Maddie said, “I think that was the lovely thing about positive psych! Especially since we were so young and we just got into this school, right? Like it just started connections – like I’ve been friends with Hannah, and other people in that class, since Grade 9! And I’ve stayed friends with

them throughout because that was relationship was created.” Finally, have fun! High school is an incredible time in your life to truly explore unknown territory with the built-in safety nets. Try on different “hats” to see what you like – look for adventure and then grab hold and enjoy the ride!

**Vignette 21: Later that day...**

**Friday, June 28, 2024**

Three hours later – the ceremony was over, and our speeches could not have gone better – they were timed to perfection, jokes landed where they needed to, and many offered kudos and compliments afterwards. Hübl (2020) describes the parallel experience of fear in the emotional body simultaneously resulting in contraction in the physical body. I felt this contraction initially, a pulling inward, shrinking away, getting smaller. As I rechanneled my physical body through the breath, I was able to pull my emotional self out from contraction, and into expansion – allowing me to reach out to the audience to find connection and coherence. As Hübl (2020) stated, “A facilitator’s capacity to feel, embrace, and hold what is present in the space is both activating and grounding, a direct catalyst for the process that will occur in the room” (p. 127). And whether the room you are facilitating is a small focus group, such as the ones I led with my students, or a graduation ceremony with 1500 audience members, group presence and coherence was achieved once I had regulated my own nervous system.

**Reflections**

My doctoral journey actually began seven years ago – at a chance parent-teacher conference with my dear friend Catherine Burdett who was a HeartMath facilitator at the time. She came in to discuss her daughter’s extreme test anxiety which she felt was the reason her daughter was struggling with her academic courses, not the content or concepts. While I had been studying and teaching science for 25 years, it was really the first time I had ever stopped to consider what this implied. She gave me a quick summary of how the sensor and app worked to calm an anxious and essentially dysfunctional brain from the bottom up. She told me she had been using mindfulness techniques with biofeedback to calm down stressed-out CEOs of large companies – and they were absolutely loving it! I was still not entirely convinced – it seemed too easy and almost made too much sense – why didn’t everyone know about this? I later spent some time researching the science behind the HeartMath instruments, and the physiology of the body’s stress response. I conducted a study in 2019 for my MEd degree, investigating

the effectiveness of HeartMath biofeedback and SEL strategies infused into a psychology course to help students reduce test anxiety and increase academic performance. The study was published in 2021 with Mike Boyes, and while I was excited about my findings, my research journey was just getting started. My (then) principal, Anne Kromm, (to whom I am indebted to for her vision and belief in my work) was intrigued by the study and wanted to develop a similar course for Grade 9s – to help them transition and regulate coming into high school.

This was the fall of 2020, so of course, COVID threw a wrench into the year. Still, my first cohort of Grade-9 positive psych students (the alumni students in this study who were in Grade 12) took the ride along with me as I played with a variety of SEL course components to see which ones would best help my students. It was a success right from the start – the students embraced the chance to learn and practice heart focused breathing. The parents were on board – who wouldn't love a program specifically designed to help dysregulated teenagers calm down and treat others with kindness? After the first year of the program (and plenty of COVID disruptions), the researcher bug began to bite once again, and I began my doctoral journey with the most incredible team of professors and doctoral colleagues I could have ever dreamed of. I was incredibly fortunate to be chosen by Veronika Bohac Clarke, the most incredible mentor I have ever had, and someone I truly admire as an esteemed colleague and dear friend. My journey is almost over. It began as an attempt to find a way to support my struggling students and while the data collection, analysis, and interpretation might be ending, my support and love for my students will endure. I owe all of this to them – you inspire me every single day.

## **Conclusion**

I began this study as a call to action, watching each new cohort of students come into high school with increasing rates of anxiety, emotional dysregulation, and decreasing ability to focus and pay attention. At the same time, there seemed to be no strategies or tools offered to these students to help manage their stress – until they became disordered and diagnosed, at which point they would need to be

pulled from school and treated. I began to wonder if students could learn how to manage their social, emotional, and mental well-being if they were taught strategies and skills and then had the opportunity to practice and master them. From here, the Positive Psychology 9 course was born, complete with a daily mindfulness breathing practice using the HeartMath sensor and app for biofeedback, along with a smorgasbord of practical, and ready-to-use coping strategies. The students quickly adopted these tools and embraced the HF breathing practice, helping to co-create a calm and coherent classroom, where students felt cared for and connected. Once safe and secure, students could then reach out and form friendships with each other and with me, enriching the morphic field of the classroom even further. At the end of the term, the students left the class feeling more focused, calm and had a better sense of self- and social-awareness. They had developed a confidence in their ability to self-regulate using HF breathing, and many continued to use the breathing practice to stay calm during stressful situations like tests, presentations, sports competitions, performances, and sleep. Long term benefits of this course were reinforced from the individual and collective subjective experiences of the alumni students, who have continued the breathing practice throughout their high school career. They were able to use the temporal space to reflect on the difficulties of being in Grade 9 but having a course with SEL practices to help build coping strategies to navigate through the stress. While the alumni students believed it should be a core course where every high school student should take it, for now at least, I would recommend that it be offered in every high school, but as an option for students to self-select into.

Anxiety is a state of mind, focussed on the stress and worry of future events with uncertain outcomes. Students do have a lot to worry about these days, along with increasing hormones, mood swings, and relationship instabilities. The anxiety that arises from these uncertainties becomes problematic for these students when they feel overwhelmed by it and lack the tools and strategies to manage it. Teaching our students what anxiety feels like, where it comes from, and how to calm down their nervous system from the breath to the heart to the brain gives them the confidence and control they

need to reign in their wild horses and enjoy the ride. This research journey has been an incredible ride for me – but my true love is in the classroom with my students, where I will continue to shine the light from my heart and connect with my soul.

## References

- Alberta Education (2020). *Physical Education K–Grade 12 (2000)*.  
<https://www.learnalberta.ca/ProgramOfStudy.aspx?lang=en&ProgramId=328056#>
- Alberta Education (2020). *Teaching quality standard*. <https://bit.ly/4aoL4ml>
- Alberta Education (2023). *Social emotional learning*. <https://www.alberta.ca/social-emotional-learning.aspx>
- Alberta Education (2024). *Assurance and accountability in Alberta’s K to 12 education system*.  
<https://www.alberta.ca/accountability-education-system.aspx>
- Alberta Government (2017). Working together to support mental health in Alberta schools.  
[https://education.alberta.ca/media/3576206/working\\_together\\_to\\_support\\_mental\\_health.pdf](https://education.alberta.ca/media/3576206/working_together_to_support_mental_health.pdf)
- Alberta Health Services (2016). Adverse childhood experiences (ace)/trauma informed resource guide.  
<https://hmhc.ca/brochures/ACE%20TIC%20Resource%20Community%20Guide%20Final%202016.pdf>
- Alberta Learning (2002). *Health and Life Skills Kindergarten to Grade 9*.  
<https://education.alberta.ca/media/160196/health.pdf>
- Alvord, M., & Halfond, R. (2019). How to help children and teens manage their stress.  
<https://www.apa.org/topics/child-development/stress>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). [doi.org/10.1176/appi.books.9780890425596](https://doi.org/10.1176/appi.books.9780890425596)
- Angelou, M. (n.d.). <https://www.goodreads.com/quotes/5934>
- Aoki, T. T. (2004). Teaching as In-dwelling between two curriculum worlds. In W. F. Pinar and R. L. Irwin (Eds.). *Curriculum in a new key: The collected works of Ted T. Aoki* (pp. 159–167). Lawrence Erlbaum Associates.

- Armstrong, T. (2020). *The stages of life according to Jean Gebser*. American Institute for Learning and Human Development. <https://www.institute4learning.com/2020/02/12/the-stages-of-life-according-to-jean-gebser/>
- Auger, R. (2011). *The school counselor's mental health sourcebook: Strategies to help students succeed*. Corwin Press.
- Bache, C. M. (2008). *The living classroom: Teaching and collective consciousness*. SUNY Press.
- Badley, G. (2003). The crisis in educational research: a pragmatic approach. *European Educational Research Journal*, 2(2), 296-308. DOI: [10.2304/eeerj.2003.2.2.7](https://doi.org/10.2304/eeerj.2003.2.2.7)
- Bailey, A. (1999). Beyond the fringe: William James on the transitional parts of the stream of consciousness. *Journal of Consciousness Studies*, 6(2-3), 141–153.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37(2), 122–147. DOI: [10.1037/0003-066X.37.2.122](https://doi.org/10.1037/0003-066X.37.2.122)
- Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, 2, 21–41. DOI: [10.1111/1467-839X.00024](https://doi.org/10.1111/1467-839X.00024)
- Barad, K. (2007). *Meeting the universe halfway: Quantum Physics and the entanglement of matter and meaning*. Duke University Press.
- Bartlett, Wright, T., Olarinde, T., Holmes, T., Beamon, E. R., & Wallace, D. (2017). Schools as Sites for Recruiting Participants and Implementing Research. *Journal of Community Health Nursing*, 34(2), 80–88. DOI: [10.1080/07370016.2017.1304146](https://doi.org/10.1080/07370016.2017.1304146)
- Bearden, A. G., van Oostrom, S., & Brown, S. B. (2023). The effects of HeartMath Heart Lock-In on elementary students' HRV and self-reported emotion regulation skills. *Psychology in the Schools*, 60(12), 5245–5263. DOI: [10.1002/pits.23025](https://doi.org/10.1002/pits.23025)
- Bloomberg, L.D. (2023). *Completing your qualitative dissertation: A road map from beginning to end* (5<sup>th</sup> edn.). Sage.



- Bohac Clarke, V. (Ed.). (2019). *Integral Theory and Transdisciplinary Action Research in Education*. IGI Global.
- Boler, M. (2018). Dilemmas of Conceptualizing Affect and Emotion: Towards a critical interdisciplinary methodology. In K. Gallagher (Ed.), *The methodological dilemma revisited* (pp. 192–212). Routledge.
- Bothe, D. A., Grignon, J. B., & Olness, K. N. (2014). The effects of a stress management intervention in elementary school children. *Journal of Developmental & Behavioral Pediatrics*, 35(1), 62–67. DOI: [10.1097/DBP.0000000000000016](https://doi.org/10.1097/DBP.0000000000000016)
- Boud, D. (2001). Using journal writing to enhance reflective practice. *New Directions for Adult and Continuing Education*, 2001(90), 9–18. DOI: [10.1002/ace.16](https://doi.org/10.1002/ace.16)
- Bowen, G.A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, (9)2. 27–40. DOI: [10.3316/QRJ0902027](https://doi.org/10.3316/QRJ0902027)
- Bowie, H. (2020). Developmental levels | The practical utopian. <https://practopian.org/blog/hbowie/developmental-levels.html>
- Bradley, R. T., McCraty, R., Atkinson, M., Tomasino, D., Daugherty, A., & Arguelles, L. (2010). Emotion self-regulation, psychophysiological coherence, and test anxiety: Results from an experiment using electrophysiological measures. *Applied Psychophysiology and Biofeedback*, 35(4), 261–283. DOI: [10.1007/s10484-010-9134-x](https://doi.org/10.1007/s10484-010-9134-x)
- Braun, V., & Clarke, V. (2012). *Thematic analysis*. American Psychological Association.
- Breuer, F., & Roth, W.-M. (2003). Subjectivity and reflexivity in the social sciences: Epistemic windows and methodological consequences. *Subjectivity and Reflexivity in Qualitative Research*, 4(2). DOI: [10.17169/fqs-4.2.698](https://doi.org/10.17169/fqs-4.2.698)
- Brewer, J. (2022). *Unwinding anxiety: New science shows how to break the cycles of worry and fear to heal your mind*. Penguin.

Brewer, J. A., Worhunsky, P. D., Gray, J. R., Tang, Y. Y., Weber, J., & Kober, H. (2011).

Meditation experience is associated with differences in default mode network activity and connectivity. *Proceedings of the National Academy of Sciences*, 108(50), 20254–20259.

DOI: 10.1073/pnas.1112029108

Brickhouse, T. C., & Smith, N. D. (2015). Socrates on the Emotions. *Plato Journal*, 15, 9–28.

[DOI: 10.14195/2183-4105\\_15\\_1](https://doi.org/10.14195/2183-4105_15_1)

Britton, W., Lepp, N., Niles, H., Rocha, T., Fisher, N., & Gold, J. A (2014). A randomized controlled pilot trial of classroom-based mindfulness meditation compared to an active control condition in sixth-grade children. *Journal of School Psychology*. 52(3), pp. 263–278.

DOI: 10.1016/j.jsp.2014.03.002

Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: validation of an adapted Mindful Attention Awareness Scale in adolescent normative and psychiatric populations. *Psychological Assessment*, 23(4), 1023.

[DOI: 10.1037/a0021338](https://doi.org/10.1037/a0021338)

Cairncross, M., & Miller, C. J. (2020). The effectiveness of mindfulness-based therapies for ADHD: A meta-analytic review. *Journal of Attention Disorders*, 24(5), 627–643.

DOI: 10.1177/1087054715625301

CAMH (2021). *Inspiring hope through science & research*. Centre for Addiction and Mental Health.

CASEL (2017). *Sample teaching activities to support core competencies of social and emotional learning*. <https://casel.s3.us-east-2.amazonaws.com/Sample-Teaching-Activities-to-Support-Core-Competencies.pdf>

CASEL (2021). What is SEL? <https://casel.org/what-is-sel/>

CASEL (2022). Our History. <https://casel.org/about-us/our-history/#founding>

CASEL (2024a). CASEL Landing page. <https://casel.org/>

- CASEL (2024b). SEL in the School. <https://casel.org/systemic-implementation/sel-in-the-school/>
- Casey, B.J. et al. (2010). The storm and stress of adolescence: insights from human imaging and mouse genetics. *Developmental Psychobiology*, 52(3):225-35. DOI: [10.1002/dev.20447](https://doi.org/10.1002/dev.20447).
- Chalmers, D. J. (1995). Facing up to the problem of consciousness. *Journal of consciousness studies*, 2(3), 200–219. DOI: [10.1093/acprof:oso/9780195311105.003.0001](https://doi.org/10.1093/acprof:oso/9780195311105.003.0001)
- Chand, G. B., Wu, J., Hajjar, I., & Qiu, D. (2017). Interactions of the salience network and its subsystems with the default-mode and the central-executive networks in normal aging and mild cognitive impairment. *Brain connectivity*, 7(7), 401–412. DOI: [10.1089/brain.2017.0509](https://doi.org/10.1089/brain.2017.0509)
- Charland, L. C. (2005). The heat of emotion: Valence and the demarcation problem. *Journal of Consciousness Studies*, 12(8–9), 82–102.
- Christodoulou, G., Salami, N., & Black, D. S. (2020). The utility of heart rate variability in mindfulness research. *Mindfulness*, 11(3), 554-570. DOI: [10.1007/s12671-019-01296-3](https://doi.org/10.1007/s12671-019-01296-3)
- Cipriano, C., Strambler, M. J., Naples, L. H., Ha, C., Kirk, M., Wood, M., ... & Durlak, J. (2023). The state of evidence for social and emotional learning: A contemporary meta-analysis of universal school-based SEL interventions. *Child Development*, 94(5), 1181–1204.
- CMHA (2022). *Mental illnesses in children and youth*. <https://cmha.bc.ca/documents/mental-illnesses-in-children-and-youth-2/>
- Cohen, J. (1988). Set correlation and contingency tables. *Applied psychological measurement*, 12(4), 425–434. DOI: [10.1177/014662168801200410](https://doi.org/10.1177/014662168801200410)
- Cohen, L., Marion, L. & Morrison, K. (2018). *Research methods in education*, (8<sup>th</sup> edn.). Routledge.
- Colbourne, R., Colbourne, H., Dobell, D., Fehres, C., MacFadyen, D., Mason, A., Thomson, G., & Venter, A. (2007). *Inquiry into biology*. McGraw-Hill Ryerson.

- Crane, S., & Broome, M. E. (2017). Understanding ethical issues of research participation from the perspective of participating children and adolescents: a systematic review. *Worldviews on Evidence-Based Nursing*, 14(3), 200–209. DOI: [10.1111/wvn.12209](https://doi.org/10.1111/wvn.12209)
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.
- Crum, A. J., Akinola, M., Martin, A., & Fath, S. (2017). The role of stress mindset in shaping cognitive, emotional, and physiological responses to challenging and threatening stress. *Anxiety, Stress, & Coping*, 30(4), 379–395. DOI: [10.1080/10615806.2016.1275585](https://doi.org/10.1080/10615806.2016.1275585)
- Damasio, A. (2019). *The strange order of things: Life, feeling, and the making of cultures*. Vintage.
- Damasio, A. (2021). *Feeling & knowing: Making minds conscious*. Pantheon.
- Dana, D. (2021). *Anchored: How to befriend your nervous system using polyvagal theory*. Sounds True.
- Darwin, C. (1872). The expression of emotions in animals and man. *London: Murray*, 11, 1872.
- Davis, B. (2019). Methodological pluralism and graduate student research in education. *Integral Theory and Transdisciplinary Action Research in Education*. Bohac Clarke, V. (Ed.). IGI Global.
- Davis, B. (2021a). EDER 711 – Week 8 Lecture Notes: The Psychological Turn, Part 2.
- Davis, B. (2021b). EDER 711 – Week 11 Lecture Notes: The EcoComplexity Turn, Part 1.
- David, B. & Francis, K. (2022). *Engaging minds: Evolving learning and teaching* (4<sup>th</sup> edn.). Routledge.
- Davis, N.T. & Callihan, L.P. (2013). Integral methodological pluralism in science education research: Valuing multiple perspectives. *Cultural Studies of Science Education*, (8), 505–516. DOI: [10.1007/s11422-012-9480-5](https://doi.org/10.1007/s11422-012-9480-5)
- den Heyer, K. (2018). A thinking education: Who might we become through our study together? Next acts: Educational impasse, events, and a one-legged magpie, (pp. 8-13). The Alberta Teachers' Association. <https://bit.ly/3yv2L4v>

- Dewey, J. (1929). My pedagogic creed. *Journal of the National Education Association*, 18(9), 291–295.  
[DOI: 10.1177/002205742601402107](https://doi.org/10.1177/002205742601402107)
- Dewey, J. (1938). *Experience & education*. Touchstone.
- Dewey, J. (1944). *Democracy and education*. New York: The Free Press.
- Dixon, M. L., Thiruchselvam, R., Todd, R., & Christoff, K. (2017). Emotion and the prefrontal cortex: An integrative review. *Psychological Bulletin*, 143(10), 1033. [DOI: 10.1037/bul0000096](https://doi.org/10.1037/bul0000096)
- Dodge, K. A. (1991). Emotion and social information processing. *The development of emotion regulation and dysregulation*, 1, 159–181. [DOI: 10.1017/CBO9780511663963.009](https://doi.org/10.1017/CBO9780511663963.009)
- Dunbar, R. I. (2009). The social brain hypothesis and its implications for social evolution. *Annals of Human Biology*, 36(5), 562–572. [DOI: 10.1080/03014460902960289](https://doi.org/10.1080/03014460902960289)
- Dunlop, K., Talishinsky, A., & Liston, C. (2019). Intrinsic brain network biomarkers of antidepressant response: a review. *Current Psychiatry Reports*, 21(9), 1–11. [DOI: 10.1007/s11920-019-1072-6](https://doi.org/10.1007/s11920-019-1072-6)
- Durlak, J., Weissberg, R., Dymnicki, A., Taylor, R., & Schellinger, K. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82:1, 405–432. [doi: 10.1111/j.1467-8624.2010.01564.x](https://doi.org/10.1111/j.1467-8624.2010.01564.x)
- Durlak, J. A. (Ed.). (2015). *Handbook of social and emotional learning: Research and practice*. Guilford.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House.
- Dweck, C.S. (2014). *The power of yet*. TEDxNorrköping. [https://www.youtube.com/watch?v=J-swZaKN2Ic&ab\\_channel=TEDxTalks](https://www.youtube.com/watch?v=J-swZaKN2Ic&ab_channel=TEDxTalks)
- Eddy, S. (2010). Effect size for analysis of variance (ANOVA).  
<https://psychohawks.wordpress.com/2010/10/31/effect-size-for-analysis-of-variables-anova/>

- Edwards, S. D. (2019). Empirical and heuristic phenomenological case study of the HeartMath Global Coherence Initiative. *International Journal of Environmental Research and Public Health*, 16(7), 1245. DOI: 10.3390/ijerph16071245
- Eisner, E. W. (2004). Educational objectives—Help of hindrance? In D. J. Flinders & S. J. Thornton (Eds.), *Curriculum Studies Reader* (2<sup>nd</sup> edn.) (pp. 85–92). Routledge.
- Ekman, P. (1999). Basic emotions. In T. Dalgleish & M. J. Power (Eds.), *Handbook of cognition and emotion*, (pp. 45–60). Wiley.
- Ellis, W. E., Dumas, T. M., & Forbes, L. M. (2020). Physically isolated but socially connected: Psychological adjustment and stress among adolescents during the initial COVID-19 crisis. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 52(3), 177. DOI: [10.1037/cbs0000215](https://doi.org/10.1037/cbs0000215)
- Esbjörn-Hargens, S. (2009). An overview of integral theory. [http://integraleuropeanconference.com/wp-content/uploads/2016/12/IT\\_3-2-2009.pdf](http://integraleuropeanconference.com/wp-content/uploads/2016/12/IT_3-2-2009.pdf)
- Esbjörn-Hargens, S., & Foucaultii, M. (2007). Integral teacher, integral students, integral classroom: Applying integral theory to education. *AQAL: Journal of Integral Theory and Practice*, 2(2), 72–103.
- Esbjörn-Hargens, S., Reams, J., & Gunnlaugson, O. (Eds.). (2010). *Integral education: New directions for higher learning*. SUNY Press.
- Evans, D., Borriello, G. A., & Field, A. P. (2018). A review of the academic and psychological impact of the transition to secondary education. *Frontiers in Psychology*, 9, 1482. DOI: 10.3389/fpsyg.2018.01482
- Farooqi, N. A., Scotti, M., Lew, J. M., Botteron, K. N., Karama, S., McCracken, J. T., & Nguyen, T. V. (2018). Role of DHEA and cortisol in prefrontal-amygdalar development and working memory. *Psychoneuroendocrinology*, 98, 86–94. DOI: [10.1016/j.psyneuen.2018.08.010](https://doi.org/10.1016/j.psyneuen.2018.08.010)

- Feuerborn, L. L., & Gueldner, B. (2019). Mindfulness and social-emotional competencies: Proposing connections through a review of the research. *Mindfulness*, 10(9), 1707–1720.  
[DOI: 10.1007/s12671-019-01101-1](https://doi.org/10.1007/s12671-019-01101-1)
- First, M. B. (2013). *DSM-5 handbook of differential diagnosis*. American Psychiatric Publication
- Flores, J., Caqueo-Urizar, A., Ramirez, C., Arancio, G., & Cofré, J. P. (2020). Locus of control, self-control, and gender as predictors of internalizing and externalizing problems in children and adolescents in Northern Chile. *Frontiers in Psychology*, 11. [DOI: 10.3389/fpsyg.2020.02015](https://doi.org/10.3389/fpsyg.2020.02015)
- Fraser Institute (2019). *Report card on Alberta's high schools 2019*. (Eds. P. Cowley & A. MacLeod).  
<https://www.fraserinstitute.org/sites/default/files/report-card-on-alberta-high-schools-2019.pdf>
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical transactions of the royal society of London. Series B: Biological Sciences*, 359(1449), 1367-1377. [DOI: 10.1098/rstb.2004.1512](https://doi.org/10.1098/rstb.2004.1512)
- Freire, P. (2005). *Pedagogy of the oppressed*. New York: Continuum.
- Gerson, L. (1987). A note on tripartition and immortality in Plato. *Apeiron*, 20(1), 81–96.  
[DOI: 10.1515/APEIRON.1987.20.1.81](https://doi.org/10.1515/APEIRON.1987.20.1.81)
- Gill, K. (2023). Workload issues prompting teachers to quit. *The Alberta Teachers Association*.  
<https://teachers.ab.ca/news/workload-issues-prompting-teachers-quit>
- Giroux, H. (2020). *On critical pedagogy* (2<sup>nd</sup> edn.). New York: Bloomsbury.
- Goddard, T. & Bohac Clarke, V. (2007). The cycles of school change: Toward an integrated developmental model. *Journal of Educational Thought*, 41(2), 105–123. <https://bit.ly/3Md3SMO>
- Godoy, L. D., Rossignoli, M. T., Delfino-Pereira, P., Garcia-Cairasco, N., & de Lima Umeoka, E. H. (2018). A comprehensive overview on stress neurobiology: basic concepts and clinical implications. *Frontiers in Behavioral Neuroscience*, 12, 127. DOI: 10.3389/fnbeh.2018.00127

Goelitz, J., & Lloyd, T. (2012). Using emwave® technology for children with ADHD: An evidence-based intervention. *Institute of HeartMath*.

<https://www.heartmath.org/assets/uploads/2015/01/emwave-technology-for-children-with-adhd.pdf>

Goleman, D. (1995). *Emotional intelligence*. Bantam Books.

Goleman, D. (2008). The secret to success. *Education Digest*, 74(4). p. 8–9.

Goleman, D., & Davidson, R. J. (2018). *Altered traits: Science reveals how meditation changes your mind, brain, and body*. Penguin.

Goodman, M. S., Madni, L. A., & Semple, R. J. (2017). Measuring mindfulness in youth: Review of current assessments, challenges, and future directions. *Mindfulness*, 8, 1409–1420. DOI: [10.1007/s12671-017-0719-9](https://doi.org/10.1007/s12671-017-0719-9)

Government of Alberta (2015). *Creating welcoming, caring, respectful and safe learning environments*. <https://bit.ly/3Y0eDIe>

Government of Alberta (2017). *Working together to support mental health in Alberta schools*. <https://bit.ly/4bJ0vq2>

Government of Alberta (2020). *Education Act*. Revised Statutes of Alberta 2020, Chapter E-.03. Edmonton, AB: Queen’s Printer. <https://www.albertaschoolcouncils.ca/public/download/files/98229>

Government of Alberta (2021a). *Building social-emotional competencies: Choosing instructional resources*. <https://bit.ly/40suwFH>

Government of Alberta (2021b). *Relationships matter*. <https://bit.ly/3xIEeee>

Government of Alberta (2023). *Alberta Education Assurance Measure Results*. <https://bit.ly/3yfLe1R>

Government of Alberta (2024a). *Ministerial Order on Student Learning*. [https://kings-printer.alberta.ca/Documents/MinOrders/2024/Education/2024\\_005\\_Education.pdf](https://kings-printer.alberta.ca/Documents/MinOrders/2024/Education/2024_005_Education.pdf)



Government of Alberta (2024b). *Social-emotional learning*.

Government of Alberta (2024c). *The Guiding Framework for the Design and Development of Kindergarten to Grade 12 Curriculum*. <https://bit.ly/45WFY03>

Gross, C. G. (1995). Aristotle on the brain. *The Neuroscientist*, 1(4), 245–250.

DOI: 10.1177/107385849500100408

Gross, J. J. (Ed.). (2013). *Handbook of emotion regulation*. Guilford.

Haidt, J. (2024). *The anxious generation: How the great rewiring of childhood is causing an epidemic of mental illness*. Random House.

Hakan, T. (2022). Philosophy of science and black swan. *Childs Nervous System* 38, 1655–1657.

DOI: [10.1007/s00381-020-05009-3](https://doi.org/10.1007/s00381-020-05009-3)

Hari, J. (2022). *Stolen focus*. Crown.

Harrington, T. (2016). The Significance of a Bipartite/Tripartite Division of the Psyche. *The Equilibrium*, 2(1), 13–16. DOI: [10.5070/Q22141229](https://doi.org/10.5070/Q22141229)

Hattie, J. (2018). Hattie effect size list – 256 influences related to achievement.

<https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/>

HeartMath (2018). *Welcome to Inner Balance for iOS*. HeartMath Support.

[https://cdn.heartmath.com/manuals/inner\\_balance\\_ios.pdf](https://cdn.heartmath.com/manuals/inner_balance_ios.pdf)

HeartMath Institute (2021a). *Quick Coherence Technique*. <https://www.heartmath.com/quick-coherence-technique/>

HeartMath Institute (2021b). *The Science of HeartMath*. <https://www.heartmath.com/science/>

HeartMath Institute (2022). *Coherence over time*.

[https://help.heartmath.com/v1/en/coherence\\_over\\_time.html](https://help.heartmath.com/v1/en/coherence_over_time.html).

HeartMath Institute (2024a). *Practical Social and Emotional Intelligence Programs*.

<https://www.heartmath.org/education/>

HeartMath Institute (2024b). *Smart Brain Wise Heart: Link to Core SEL Standards*.

<https://sbwh.heartmathlearning.org/sbwh/login/>

HeartMath Institute (2024c). *Smart Brain Wise Heart: Leader's Guide*.

<https://sbwh.heartmathlearning.org/sbwh/login/>

Henriques, G., Keffer, S., Abrahamson, C., & Jeanne Horst, S. (2011). Exploring the effectiveness of a computer-based heart rate variability biofeedback program in reducing anxiety in college students. *Applied Psychophysiology and Biofeedback*, 36, 101–112.

[DOI 10.1007/s10484-011-9151-4](https://doi.org/10.1007/s10484-011-9151-4)

Hoey, B. (2014). A simple introduction to the practice of ethnography and guide to ethnographic fieldnotes. *Marshall University Digital Scholar*, 1–10.

<https://www.cedarnetwork.org/wp-content/uploads/2016/06/Wasserfall-Intro-to-ethnography.pdf>

Holmes, A. G. D. (2020). Researcher positionality: A consideration of its influence and place in qualitative research—A new researcher guide. *Shanlax International Journal of Education*. 8(4), p. 1–10. [DOI: 10.34293/education.v8i4.3232](https://doi.org/10.34293/education.v8i4.3232)

Hübl, T. (2020). *Healing collective trauma: A process for integrating our intergenerational and cultural wounds*. Sounds True.

Husserl, E. (1931). *Ideas: General introduction to pure phenomenology* (D. Carr, Trans.). Macmillan.

Husserl, E. (2002). *The shorter logical investigations*. Routledge.

<https://philpapers.org/archive/HUSLIV.pdf>

Integral Theory (2017). <https://integrallife.com/glossary/integral-theory/>

James, W. (1884). On some omissions of introspective psychology. *Mind*, 9(33), 1–26.

<https://bit.ly/3oWLiPD>

James, W. (1892). *Psychology*. H. Holt. <https://bit.ly/3Nqjvkx>

James, W. (1922). The emotions. In C. G. Lange & W. James (Eds.), *The emotions*, Vol. 1, pp. 93–135. Williams & Wilkins Co. DOI: 10.1037/10735-003

Judith, A. (2004). *Eastern body, western mind: Psychology and the chakra system as a path to the self*. Celestial Arts.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future.

[DOI: 10.1093/clipsy.bpg016](https://doi.org/10.1093/clipsy.bpg016)

Kabat-Zinn, J. (2015). Mindfulness. *Mindfulness*, 6(6), 1481–1483. [DOI: 10.1007/s12671-015-0456-x](https://doi.org/10.1007/s12671-015-0456-x)

Kalolo, J. F. (2015). The drive towards application of pragmatic perspective in educational research: Opportunities and challenges. *Journal of Studies in Education*, 5(1), 150–171.

[DOI: 10.5296/jse.v5i1.7145](https://doi.org/10.5296/jse.v5i1.7145)

Kegan, R. (1994). *In over our heads: The mental demands of modern life*. Harvard University Press.

Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science*, 330(6006), 932-932. [DOI:10.1126/science.1192439](https://doi.org/10.1126/science.1192439)

Kilner, J. M., & Lemon, R. N. (2013). What we know currently about mirror neurons. *Current Biology*, 23(23), R1057-R1062. DOI: 10.1016/j.cub.2013.10.051

Kimmerer, R. (2013). *Braiding sweetgrass: Indigenous wisdom, scientific knowledge and the teachings of plants*. Milkweed Editions.

Kincheloe, J. (2003). *Teachers as researchers (classic edition): Qualitative inquiry as a path to empowerment*. Routledge.

Kirby, S.L., Greaves, L., & Reid, C. (2017). *Experience, research, social change: Critical methods* (3<sup>rd</sup> edn.). University of Toronto Press.

Kleineberg, M. (2016). Integral methodological pluralism: an organizing principle for method classification. *Knowledge Organization for a Sustainable World: Challenges and Perspectives for Cultural, Scientific, and Technological Sharing in a Connected Society*, 133-41.

<http://154.68.199.18:8080/bitstream/123456789/1943/1/ARTICLE%2010.pdf#page=135>

- Kresovich, A., et al. (2023). Experimental evaluation of a neurophysiological intervention designed to increase student resilience: A pilot study. *Journal of Child & Adolescent Mental Health*, 35(1–3), 129–146. DOI: [10.2989/17280583.2024.2336473](https://doi.org/10.2989/17280583.2024.2336473)
- Krönke, K. M., Wolff, M., Shi, Y., Kräplin, A., Smolka, M. N., Bühringer, G., & Goschke, T. (2020). Functional connectivity in a triple-network saliency model is associated with real-life self-control. *Neuropsychologia*, 149, 107667. DOI: [10.1016/j.neuropsychologia.2020.107667](https://doi.org/10.1016/j.neuropsychologia.2020.107667)
- Kuhn, T. (1970). *The structure of scientific revolutions* (4<sup>th</sup> edn.). University of Chicago Press.
- Lawlor, M. S. (2014). Mindfulness in practice: Considerations for implementation of mindfulness-based programming for adolescents in school contexts. *New Directions for Youth Development*, 2014(142), 83–95. DOI: [10.1002/ym.20098](https://doi.org/10.1002/ym.20098)
- Lazarus, R. (1991). Progress on a cognitive-motivational-relational theory of emotion. *The American Psychologist*, 46(8), 819–834. DOI: [10.1037/0003-066X.46.8.819](https://doi.org/10.1037/0003-066X.46.8.819)
- LeDoux, J. E. (1994). Emotion, memory and the brain. *Scientific American*, 270(6), 50–57. <https://www.jstor.org/stable/24942732>
- LeDoux, J. E. (1995). Emotion: Clues from the brain. *Annual Review of Psychology*, 46(1), 209–235. DOI: [10.1146/annurev.ps.46.020195.001233](https://doi.org/10.1146/annurev.ps.46.020195.001233)
- Marshall, M. (2009). Timeline: The evolution of life. *New Scientist*. July, 14.
- Maté, G. (2011). *When the body says no: The cost of hidden stress*. Vintage Canada.
- Maté, G. (2022). *The myth of normal: Trauma, illness & healing in a toxic culture*. Alfred A. Knopf.
- Maté, G. (2024). *Scattered minds: The origins and healing of attention deficit disorder*. Vintage Canada.
- McCraty, R. (2022). Following the rhythm of the heart: HeartMath Institute’s path to HRV biofeedback. *Applied Psychophysiology and Biofeedback*, DOI: [10.1007/s10484-022-09554-2](https://doi.org/10.1007/s10484-022-09554-2)

McCraty, R., & Childre, D. (2004). The grateful heart the psychophysiology of appreciation.

*Psychological Gratitude*, 230.

McCraty, R., Atkinson, M., Tomasino, D., & Tiller, W. A. (1998). The electricity of touch: Detection and measurement of cardiac energy exchange between people. *Brain and values: Is a biological science of values possible*, 1998, 359–379. IHM web site: [www.heartmath.org](http://www.heartmath.org).

McCraty, R., & Tomasino, D. (2004). Heart rhythm coherence feedback: A new tool for stress reduction, rehabilitation, and performance enhancement. In *Proceedings of the first Baltic forum on neuronal regulation and biofeedback* (Vol. 2, pp. 1–5).  
<https://www.heartmath.org/assets/uploads/2015/01/hrv-biofeedback.pdf>

McCraty, R., & Zayas, M. A. (2014). Cardiac coherence, self-regulation, autonomic stability, and psychosocial well-being. *Frontiers in Psychology*, 1090. DOI: [10.3389/fpsyg.2014.01090](https://doi.org/10.3389/fpsyg.2014.01090)

McCraty, R., Atkinson, M., Stolc, V., Alabdulgader, A. A., Vainoras, A., & Ragulskis, M. (2017). Synchronization of human autonomic nervous system rhythms with geomagnetic activity in human subjects. *International Journal of Environmental Research and Public Health*, 14(7), 770. <https://doi.org/10.3390/ijerph14070770>

McLeod (2021). Research journal reflections. Collected December, 2021.

McLeod, C. & Boyes, M. (2021). The effectiveness of social-emotional learning strategies and mindful breathing with biofeedback on the reduction of adolescent test anxiety. *Canadian Journal of Education*. 44(3), 815–847. DOI: [10.53967/cje-rce.v44i3.4869](https://doi.org/10.53967/cje-rce.v44i3.4869)

Menon, V. (2013). Developmental pathways to functional brain networks: Emerging principles. *Trends in Cognitive Sciences*, 17(12), 627–640. DOI: [10.1016/j.tics.2013.09.015](https://doi.org/10.1016/j.tics.2013.09.015)

Mohsenabadi, H., Shabani, M. J., & Zanjani, Z. (2019). Factor structure and reliability of the mindfulness attention awareness scale for adolescents and the relationship between mindfulness and anxiety in adolescents. *Iranian Journal of Psychiatry and Behavioral Sciences*, 13(1).

[DOI: 10.5812/ijpbs.64097](https://doi.org/10.5812/ijpbs.64097)

Moustakas. (1994). *Phenomenological research methods*. Sage.

Mruck, K., & Breuer, F. (2003). Subjectivity and reflexivity in qualitative research: A new FQS issue. *Historical Social Research / Historische Sozialforschung*, 28(3), 189–212.

<https://www-jstor-org.ezproxy.lib.ucalgary.ca/stable/20758011>

Murthy, V. (2023). Krista Tippett (Host). (April 13, 2023). To be a healer. *On Being* [audiopodcast].

The On Being Project. <https://onbeing.org/programs/vivek-murthy-to-be-a-healer/>

Nathan, M. J., Eilam, B., & Kim, S. (2007). To disagree, we must also agree: How intersubjectivity structures and perpetuates discourse in a mathematics classroom. *The Journal of the Learning Sciences*, 16(4), 523–563. [DOI: 10.1080/10508400701525238](https://doi.org/10.1080/10508400701525238)

Niven, K. (2013). Affect. In: M.D. Gellman & J.R. Turner (Eds) *Encyclopedia of Behavioral Medicine*. Springer. [DOI: 10.1007/978-1-4419-1005-9\\_1088](https://doi.org/10.1007/978-1-4419-1005-9_1088)

Northside High School (2024a). *Our school*.

Northside High School (2024b). *Student handbook*.

Oberle, E., Domitrovich, C. E., Meyers, D. C., & Weissberg, R. P. (2016). Establishing systemic social and emotional learning approaches in schools: A framework for schoolwide implementation. *Cambridge Journal of Education*, 46(3), 277–297. [DOI: 10.1080/0305764X.2015.1125450](https://doi.org/10.1080/0305764X.2015.1125450)

Onwuegbuzie, A. J., & Leech, N. L. (2007). Sampling designs in qualitative research: Making the sampling process more public. *Qualitative Report*, 12(2), 238–254.  
<https://files.eric.ed.gov/fulltext/EJ800181.pdf>

Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2013). Do-it-yourself: An online positive psychology intervention to promote positive emotions, self-efficacy, and engagement at work. *Career Development International*. [DOI: 10.1108/CDI-10-2012-0102](https://doi.org/10.1108/CDI-10-2012-0102)

Packer, M. (2011). *The science of qualitative research*. Cambridge University Press.

- Palmer, P. J. (2017). *The courage to teach: Exploring the inner landscape of a teacher's life*. Wiley.
- Panhwar, A. H., Ansari, S., & Shah, A. A. (2017). Post-positivism: An effective paradigm for social and educational research. *International Research Journal of Arts and Humanities*, 45(45), 253–259.  
<https://bit.ly/3YrbNbH>
- Pannebakker, F. D., van Genugten, L., Diekstra, R. F., Gravestijn, C., Fekkes, M., Kuiper, R., & Kocken, P. L. (2019). A social gradient in the effects of the skills for life program on self-efficacy and mental well-being of adolescent students. *Journal of School Health*, 89(7), 587–595.  
[DOI: 10.1111/josh.12779](https://doi.org/10.1111/josh.12779)
- Perry, B. D. & Szalavitz, M. (2017). *The boy who was raised as a dog: And other stories from a child psychiatrist's notebook – What traumatized children can teach us about loss, love, and healing*. Hachette UK.
- Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. Basic Books.
- Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. Norton.
- Porges, S. W. (2015). Making the world safe for our children: Down-regulating defence and up-regulating social engagement to ‘optimise’ the human experience. *Children Australia*, 40(2), 114–123. [DOI:10.1017/cha.2015.12](https://doi.org/10.1017/cha.2015.12)
- Porges, S.W. (2019). Polyvagal theory and safety in schools. (Stephen Hurley). *VoiceEd Radio*.  
[https://voiced.ca/podcast\\_episode\\_post/stephen-porges-polyvagal-theory-and-safe-schools/](https://voiced.ca/podcast_episode_post/stephen-porges-polyvagal-theory-and-safe-schools/)
- Porges, S. W. (2022). Polyvagal theory: a science of safety. *Frontiers in Integrative Neuroscience*, 16, 27. [DOI:10.3389/fnint.2022.871227](https://doi.org/10.3389/fnint.2022.871227)

- Public Safety Canada (2022). Crime prevention – Research highlights 2017-H01-CP – Youth mental health, mental illness and crime. <https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/2017-h01-cp/index-en.aspx>
- Pugh, E. M. (1971). Introduction to brain structure and basic functions – Part I. [https://us.corwin.com/sites/default/files/upm-binaries/23212\\_Chapter\\_5.pdf](https://us.corwin.com/sites/default/files/upm-binaries/23212_Chapter_5.pdf)
- Racine, N., McArthur, B. A., Cooke, J. E., Eirich, R., Zhu, J., & Madigan, S. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. *JAMA Pediatrics*. DOI:10.1001/jamapediatrics.2021.2482
- Reinke, W. M., Herman, K. C., Stormont, M., Newcomer, L., & David, K. (2013). Illustrating the multiple facets and levels of fidelity of implementation to a teacher classroom management intervention. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 494–506. DOI: 10.1007/s10488-013-0496-2
- Renée, R. (2008). *The efficacy of a portable HRV feedback device in conjunction with mental health treatment of clients with major depressive disorder enrolled in a county welfare-to-work program*. ProQuest.
- Ricci, M.C. (2024). Mindsets in the classroom: Building a growth mindset learning community (3<sup>rd</sup> edn.). Routledge. DOI: 10.4324/9781003406914
- Riediger, M., & Klipker, K. (2013). Emotion regulation in adolescence. *Handbook of emotion regulation*. Guilford publications. DOI: 10.1177/0963721413475445
- Rimé, B., & Páez, D. (2023). Why we gather: A new look, empirically documented, at Émile Durkheim’s theory of collective assemblies and collective effervescence. *Perspectives on Psychological Science*. DOI: 10.1177/17456916221146388
- Robinson, K. (2001). *Out of our minds: Learning to be creative*. Capstone.
- Rorty. (1990). *Objectivity, relativism, and truth*. Cambridge University Press.



- Ross, K. M., & Tolan, P. (2018). Social and emotional learning in adolescence: Testing the CASEL model in a normative sample. *The Journal of Early Adolescence*, 38(8), 1170–1199. [DOI:10.1177/0272431617725198](https://doi.org/10.1177/0272431617725198)
- Ruiz, A. A., & Seco, M. M. (2024). Heart rate variability biofeedback intervention programme to improve attention in primary schools. *Applied Physiological Biofeedback*, 49(4), 651–664. [DOI: 1007/s10484-024-09659-w](https://doi.org/10.1007/s10484-024-09659-w)
- Rush, K. S., Golden, M. E., Mortenson, B. P., Albohn, D., & Horger, M. (2017). The effects of a mindfulness and biofeedback program on the on-and off-task behaviors of students with emotional behavioral disorders. *Contemporary School Psychology*, 21(4), 347–357. [DOI: 1007/s40688-017-0140-3](https://doi.org/10.1007/s40688-017-0140-3)
- Russell, B. (1945). *A history of western philosophy*. Simon & Schuster.
- Saldaña, J. (2021). *The coding manual for qualitative researchers*. Sage.
- Salience network. (2022, February 11). In *Wikipedia*. [https://en.wikipedia.org/wiki/Salience\\_network](https://en.wikipedia.org/wiki/Salience_network)
- Schonert-Reichl, Oberle, E., Lawlor, M. S., Abbott, D., Thomson, K., Oberlander, T. F., & Diamond, A. (2015). Enhancing cognitive and social-emotional development through a simple-to-administer mindfulness-based school program for elementary school children: A randomized controlled trial. *Developmental Psychology*, 51(1), 52–66. [DOI: 10.1037/a0038454](https://doi.org/10.1037/a0038454)
- Schwartz, R. C. (2021). *No bad parts: Healing trauma and restoring wholeness with the internal family systems model*. Sounds True.
- Seligman, M. E. (2018). *The hope circuit: A psychologist's journey from helplessness to optimism*. Hachette UK.
- Selye, H. (1950). Stress and the general adaptation syndrome. *British medical journal*, 1(4667), 1383–1392.
- Selye, H. (1956). *The stress of life*. McGraw-Hill.

- Shapiro, S. (2020). *Good morning, I love you: Mindfulness and self-compassion practices to rewire your brain for calm, clarity, and joy*. Sounds True.
- Shear, J., & Varela, F. J. (Eds.). (1999). *The view from within: First-person approaches to the study of consciousness*. Imprint Academic.
- Siegel, D. J. (2017). *Mind: A journey to the heart of being human*. Norton.
- Siegel, D.J. (2020). *Aware: The science and practice of presence*. Penguin Random House.
- Siegel, D.J. (2023). *Intraconnected: Mwe (Me to We)*. Mind Your Brain.
- Siepmann, M., Weidner, K., Petrowski, K., & Siepmann, T. (2022). Heart rate variability: a measure of cardiovascular health and possible therapeutic target in dysautonomic mental and neurological disorders. *Applied Psychophysiology and Biofeedback*, 47(4), 273–287. DOI: [10.1007/s10484-022-09572-0](https://doi.org/10.1007/s10484-022-09572-0).pdf
- Smucny, J., Wylie, K. P., & Tregellas, J. R. (2014). Functional magnetic resonance imaging of intrinsic brain networks for translational drug discovery. *Trends in Pharmacological Sciences*, 35(8), 397–403. DOI: [10.1016/j.tips.2014.05.001](https://doi.org/10.1016/j.tips.2014.05.001)
- Statistics Canada (2024). *2023 Canadian Health Survey on Children and Youth – Changes in the mental health of respondents from the 2019 survey*. [https://www150.statcan.gc.ca/n1/en/daily-quotidien/240910/dq240910a-eng.pdf?st=rl9rnwO\\_](https://www150.statcan.gc.ca/n1/en/daily-quotidien/240910/dq240910a-eng.pdf?st=rl9rnwO_)
- Tan K, Sinha G, Shin OJ, Wang Y. (2018). Patterns of social-emotional learning needs among high school freshmen students. *Children and Youth Services Review*. 6(217), DOI: [10.1016/j.childyouth.2018.01.033](https://doi.org/10.1016/j.childyouth.2018.01.033)
- Teasdale. (2022). *What happens in mindfulness: Inner awakening and embodied cognition*. Guilford.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the society for research in child development*, 25–52.
- Tight, M. (2019). *Documentary research in the social sciences*. Sage.

- Timofejeva, I., McCraty, R., Atkinson, M., Joffe, R., Vainoras, A., Alabdulgader, A. A., & Ragulskis, M. (2017). Identification of a group's physiological synchronization with earth's magnetic field. *International Journal of Environmental Research and Public Health*, 14(9), 998.  
[DOI: 10.3390/ijerph14090998](https://doi.org/10.3390/ijerph14090998)
- Tyler (2004). Basic principles of curriculum and instruction. In D. J. Flinders & S. J. Thornton (Eds.). *Curriculum Studies Reader* (2<sup>nd</sup> edn.) (pp. 51–61). Routledge.
- Valley School Division (2021). *Assessment and Communication of Student Learning (AP-360)*.
- Valley School Division (2021). *Responding to Behaviour: Positive Behaviour Interventions and Support*.
- Valley School Division (2023). *Four-Year Plan (2019-2023). Year Four*. <https://bit.ly/3JQDLZa>
- Valley School Division (2023). Northside High School on First Street Presentation.
- Valley School Division (2023a). *Inclusive Education Practice Guide*.
- Valley School Division (2023b). *Instruction and Assessment Practice Guide*.
- Valley School Division (2024a). *Education Plan (2023–2027). Year Two*.
- Valley School Division (2024b). *OURSchool Secondary Survey: Northside*.
- Valley School Division Professional Learning (2024). Course Catalogue.
- Van Gulick, R. (2022). Consciousness. *The Stanford Encyclopedia of Philosophy*. E. N. Zalta & U. Nodelman (Eds.), <https://plato.stanford.edu/archives/win2022/entries/consciousness>
- Van der Kolk, B. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma*. Penguin.
- Van Heertum, R. (2006). Marcuse, Bloch and Freire: Reinvigorating a pedagogy of hope. *Policy Futures in Education*, 4(1), 45–51. [DOI: 10.2304/pfie.2006.4.1.45](https://doi.org/10.2304/pfie.2006.4.1.45)
- Voss, A., Schroeder, R., Heitmann, A., Peters, A., & Perz, S. (2015). Short-term heart rate variability – influence of gender and age in healthy subjects. *PloS One*, 10(3), e0118308–e0118308.  
[DOI: 10.1371/journal.pone.0118308](https://doi.org/10.1371/journal.pone.0118308)

- Wallace, B. A. (1999). The Buddhist tradition of Samatha: Methods for refining and examining consciousness. *Journal of Consciousness Studies*, 6(2–3). 175–187.
- Weil, S. (1952). *The need for roots: Prelude to a declaration of duties toward mankind*. Psychology Press.
- Weimer, G. (2019). *Polyvagal theory – Part 3*. <https://glenweimer.com/polyvagal-theory-part-3/>
- Wilber, K. (2000a). *Integral psychology*. Shambhala.
- Wilber, K. (2000b). *Sex, ecology, spirituality* (2<sup>nd</sup> edn.). Shambhala.
- Wilber, K. (Ed.). (2001). *Quantum questions: Mystical writings of the world's great physicists*. Shambhala.
- Wilber, K. (2003). Foreword in F. Visser, *Ken Wilber: Thought as passion*, pp. xii–xiii. [www.kenwilber.com/Writings/PDF/ForewordThoughtasPassion\\_OTHERS\\_2003.pdf](http://www.kenwilber.com/Writings/PDF/ForewordThoughtasPassion_OTHERS_2003.pdf)
- Wilber, K. (2005). Introduction to integral theory and practice. *AQAL: Journal of Integral Theory and Practice*, 1(1), 2–38. [DOI: 0.31795/2159-0065-001-001-0002](https://doi.org/10.31795/2159-0065-001-001-0002)
- Wilber, K. (2007). *Integral spirituality*. Shambhala.
- Wilber, K. (2017). *Trump and a post-truth world*. Shambhala.
- Wilber, K. (2020). *Summary of Spiral Dynamics Model*. Awaken. April 30, 2020. <https://awaken.com/2020/04/ken-wilber-summary-of-spiral-dynamics-model/>
- Williamson, A. A., Modecki, K. L., & Guerra, N. G. (2015). SEL programs in high school. In Durlak, J. A. (Ed.). (2015). *Handbook of social and emotional learning: Research and practice*. Guilford.
- Winfrey, O., & Perry, B. (2021). *What happened to you? Conversations on trauma, resilience, and healing*. Boxtree.
- Wong, J. (2024). Teacher shortages are leaving educators with no ‘good options’ – and they say students are paying the price. *CBC News*. <https://www.cbc.ca/news>

- Yeager, D. S. (2017). Social and emotional learning programs for adolescents. *The Future of Children*, 21(1), 73–94. [DOI: 10.1353/foc.2017.0004](https://doi.org/10.1353/foc.2017.0004)
- Zadina, J. N. (2023). The Synergy Zone: Connecting the Mind, Brain, and Heart for the Ideal Classroom Learning Environment. *Brain Sciences*, 13(9), 1314. [DOI: 10.3390/brainsci13091314](https://doi.org/10.3390/brainsci13091314)
- Zhang, J., Zhao, N., & Kong, Q. P. (2019). The relationship between math anxiety and math performance: A meta-analytic investigation. *Frontiers in Psychology*, 10, 1613. [DOI: 10.3389/fpsyg.2019.01613](https://doi.org/10.3389/fpsyg.2019.01613)

## Appendix A

### *Models of Consciousness Development*

Age of emergence	Basic Structures	Chakras	Jean Gebser (1905-1973)	Jean Piaget (1896-1980)	Clare Graves (1914-1986)	Robert Kegan (1946-)	Ken Wilber (1949-)
0-2	matter, sensation, perception	<b>First chakra</b> physical identity (self-preservation)	<b>Archaic</b> no separate self, lack of differentiation	Sensori-motor	<b>Autistic/Automatic</b> physiological safety	<b>1<sup>st</sup> order of consciousness</b> sensations; perceptions; impulses	<b>Archaic (beige)</b> undifferentiated self
2-6	emotion, impulse, play, rules	<b>Second chakra</b> emotional identity (self-gratification)	<b>Magic</b> magical thinking	Pre-operational	<b>Tribal/Magical</b> Safety, animalistic <b>Egocentric</b> self-awareness	<b>2<sup>nd</sup> order of consciousness</b> Durable categories; 1 <sup>st</sup> person point of view	<b>Magical (red)</b> Egocentric, narcissistic
7-11	categories, symbols	<b>Third chakra</b> Ego identity (self-definition)	<b>Mythical</b> heros, symbols	concrete operations	<b>Sociocentric</b> material needs	<b>2<sup>nd</sup> order of consciousness</b> Emerging cause and effect, 2 <sup>nd</sup> person perspective	<b>Mythical (amber)</b> Myths, power dynamics
12-16	early abstract,	<b>Fourth chakra</b> Social identity (self-acceptance)	<b>Mental</b> emergent and separate self	formal operations	<b>Interpersonal</b> multipluristic	<b>3<sup>rd</sup> order of consciousness</b> Interpersonal Cross-categorical understanding; multiple perspectives; abstract thought	<b>Rational (orange)</b> Concrete operations
16-20	abstract, problem solving	<b>Fifth chakra</b> Creative identity (self-expression)	<b>Mental</b> emergent and separate self	formal operations	<b>Interpersonal</b> Relativistic/individualistic	<b>4<sup>th</sup> order of consciousness</b>  <b>Formal Institutional</b> Critical thinking; self-initiating; reflexive	<b>Pluralistic (green)</b> cross-paradigmatic multiple truths
21-30	abstract mapping	<b>Sixth chakra</b> Archetypal identity (self-reflection)	<b>Integral</b> extension of self through space, time, others' consciousness	polyvalent logic	<b>Systemic/Integrated</b>	<b>4<sup>th</sup> order of consciousness</b> Synthesis; formulation; creativity; self in society	<b>Integral (yellow)</b> causal, sage
31-40+		<b>Seventh chakra</b> Universal identity (self-knowledge)		system of systems		<b>5th order of consciousness</b> <b>Postformal</b> <b>Inter-individual</b> Reflection on formulation; outside ideological perspectives	<b>Integral (turquoise)</b> transcend and include, holism

*Adapted from Kegan (1994); Wilber (2000a, p. 200-209); Armstrong (2020), Judith (2004).*

## Appendix B

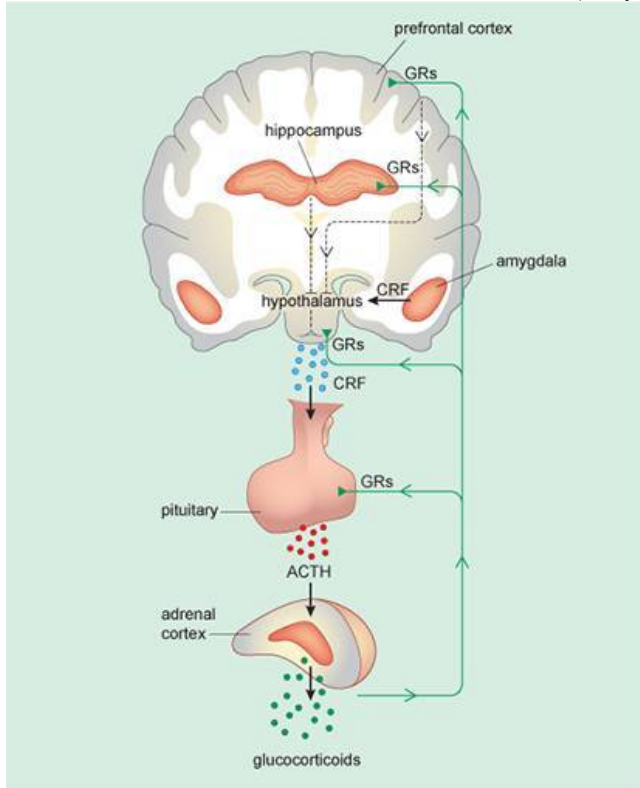
### *Integral Theory Levels of Development*

Worldview (Level)	MEME	Individual	Society	Characteristics
Archaic	Beige	Impulsive	Early human	Basic survival, instinct
Magic	Purple	Animistic	Ethnic tribes	Voodoo, rituals, superstitions
Power	Red	Egocentric	Feudal empires	Power dictators, villains
Mythic	Amber	Conformist	Social order	Rigid hierarchies, religious
Traditional	Orange	Rational	Scientific	Enlightenment, age of reason
Post-modern	Green	Individualistic	Pluralistic	Socialism, post-modernism
Integrative	Yellow	Autonomous	Knowledgeable	Flexible, integrated, equity
Holistic	Turquoise	Transcendent	Universal order	Harmonics, universal system

Adapted from Wilber (2000a).

## Appendix C

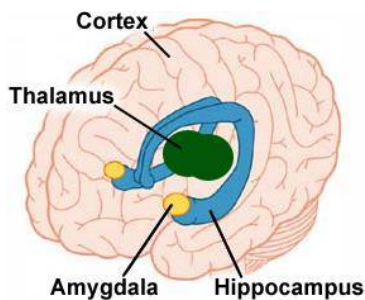
### *The Basic Structures Associated with Stress (Amygdala and HPA axis)*



Source: <https://www.open.edu/openlearn/health-sports-psychology/health/understanding-depression-and-anxiety/content-section-0/?printable=1>

The amygdala stimulates the hypothalamus to release corticotropin-releasing factor (CRF) from the hypothalamus which activates the pituitary gland to release adrenocorticotrophic hormone (ACTH) to travel through the blood to the adrenal glands, where glucocorticoids (cortisol) is released. Cortisol releases the body's fat and stored energy reserves to release glucose into the bloodstream for uptake from muscles (fight/flight) (Inquiry into Biology, 2007).

### *Stress Activation Centres in the Brain*



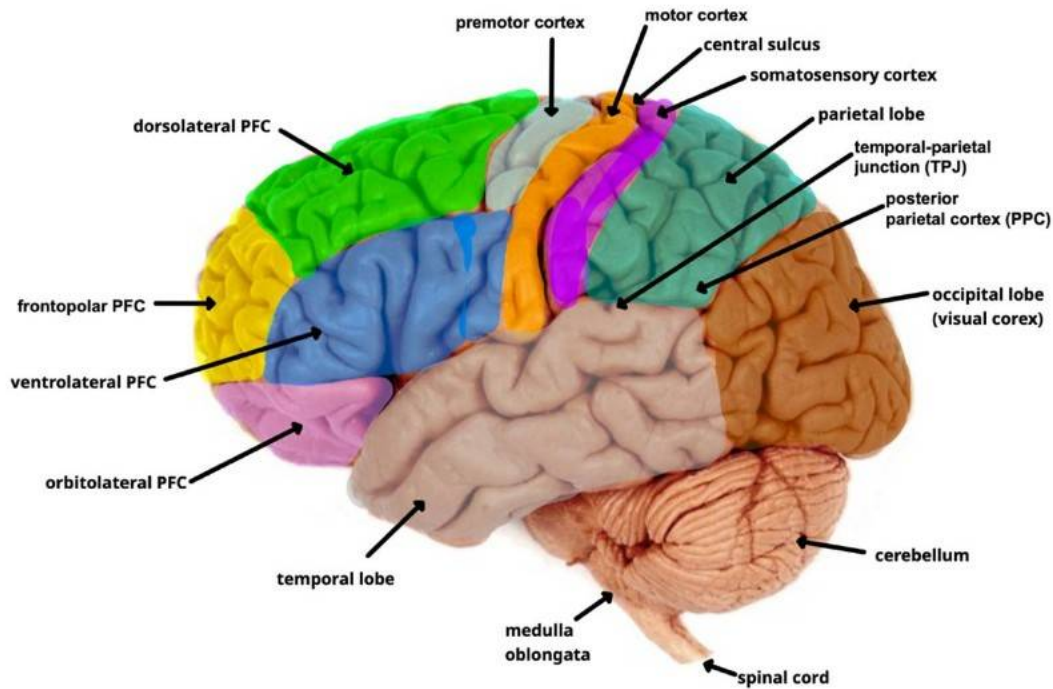
Source: <https://www.londonhypnotherapyuk.com/glossary-amygdala/>



## Appendix D

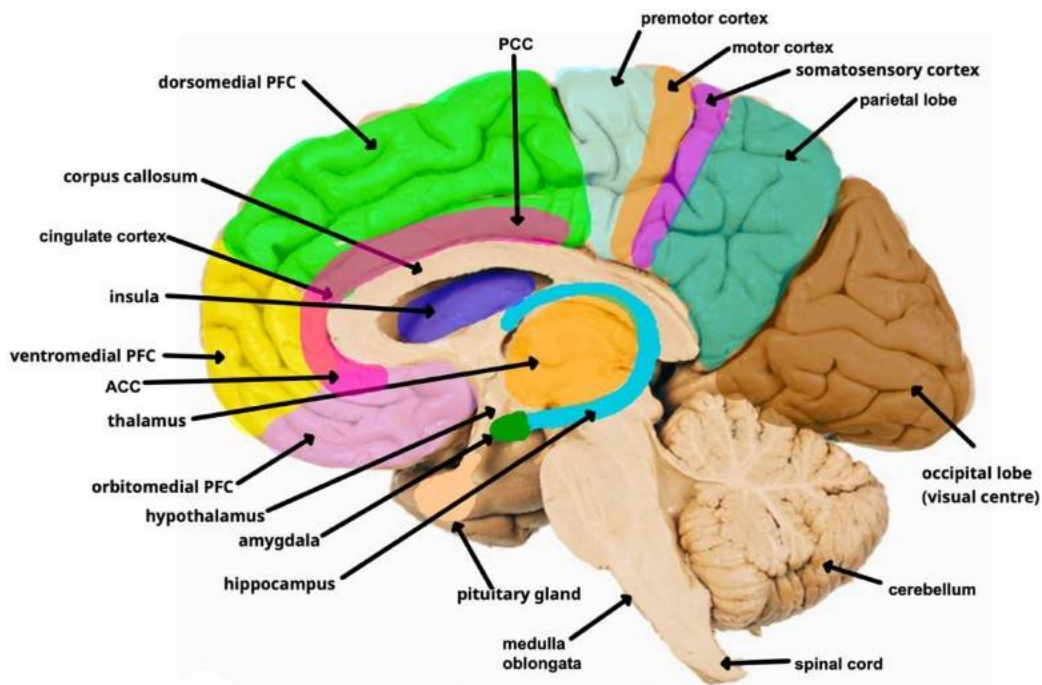
### Anatomy of the Brain: Lateral and Sagittal Views

#### *Lateral View of the Brain*



Adapted from Dixon et al. (2017)

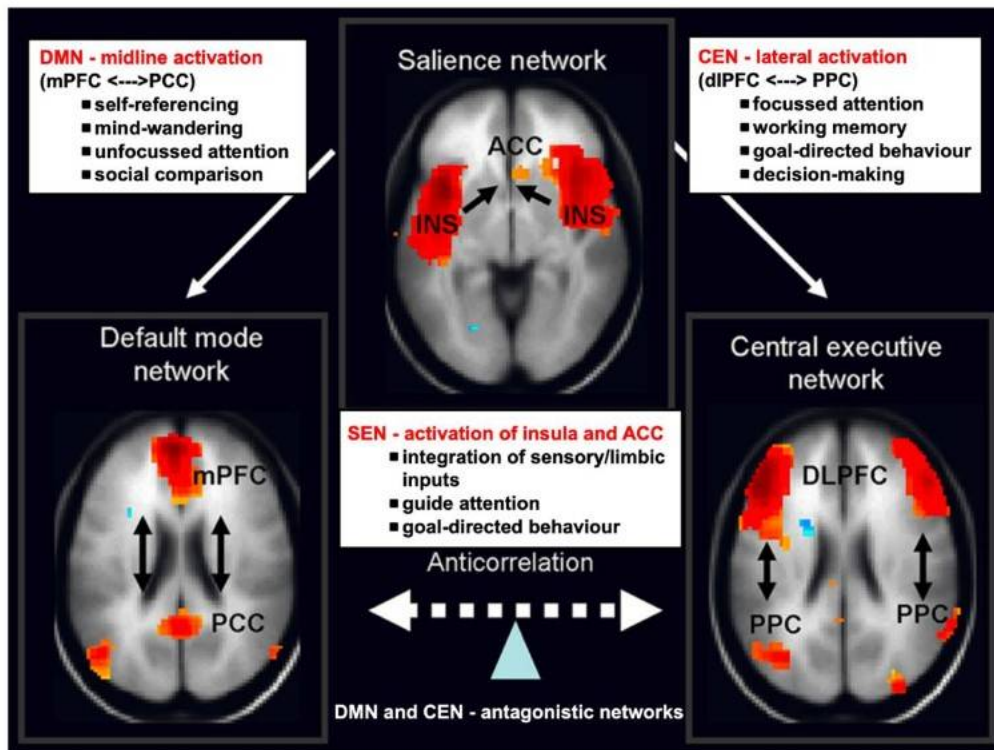
#### **Figure 6** *Sagittal View of the Brain*



Adapted from Dixon et al., 2017

## Appendix E

### Intrinsic Brain Networks (IBNs)



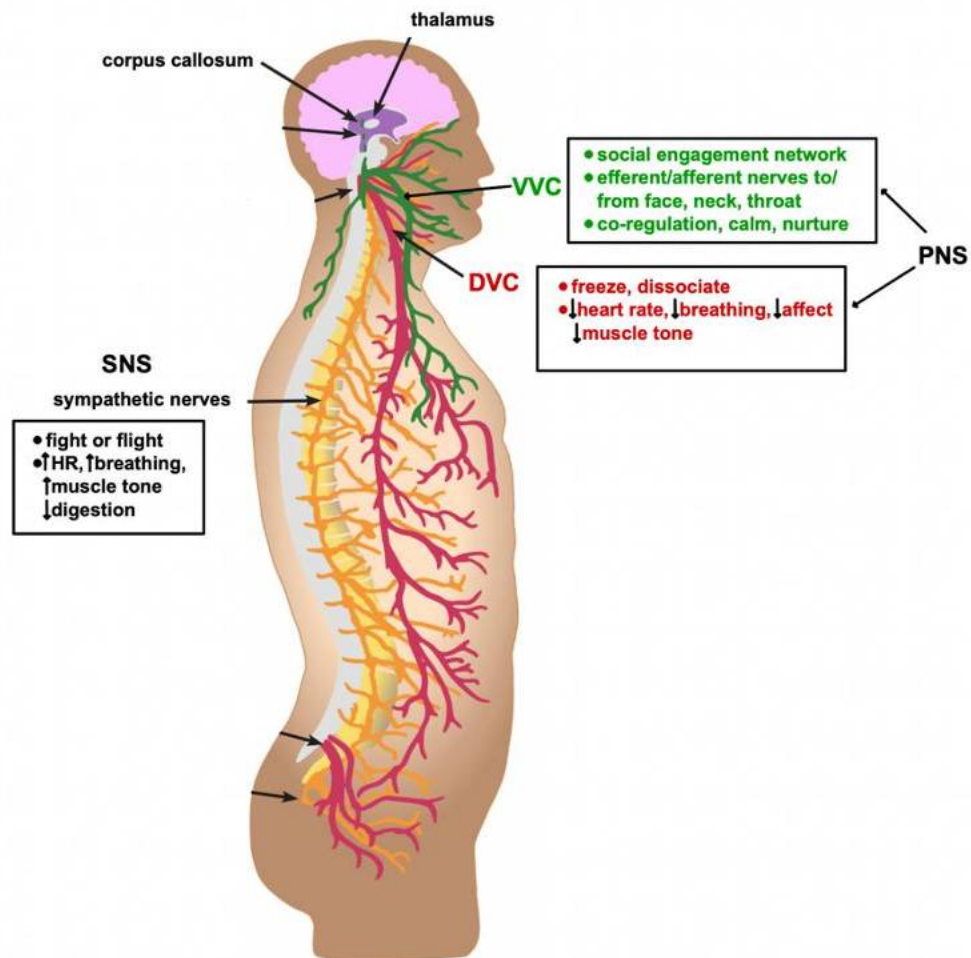
*Intrinsic Brain Networks (IBNs) showing the areas for CEN, SEN, and DMN networks.*

Adapted from Salience network (2022); Krönke (2020).

## Appendix F

### Branches of the Vagus Nerve

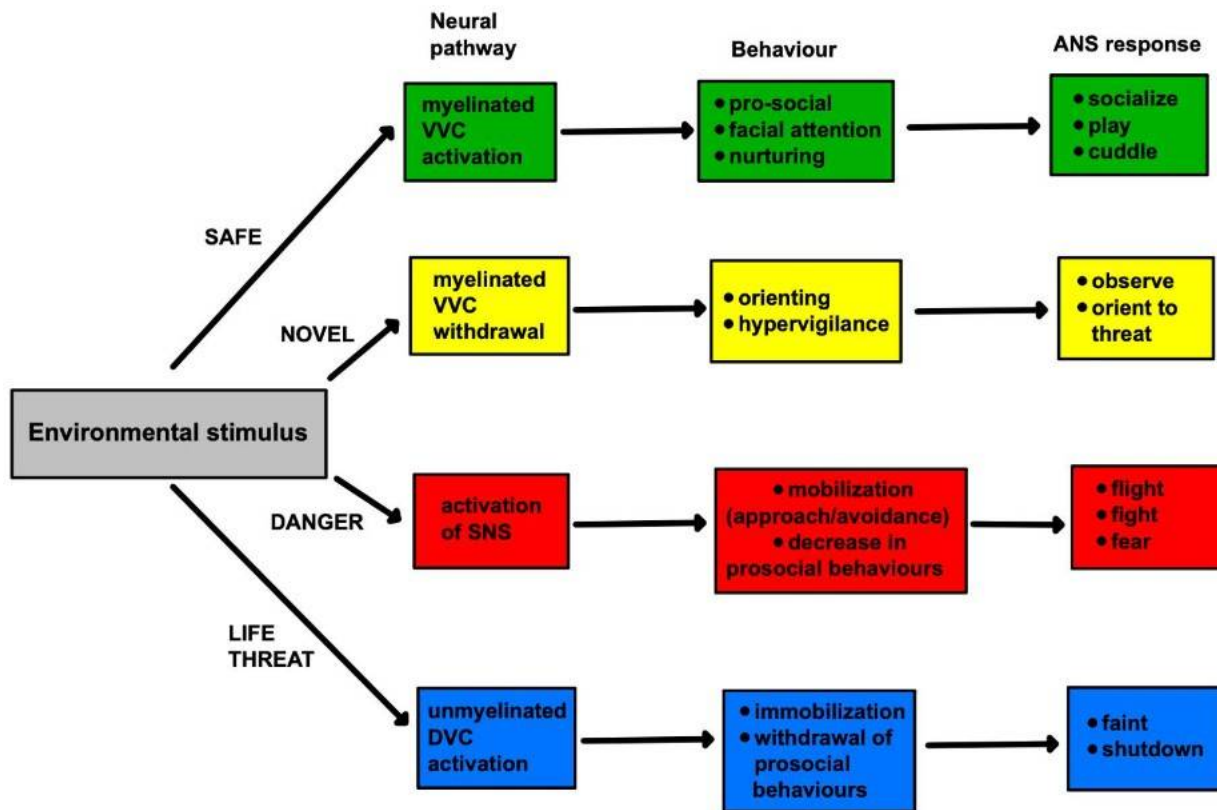
#### *Polyvagal ANS Innervation*



Source: Adapted from Weimer (2019).

## Appendix G

### Physiological Pathways in Response to Environmental Stimuli



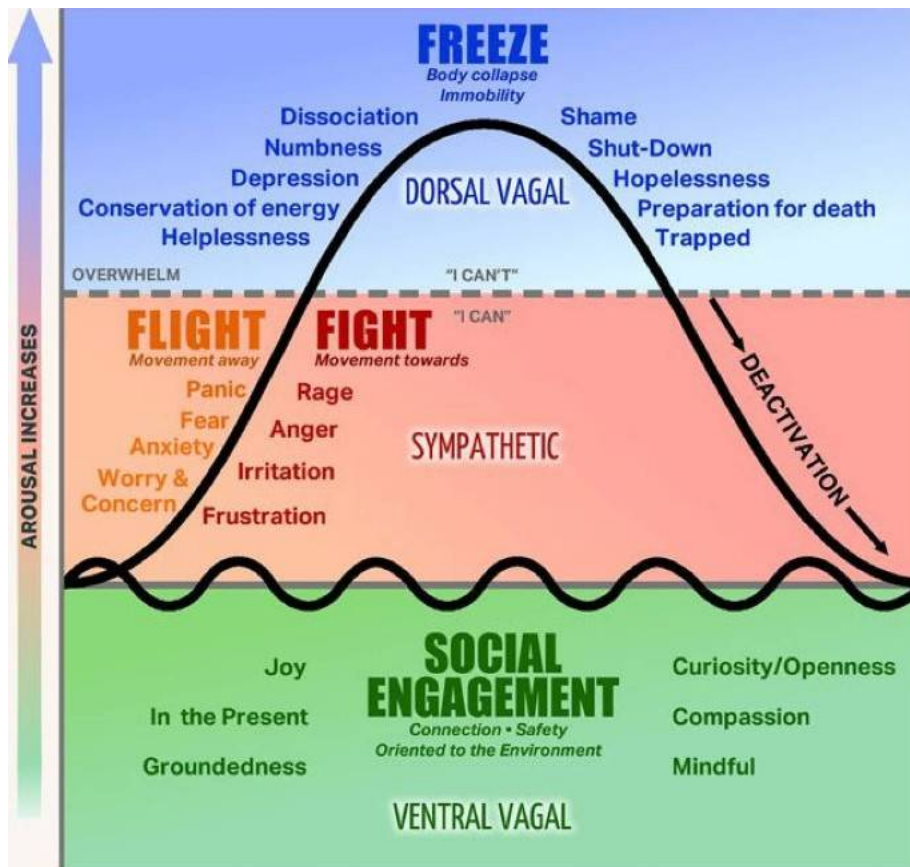
*Polyvagal Theory Pathways*

Source: Adapted from Barnsely (2012)

VVC – ventral vagal complex; DVC – dorsal ventral complex; SNS – sympathetic nervous system.

## Appendix H

### Thoughts, Feelings, Behaviours Related to Arousal Level



*Polyvagal Theory Thoughts, Feelings, and Behaviours*

Source: (Webb, 2022) <https://webbtherapy.org/polyvagal-theory-and-trauma-dr-stephen-porges/>  
(used with permission).

## Appendix I

### Polyvagal Ladder: Activation of Vagal System



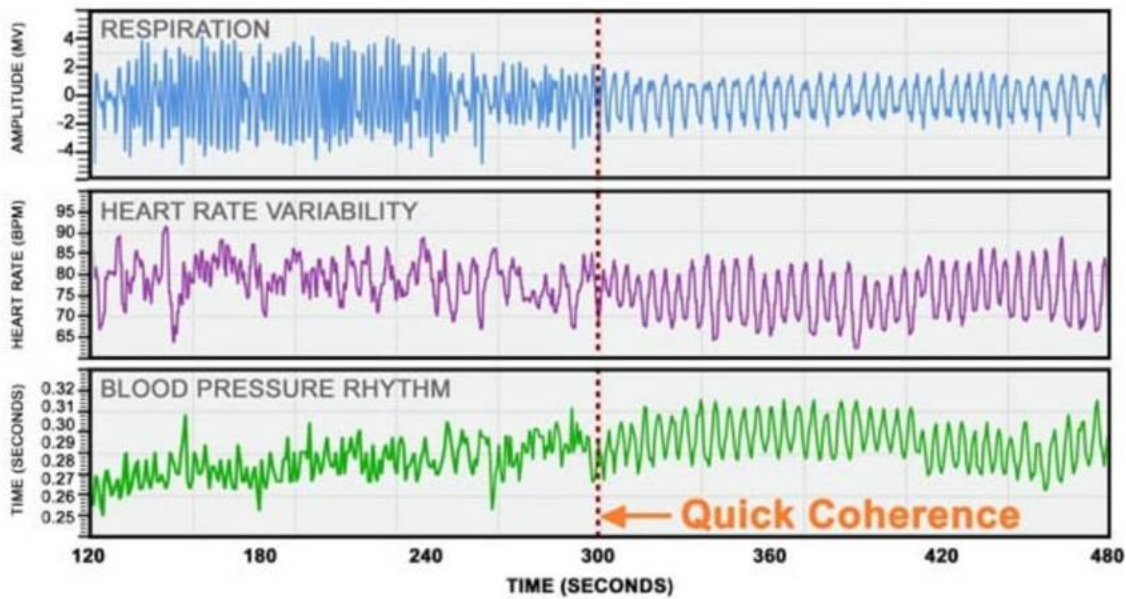
*Polyvagal Ladder*

Source: Adapted from Dana, D. (2021).



## Appendix J

### Tracing From EmWave Program



*Respiration, HRV, and BP before and after Quick Coherence*

Source: From HeartMath (2021b).

## Appendix K

### Professional Development and Training and Program Fidelity

#### Evidence of Fidelity to the Program

Evidence of Fidelity	Actionable Items	Date of Action
Teacher Training	1. Completion of 8 undergraduate psychology courses (4 from Queen's; 4 from Athabasca)	(1984-2009)
	2. MEd degree (Children/Adolescent Mental Health and School Counselling)	(2017-2020)
	3. HeartMath Institute training courses:	
	a) HeartMath Clinical Certification for Stress, Anxiety and Self-regulation	(2023)
	b) The Resilient Heart: Trauma-Sensitive HeartMath Certification	(2023)
Ongoing Coaching Consultations	c) Using HeartMath in Your Health Professional Practice	(2023)
	d) Add Heart Facilitator	(2019)
	I will recruit a colleague (teacher or administrator) to observe my classes on occasion, to document practices and procedures to provide me with immediate and direct feedback.	(2023-24)
	I will also utilize a HeartMath Certified Trainer to come in to observe my classes to ensure I am teaching/modelling the HeartMath techniques properly and effectively.	(2023-24)
Evidence of Teacher Skill Implementation	Reinke and colleagues (2013) recommend the use of self-assessments, as well as participant engagement (measured through feedback surveys) and peer assessment.	(2023-24)
Adherence to Program	Self-evaluations and lesson plan data were used to determine the content delivery each day throughout the semester.	(2023-24)

Adapted from Reinke et al. (2013).



## Appendix L

### Warrants, Data, and Evidence

Quad	Zone	Data sources	Warrants Linking Data to Evidence	Rival Warrants	Evidence
UL	1	Individual student semi-structured interviews	Themes including: understanding of stress response; coping strategy self-efficacy; increased positive affect; improved feelings of emotion control	-natural maturity of emotion control after 5 months -parental influence on mood, emotion, coping strategies -peer/teacher/coach influences -life events, trauma, therapy	-students develop increased self-awareness, self-management, learn about physiology of stress, learn and practice coping strategies, understand biofeedback metrics and relation to own physiology/cognition
UL	2	Individual student developmental awareness surveys (pre/post)	Students organized in developmental levels including: red, orange, green, turquoise	-natural maturity of emotion control after 5 months -parental influence on mood, emotion, coping strategies -peer/teacher influences -life events, trauma, therapy	-a snapshot of each student's developmental levels of consciousness/awareness to provide insight into individual worldview shaping attitudes
LL	4	Focus groups (8-10 students) collective thoughts, discussions	Themes including: collective understanding of stress, coping strategies, classroom culture, support	-group-think emerges, students just agreeing -personality of peer social issues affect trust and openness to sharing -some voices are louder than others, some not heard	-collective meanings about emotion regulation, coping strategies, coherence -new understandings that emerge as a direct result of focus group discourse and interaction
UR	5	Individual student attitude/behaviour survey (pre/post; Exp/Control)	Themes including: awareness of stress/emotion, self-efficacy, coping, behavioural changes, self-awareness	-students in both groups mature over 5 months and become more self-aware, empathetic, develop skills/strategies in school -some students in therapy, learning additional coping strategies	-students in EG increase positive affect, self-awareness, self-efficacy, communication, empathy/perspective taking, prosocial behaviours from T1 to T2 and compared to CG
UR	6	Individual student physiological HRV data (collected throughout study)	Improvements in HRV from T1 to T2, indicating increased coherence and emotion management skills	-students practicing yoga or other exercises at home that lower their scores -students have more/less stress in their school/home schedule affecting HRV	-students increase HRV coherence scores, achievement scores from Time 1 to Time 2 as a result of practice with sensors
LR	8	Document analysis, texts, manuscripts	Themes including: priorities on "core" subjects, funding models supporting standardized testing results, outcome-based assessment, priorities for options in curricula	-other programs that require funding and are prioritized above this one -school/division "4-year plan" does not include this option program -alternative programming to support mental/emotional health is preferred	-a clear understanding of how the school, division, province support or inhibit a positive psychology program -ways to improve access to this type of programming, communication of its efficacy

*Warrants linking data to evidence and rival warrants with alternate explanations*

## Appendix M

### Student Semi-Structured Interview Questions

RQ Zone 1: *What does a student believe and understand about their ability to regulate emotions using SEL/mindfulness with biofeedback?*

#### Preamble:

Thank you for joining me today to answer a few questions about your experience in the Grade 9 Positive Psychology course. I will be audio recording your statements and feedback and then transcribing it, however, your name and any identifying information will be removed and a pseudonym will be used in its place. I have a list of possible pseudonyms if you would like to choose your own, otherwise one will be selected for you. You are welcome to stop this interview at any time, and your statements will be removed from the data collection if you wish. If you feel uncomfortable or anxious about any of the questions, during your responses, or even after the interview is complete, you may reach out for additional supports (for example, a meeting with one of the guidance counsellors). Your thoughts, beliefs, and overall experience from this course are very important to me and my research and will be handled with the utmost professionalism. I am truly honoured that you are providing me with these insights and the very valuable gift of your time. To acknowledge this, I will be entering your name into a draw for one of five \$50 gift cards. Do you have any questions before we begin?

Please state your full name and grade: \_\_\_\_\_

What is your gender? **Female**                      **Male**                      **Non-binary**                      **Other/prefer not to say**

(other demographics?)

Think back to some of the things you learned about in this course. I will be asking you to reflect on things we did in class, things you learned, and skills you acquired. If you can't remember what the term is, or concept, don't worry, just do your best. Your feedback is very valuable and important to me, just the way it is.

1. Can you describe for me what happens to your brain and body when you are anxious, stressed, or under threat? Consider what you know about different parts of your brain, and the physical sensations you have when you are stressed or anxious.
2. Can you tell me how the brain, heart, and breath are connected – and how knowing about this might affect you in your life?
3. How does knowing about your emotions help you in your daily life?
4. What does “emotional regulation” mean to you?
5. What does mindfulness mean to you? What are some of the mindfulness practices that you know about?

6. How does the HeartMath sensor and Innerbalance app work? (pretend you are teaching someone who has never used them before)
7. Has the sensor biofeedback helped you? If so, can you describe how?
8. What have been the most useful things you have learned in this course? (Describe as many as you can).
9. How do you think you could use heart-focussed breathing in other parts of your life? (Describe a few)
10. How confident are you in your ability to calm down in stressful situations (like tests, exams, or presentations)? What are some of the things you might do when faced with a stressful situation like a test, presentation, or difficult conversation?
11. Overall, what was your experience in this class like? Describe it as best you can.

## **Appendix N**

### **Developmental Perspectives Survey**

Welcome to the 2023/24 Developmental Perspectives Survey!

Instructions: You are taking this survey as part of a course at Cochrane High School. Your responses to this survey will help us evaluate your current perspective about yourself and the world you live in. This survey asks about your ideas and beliefs about social emotional wellness, social relationships, and political worldviews. This survey is NOT A TEST. There are no right or wrong responses, just your experiences.

Your responses will be kept CONFIDENTIAL. Once your survey has been submitted, your name will BE DELETED from the information you provide. Your participation is VOLUNTARY. You can finish at any time if you become uncomfortable or want to stop. It will help you and other students if you answer all of the questions HONESTLY.

Please enter your First and Last names.

Please enter your gmail address.

Please enter your gender (female, male, nonbinary, prefer not to say)

#### **UL: All about me**

1. I believe that my health is totally dependent on my behaviour – for example, what I eat or how much I exercise.
2. When I feel afraid, I go to my parents for help. A
3. Creativity is a skill that can be taught. O
4. I can feel connected to nature or to a pet. G
5. There is the same life energy running through all living things and people. TEAL
6. Rules are made to protect people. A

Complete:

1. I feel my best when ...
2. For me, growing up is ...

#### **UR: All about the Science**

1. I think that science provides us with the ultimate Truth, no matter your race, culture, or wealth. O
2. I think that people have equal chance to be whatever they want to be, and they must work hard and rise up to be successful. O
3. I believe that if people work hard they should make more money so they can buy nicer things. A
4. Climate change is real but affects people, animals, and plants in different ways, depending on where they live on the planet. G.
5. The mind and body are connected by brain cells and also by energy fields. T

Complete:

1. When I think of science, I think of...
2. Human behaviours are caused by....

### **LL: All about us**

1. I think it's better to do something you don't want to (still legal, of course) in order to fit in and be liked by your peer group. A
2. I think that everyone should be treated equally and given the same wages, homes, opportunities, benefits, no matter what they do or who they are. G?
3. I think it's important to learn more about other cultures, races, religions, and ways of living so that we can understand other peoples' points of view more clearly. T
4. I believe we are all connected in some way and that things I do influence many other people. T
5. If you work hard in school, you can get any job you want. O

Complete:

1. My thoughts on working in a group are...
2. When I think about inclusion, I think of...

### **LR: All about the system**

1. I believe that some people start out life at a disadvantage (wealth, race, ability), and should be given more support (money/assistance) than others who are well-off. G
2. I think that more time and money should be spent on marginalized groups such as LGBTQ2+, ethnic minorities, disabled, extreme poverty, and homeless people. G.
3. When crimes are committed, punishment works better than rehabilitation. A
4. The leader of a country (prime minister or president) should be in control of the people's interests – including money, rights, and freedoms. A
5. Everything in our world is connected – including plants, animals, rocks, oceans, sky, and humans. T (Indigenous)
6. Schools should enforce their rules better and kick kids out who just want to fool around and not take it seriously. O

Complete:

1. Schools would be better if...
2. The best kind of society would be....

### **Perspectives Survey (DLS)**

This survey can be found on Qualtrics using this link:

[https://survey.ucalgary.ca/jfe/form/SV\\_5dlhBljTloW0sTA](https://survey.ucalgary.ca/jfe/form/SV_5dlhBljTloW0sTA)

## Appendix O

### The Mindful Attention Awareness Scale for Adolescents (MAAS-A)

Please answer according to what really reflects your experience rather than what you think your experience should be.

Items	Almost always	Very often	Somewhat often	Somewhat rarely	Not very often	Almost never
I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what is happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I am going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I am doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I am doing.	1	2	3	4	5	6
I find myself listening to someone with 1 ear, doing something else at the same time.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I am eating.	1	2	3	4	5	6

Total score: \_\_\_\_\_

Brown, K. W., West, A. M., Loverich, T. M., & Biegel, G. M. (2011). Assessing adolescent mindfulness: validation of an adapted Mindful Attention Awareness Scale in adolescent normative and psychiatric populations. *Psychological assessment*, 23(4), 1023.  
DOI: 10.1037/a0021338



## Appendix P

### Focus Group Format, Questions, and Confidentiality Statement

#### **Format**

Students will be organized into groups of 8-10 students from the same grade. Ideally, there will be 3 groups of grade 9 students, and 1 group each of grade 10s, 11s, and 12s. The group will be arranged around a large table (in the office conference room) and will be provided with instructions about the format. After reading the initial script explaining the expectations and structure of the activity, the researcher/teacher will then ask the questions, and where needed, facilitate the conversation and provide additional information.

#### **Script**

Welcome to our Focus Group session today. Thank you so much for agreeing to be a part of this important research process. We will be discussing the features, effects, benefits, and any issues with the grade 9 positive psychology course that you took (recently – for grade 9s) (when you were in grade 9). The purpose of this focus group is to help gather additional information from your thoughts and feelings, as well as your collective interactions and new ideas that emerge within this discussion forum.

#### **Ground Rules**

There will be a series of ten questions, and after each question is read, each student will have an opportunity to respond with their own individual thoughts and feelings. They are also welcome to pass at this time if they do not wish to answer the question or would prefer more time to collect their thoughts. When someone in the group is speaking, it is important that all other members are listening attentively (without distractions from phones, computer, other people, etc) and acting in a non-judgemental and positive way. Comments, questions, and challenges about what someone has said are acceptable and encouraged, but harsh criticism and personal put-downs are not acceptable in this space. All members have equal status and power, and every thought and opinion matters and will be heard. The conversations and opinions expressed in this room and in these groups will remain private and confidential and will not be relayed to others outside of this process. In other words, what you say in this group will not be restated outside of this room. Everyone has the right to this confidentiality and privacy. You do not have to add comments if you do not feel comfortable, and as well, there is no limit to how many comments you want to add once the discussion gets going (unless time is running out). If you have any specific questions or need clarification at any time, you can always ask the group facilitator.

#### **Focus Group Questions:**

1. What are your overall thoughts, feelings, or impressions about this course? (consider the HeartMath technology (InnerBalance), Smart Brain Wise Heart program, content areas including personality theory, the science of stress, anxiety management, study skills strategies, and emotional regulation skills.
2. What is your understanding of stress and how it affects the mind and body?
3. How do you manage stress and the negative emotions (such as frustration, irritability, and inattention) that often comes with it?
4. What is your impression of the HeartMath sensor and Inner Balance app which provides you with the visual biofeedback?
5. Are there any immediate benefits to this program? If so, what are they?
6. Are there long-term benefits to this type of program? Comment.

7. Where do you see this type of program integrated into school curricula? Should it be a core course or option course?
8. Which grade level might benefit most from this type of program?
9. Would you recommend this program to anyone? Who?
10. What are some of the limitations of this program?

Exit comments: If you wish, you may add any written comments (anonymous) that you feel were missed, or that you wanted to add but were not able to add into the conversation.

## Focus Group Confidentiality Agreement

Study: ***Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social Emotional Learning on Adolescent Emotion Regulation***

Researcher: **Carolyn McLeod, MEd**

I, \_\_\_\_\_ [name], agree that I will keep all information shared with me by other participants and by the researcher confidential by not discussing or sharing the information with anyone outside of this focus group. I agree that I will not reveal the identities of any of the other members of the focus group to anyone.

\_\_\_\_\_  
Name of the participant (First, Last)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of the participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of the researcher

\_\_\_\_\_  
Date

## Appendix Q

### The Student Opinion Survey (SOS)

The SOS was developed for a previous study looking at the effects of mindfulness and SEL on test anxiety (McLeod & Boyes, 2021). The survey was issued to 105 students over two separate time periods. Validity testing? (check original study). The survey was organized into 8 categories, each with 5-7 relevant statements for students to respond to. The section relating to developmental levels was adapted from research provided by Divine (2009). There are limited available surveys and instruments relating to Wilber's developmental levels, however, those that are out there typically use sentence completion or statement identification to determine each student's applicable level of development. Divine (2009) uses an "AQAL Constellation" to view clients in therapy, which allows practitioners to understand their clients from "the client's way of orienting and translating and [their] level of each competency in each quadrant" (p. 42).

As this SOS will be administered over 2 time periods (4-5 months apart), it is also possible that the student's developmental level may change.

Welcome to the 2023/24 Student Opinion Survey (SOS)!

Instructions: You are taking this survey as part of a course at Cochrane High School. Your responses to this survey will help us evaluate your current perspective about yourself and the world you live in. This survey asks about your ideas and beliefs about social emotional wellness, social relationships, and political worldviews. This survey is NOT A TEST. There are no right or wrong responses, just your experiences.

Your responses will be kept CONFIDENTIAL. Once your survey has been submitted, your name will BE DELETED from the information you provide. Your participation is VOLUNTARY. You can finish at any time if you become uncomfortable or want to stop. It will help you and other students if you answer all of the questions HONESTLY.

Please enter your First and Last names.

Please enter your gmail address.

Please enter your gender (female, male, nonbinary, prefer not to say)

Where do you live? (5 choices given)

Who do you live with? (2 biological parents, 1 biological parent/1 step-parent, 1 parent, other relatives (grandparents, aunt/uncle, etc), other caregiver/s

What was your favourite subject in grade 8? (science, English, math, social studies, gym, art, band, outdoor ed, French)

Instructions:

Please read each of the statements carefully and answer as honestly and accurately as you can. There are no right or wrong answers, only your own individual experience.

Once the data is collected, your name will be removed and recoded for analysis purposes. Your responses will be kept confidential.

### Survey questions

Category	Question
Social awareness	1.I feel that people (family, friends) are counting on me to do well in school.
	2.I listen politely to other people's opinions, even when I don't agree with them.
	3.I can tell by looking at someone and talking to them how they are feeling.
	4.I tend to do what my friends are doing, even if I don't agree with it.
	5.I feel that students in my class are constantly judging my thoughts and behaviours.
Emotional Anxiety Indicators	1.I tend to procrastinate schoolwork which results in me feeling even more stressed out.
	2.I worry about who I will work with on a group project and this causes me stress.
	3.Giving presentations in front of the class terrifies me.
	4.I am often preoccupied by the past and this worries me.
	5.Worrying about how well I will do interferes with my preparation and performance on tests.
Physical Anxiety Indicators	1.I feel physically panicky, dizzy, and shaky during important tests or presentations.
	2.My muscles tense up in certain areas of my body during tests or presentations.
	3.My stomach becomes upset before important tests or exams.
	4.I feel relaxed and ready for important tests or exams.
	5.Having to take an important test disturbs my sleep so I don't feel rested before a test.
	6.Room noises (from lights, fans, other students) bother me during tests and exams.
	7.I often avoid stressful situations, which then makes me more anxious.
Cognitive Anxiety Indicators	1.I mentally freeze up on important tests or exams and my mind seems to go blank.
	2.After taking a test, I feel I could have done better than I actually did.
	3.During tests, I sometimes get so nervous that I forget facts I really know.
	4.I have difficulty focusing on the present moment.
	5.When I am stressed or nervous, my thoughts are racing and I have trouble focusing.
Coping Strategies	1.I use mindful breathing to calm myself down when I'm feeling stressed out.
	2.I find it helpful to do physical exercise or some other activity when I am experiencing stress.
	3.I like to help others cope with stress by teaching them the strategies that I use.
	4.There are people who are close to me (friends, family) that I can turn to for support when I am feeling a lot of stress.
	5.I feel that I have effective strategies to stay organized and on top of my schoolwork.
	6.I am confident in my ability to calm myself down before tests or class presentations.
Self-awareness and self-management	1.In the past 2 weeks, I have felt excited, joyful, cheerful.
	2.In the past 2 weeks, I have felt calm, peaceful, appreciative.
	3.In the past 2 weeks, I have felt angry, frustrated, irritated.
	4.In the past 2 weeks, I have felt sad, lonely, depressed.
	5.I think it's easier to get over negative (sad or mad) feelings by changing my thinking.
	6.I think it's easier to get over negative (sad or mad) feelings by changing my breath and heart rhythms.
	7.When I get stressed, I know what to do to calm myself down.

This survey can be found on Qualtrics:

[https://survey.ucalgary.ca/jfe/form/SV\\_5hziilUoHRtoKG2](https://survey.ucalgary.ca/jfe/form/SV_5hziilUoHRtoKG2)

## Appendix R

### HeartMath Coherence Tracking Data

**Name:** \_\_\_\_\_ **Code:** \_\_\_\_\_

[illegible]

## **Appendix S**

### **Mindfulness Script**

#### **Heart-focused Breathing script**

Get comfortable in your chair. Relax your arms and shoulders and place both feet flat on the floor. Close your eyes if you feel comfortable, or simply look down at your mandala wheel or at the scenery on the screen. Relax the muscles in your neck and back, and legs and feet. Take a deep breath in – and slowly let it out, releasing the air from your lungs. Take another deep breath in, filling your lungs deeply, and slowly release your breath. Focus your attention on the area of your heart and your breath. Continue to breathe deeply, slowly, and evenly, focussing only on your breath until you have a comfortable rhythm. If a thought comes into your mind, that's OK – just notice it, and gently let it go. Return your focus to your breath. If your mind starts to wander again, just take notice, try not to judge, and just let all of the thoughts go for now. Return to the breath – slow breath in, slow breath out.

Now that you are breathing deeply and are feeling calm and relaxed, think about something or someone you appreciate deeply. It might be a person who has been kind to you, or gave you a compliment, or showed genuine love and appreciate for you being in their lives. It might be someone whom you enjoy being with, sharing time and space with. Think about how much you value and feel gratitude towards that person. It might be a pet, who gives you unconditional love and joy every day. Feel the gratitude and appreciation you have for having this pet in your life and how it has made your life better. It might be a place that brings you immense happiness and joy, a place without worry or stress, a place of pure peacefulness. Maybe a lake, or beach, or cabin in the woods, or simply a beautiful morning with a cup of coffee and warm sun on your face. Focus on these feelings of deep gratitude and appreciation as you continue to breathe slowly and deeply.

## Appendix T

### HRV Metrics Collected from the HeartMath Sensor and Inner Balance App

Metric	Description	Citation
Challenge Level	Levels range from 1 (lowest) to 2 (15% more difficult to remain in the green zone), 3 (increased difficulty by 15%) and 4 (increased difficulty by 30%).	(HeartMath, 2018).
Coherence Score	(Low-Medium-High) – This is a measure of the heart rhythm pattern, with a coherent (green) pattern “resembling a sine wave at a single frequency between 0.04-0.24 Hz (3-15 cycles per minute)”	(HeartMath, 2018, p. 25)
Average Coherence Score	The more stable and consistent heart rhythm patterns are, the higher the ACS, with scores ranging from 0-16. Scores at 1.0 are “good”, 2.0 are “very good”, and 3.0+ are “excellent”	(HeartMath, 2018, p. 25).
Length of Session	This is the time (in minutes) for each session. The student’s app will be set to a fixed 5-minute session however they may do multiple sessions in a class	(HeartMath, 2018).
Achievement	The achievement score is measured by taking the “sum of your individual Coherence Scores during the length of a session” (HeartMath, 2018, p. 25). Thus, a higher ACS and longer session means a higher achievement score	(HeartMath, 2018).
Emotion	Students will be given an Emotional Granularity Infographic to select one (or more) emotions that they are feeling at that present time	(HeartMath, 2018).

Source: HeartMath, 2018.

#### *Detailed Sessions Screen for Five Minutes*



Source: McLeod (2023) personal device

## Appendix U

### LR Quadrant Document Sources

Institution	Title of Document	URL
Alberta Ed (2023)	Assurance and accountability in Alberta's K to 12 education system	<a href="https://www.alberta.ca/accountability-education-system.aspx">https://www.alberta.ca/accountability-education-system.aspx</a>
Alberta Ed (2023)	Social-emotional learning	<a href="https://www.alberta.ca/social-emotional-learning.aspx">https://www.alberta.ca/social-emotional-learning.aspx</a>
Alberta Ed (2020)	TQS Document	<a href="https://bit.ly/40K3hH7">bit.ly/40K3hH7</a>
Alberta Ed (2002)	Program of Studies Gr 9	<a href="https://education.alberta.ca/media/160196/health.pdf">https://education.alberta.ca/media/160196/health.pdf</a>
Alberta Ed (2021)	Building Social-Emotional Competencies: Choosing Instructional Resources	<a href="https://bit.ly/40suwFH">https://bit.ly/40suwFH</a>
Alberta Ed (2013)	Report on Social Emotional Learning	<a href="http://www.everactive.org/uploads/files/Documents/CSH/SEL-Final_2013-06-10sk.pdf">http://www.everactive.org/uploads/files/Documents/CSH/SEL-Final_2013-06-10sk.pdf</a>
RVS (2021/22)	Annual Education Results Report	<a href="https://www.rockyview.ab.ca/common/pages/DisplayFile.aspx?itemId=75372203">https://www.rockyview.ab.ca/common/pages/DisplayFile.aspx?itemId=75372203</a>
RVS (2019-23)	4 Year Plan	<a href="https://bit.ly/3JQDLZa">https://bit.ly/3JQDLZa</a>
RVS (2023)	Stepping Stones to Mental Health (Universal/Classroom programs)	<a href="https://sites.google.com/view/steppingstonestomentalhealth/programming/universal-programs">https://sites.google.com/view/steppingstonestomentalhealth/programming/universal-programs</a>
RVS (2023)	Documents Page	<a href="https://www.rockyview.ab.ca/schools/learning/RCSD_documents">https://www.rockyview.ab.ca/schools/learning/RCSD_documents</a>
CHS (2023)	Mission statement, programming	<a href="https://cochrane.rockyview.ab.ca/our-school">https://cochrane.rockyview.ab.ca/our-school</a>
CHS (2023)	Course handbook	<a href="https://cochrane.rockyview.ab.ca/2023-24-grade-9-course-description-handbook/view">https://cochrane.rockyview.ab.ca/2023-24-grade-9-course-description-handbook/view</a>
SBWH (2023)	Link to Core standards as they relate to SBWH	<a href="http://bit.ly/3ZxpXsx">http://bit.ly/3ZxpXsx</a>
CASEL (2023)	SEL in Schools	<a href="https://casel.org/systemic-implementation/sel-in-the-school/">https://casel.org/systemic-implementation/sel-in-the-school/</a>
GODDARD BOHAC-CLARKE(2007)	The Cycles of School Change: Toward an Integrated Developmental Model	<a href="https://bit.ly/3Md3SMO">https://bit.ly/3Md3SMO</a>



## Appendix V

### Valley School Division Research Proposal Approval

June 12, 2023

**Project Title:** Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Researcher:** Carolyn McLeod

**Affiliate Program:** University of Calgary

**Approval Date:** June 12, 2023

The Research Review committee has examined your proposal and is pleased to inform you of their consent to proceed with your research with the following conditions:

1. We ask that interviews and surveys whenever possible, be conducted electronically/online.
2. The final decision of participation rests with school administration, teachers, students, or parents involved.
3. This letter does not obligate participation by anyone associated with the  Division.
4. Please present this letter to school personnel when requesting access to teachers, staff and/or students. This approval does not include access to student, staff or school records.
5. In providing for knowledge mobilization in regard to the results of the study, we would ask that you provide an abstract and/or copy of this study or a link to where it may be posted upon completion.

Please ensure a current certificate of ethics is received by our office prior to your research commencing.

Upon finalization of your project, please confirm that your findings or a link to your findings have been sent to  (e.g. final report, research article, abstract of findings).

This approval to undertake the research is valid **until June 30, 2024**. Any significant changes of the above-mentioned project should be reported to the Research Review committee in advance of implementation of such changes.

We look forward to seeing the outcomes of this endeavour.

**Appendix W**  
TCPS 2: Certificate of Completion

**PANEL ON  
RESEARCH ETHICS**

*Navigating the ethics of human research*

**TCPS 2: CORE 2022**

# *Certificate of Completion*

*This document certifies that*

**Carolyn McLeod**

*successfully completed the Course on Research Ethics based on  
the Tri-Council Policy Statement: Ethical Conduct for Research  
Involving Humans (TCPS 2: CORE 2022)*

**Certificate # 0000499516**

**23 January, 2023**

**Appendix X**  
 HM Certificate of Completion – Trauma Course

+♥ HeartMath® Institute

+♥ HeartMath®

# Certificate of Completion

Proudly presented to:

Carolyn McLeod

For successfully completing 13-hours of professional development in:

**The Resilient Heart™: Trauma-Sensitive HeartMath Course**

February 19, 2023

Course Completion  
Date



Tricia A. Hoffman

Tricia A. Hoffman, Director Training and Licensing, HeartMath LLC

Jorina Elbers

Jorina Elbers, Director Trauma Recovery Project, HeartMath Institute

## Appendix Y

### List of Possible Pseudonyms

Female	Male	Nonbinary	Elizabeth	Edward	Milan	Leah	Justin		
Abbie	Aaron	Addison	Ellen	Elijah	Miley	Leslie	Karl		
Aimee	Abdul	Alex	Emily	Emmanuel	Morgan	Lily	Keith		
Alice	Adam	Amari	Emma	Eric	Nell	Linda	Kevin		
Alissa	Ahmed	Amrit	Erin	Ethan	Oakley	Lindsay	Kyle		
Allison	Aidan	Avery	Eve	Eugene	Paige	Lisa	Larry		
Amber	Alan	Beau	Evelyn	Evander	Parker	Lois	Lenny		
Amelia	Alfie	Blair	Fiona	Ezra	Pat	Lorna	Leon		
Amy	Andrew	Blake	Frances	Felippe	Pax	Lorraine	Lewis		
Andrea	Anthony	Bobbie	Francesca	Frank	Peyton	Louise	Liam		
Angela	Archie	Brogan	Freya	Fredrick	Phoenix	Lucy	Lincoln		
Anita	Asher	Casey	Gail	Gabriel	Quinn	Madeleine	Logan		
Anna	Barry	Charlie	Gemma	Gareth	Reagan	Maisie	Louis		
Annette	Benjamin	Coleman	Gloria	Gary	Regan	Mandy	Luke		
Ashley	Bill	Cooper	Grace	Gavin	Remi	Margaret	Mahdi		
Asia	Bobby	Corey	Hannah	George	Remi	Marie	Malcolm		
Ava	Bradley	Dakota	Hayley	Gerald	Riley	Marilyn	Malik	Ruth	Robert
Bailey	Brian	Daylon	Heather	Glen	River	Martha	Marcus	Sadie	Roger
Barbara	Bruce	Devon	Helen	Graham	Robin	Mary	Martin	Sally	Ronald
Basia	Caleb	Easton	Holly	Grayson	Rowan	Maureen	Mason	Samantha	Roy
Bethany	Callum	Elliott	Imogen	Gregory	Sacha	Megan	Matthew	Sandra	Russell
Betty	Cameron	Ellis	Irene	Guiermo	Sawyer	Melissa	Max	Sarah	Ryan
Beverley	Carlos	Emerson	Isabel	Harris	Shilo	Mia	Michael	Scarlett	Samir
Bonnie	Cedric	Finnegan	Jackie	Harvey	Sidney	Michelle	Michel	Shannon	Scott
Brenda	Charles	Frankie	Jade	Henry	Spencer	Millie	Miko	Sharon	Sean
Brooklyn	Christopher	Garnet	Janelle	Howard	Tatum	Molly	Mohammed	Sherry	Sebastian
Caitlin	Colin	Harper	Janet	Hudson	Taylor	Nancy	Nathan	Shirley	Simon
Carly	Craig	Hayden	Janice	Hunter	Tegan	Naomi	Neil	Sienna	Steven
Carol	Damien	Jace	Jean	Ian	Terry	Natalie	Nicholas	Simrat	Stuart
Charlotte	Daniel	Jaden	Jennifer	Idris	Tylan	Nicole+A120	Nigel	Sophie	Sylvestre
Cheryl	Dante	Jamie	Jessica	Isaac	Tyler	Nina	Noah	Stella	Ted
Chloe	Darius	Jesse	Jill	Jack	Walker	Nora	Norman	Stephanie	Terrence
Christine	David	Jody	Joanna	Jacob	Wallace	Olivia	Oliver	Susan	Theo
Claire	Dean	Jordan	Joyce	James	Willow	Paige	Owen	Talia	Thomas
Connie	Declan	Jordan	Judith	Jaques	Winter	Pamela	Pablo	Tamara	Timothy
Dana	Dennis	Kade	Judy	Jason	Xenon	Patricia	Patrick	Tanya	Tony
Danica	Derek	Kasey	Julia	Jay	Yardley	Pauline	Paul	Theresa	Travis
Dawn	Desmond	Kennedy	Karen	Jeremy	Zane	Peggy	Peter	Tina	Trent
Debbie	Dexter	Kian	Kate	Jimmy	Zasha	Phyllis	Phillip	Toni	Trevor
Denise	Diego	Kiran	Katherine	Joel		Rachel	Pierre	Valerie	Vijay
Diane	Dominic	Landon	Katie	John		Raisa	Rahul	Victoria	Vincent
Donna	Donald	Lee	Kimberly	Jonathan		Rebecca	Ralph	Virginia	Walter
Dorothy	Douglas	Mackenzie	Kirsty	Joseph		Rhiannon	Raymond	Yvonne	Wayne
Elaine	Duncan	Marley	Laila	Joshua		Rosemary	Rhys	Zahara	William
Eleanor	Dylan	Max	Laura	Julian		Ruby	Richard	Zoe	Xavier

## Appendix Z

### Copyright Permission (MAAS-A)

12/18/24, 3:07 PM

Mail - Carolyn McLeod - Outlook

#### Outlook

---

#### Fwd: Access to the MAAS-A for Research Purposes

---

From [REDACTED] >  
 Date Fri 5/5/2023 9:45 AM  
 To Carolyn McLeod <carolyn.mcleod1@ucalgary.ca>  
 (1 attachment (313 KB))  
 Screen Shot 2023-03-29 at 11.46.37 AM.png:

[AEXTERNAL]

Thanks for your interest in using the MAAS-A, and sorry for the delayed reply. You are welcome to use it. You can find the scale, along with background normative and other information, on the 'Lab > Tools for Researchers' page of my Lab website, the link for which is below. The 'Publications' page has papers related to the validation of the MAAS-A. See especially Brown, West, ~~Loverich~~ & Biegel, 2011.

All the best with your research,

[REDACTED]

---

[REDACTED]  
 Affiliate Professor  
 Department of Psychology Virginia Commonwealth University  
 T 804.687.9235

Editorial Board, Scientific Reports  
 Editorial Board, Journal of Personality

Pronouns: [REDACTED]

-----Forwarded message-----

From: Carolyn McLeod <carolyn.mcleod1@ucalgary.ca>  
 Date: wed, Mar 29, 2023 at 1:50 PM  
 Subject: Access to the MAAS-A for Research Purposes To:  
 [REDACTED]



## Appendix AA

### Letter of Invitation – Positive Psych 9



Dear Positive Psychology student,

I am pleased to invite you to participate in a study investigating the effects of HeartMath biofeedback, social-emotional learning strategies, and study skills on the reduction of anxiety and improvement of academic performance. The study will be used as research conducted in partnership with the Werklund Faculty of Education at the University of Calgary and will take place over one term. This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board (REB23-0428).

#### **What is involved?**

The study will involve completing 3 surveys (Student Opinion Survey, Perspectives Survey, and Mindfulness Awareness Survey), both before and after the course is completed. Additionally, you can select to participate in an in-person interview with Mrs. McLeod and a focus group with 8-10 of your classmates at the end of the course. An app called “InnerBalance” will be installed on your cellphone and data from the HeartMath sensors will be collected (by you writing it down on a data collection sheet) and used in the study. All data collected will be coded such that your name and personal information will be deidentified using a pseudonym. No data will be collected until after the course is complete, and none of the data collected will be used in the generation of marks for the course.

#### **Confidentiality**

All data collected will remain deidentified and confidential and will be stored in a secure location.

#### **Are there any risks?**

There are no physical risks due to being involved in this course. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in a group setting but may opt out of these situations. Additional supports can be offered to students upon request.

#### **Are there any benefits?**

Participants may learn new techniques and skills related to the management of stress and anxiety. They may master the ability to self-regulate their own anxiety, particularly when faced with school assessments. The carry-over effects may lend themselves to other academic classes. Students may develop self-efficacy and greater self-esteem towards stressful school-related experiences as well as other life experiences that might benefit from stress management strategies.

#### **Additional considerations:**

Heart Math sensors will be assigned individually to be kept in a bin for each student throughout the course. A tablet will be provided for any student who does not have a personal device such as a phone.

If you have any questions or concerns, you may contact me using the information below.

Sincerely,

**Carolyn McLeod, EdD Candidate**

Psychology teacher

Cochrane High School/University of Calgary

403.932.2542

[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

**Veronika Bohac Clark, PhD**

Associate Professor

Werklund School of Education

University of Calgary

403.220.3363

[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)



## Appendix BB



### Letter of Invitation – Grade 9 student (control group)

Dear Grade 9 student,

I am pleased to invite you to participate in a study investigating the effects of HeartMath biofeedback technology, social-emotional learning strategies, and study skills on the stress and emotion regulation. The study will be used as research conducted in partnership with the Werklund Faculty of Education at the University of Calgary and will take place over one term.

This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board.

#### What is involved?

The study will involve completing 2 surveys both before and after the term is completed. The surveys will be focused on social emotional learning, and mindfulness. This course will follow the usual Foods/Leadership curriculum objectives and outcomes. This course will be used simply as a control group for data comparison with an experimental group which will take Positive Psychology 9 which will include topics such as: social emotional learning strategies, stress and anxiety awareness and management, mindfulness practice, and other study skills.

#### Confidentiality

All data collected will remain anonymous and confidential and will be stored in a secure location.

#### Are there any risks?

There are no physical risks due to being involved in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety.

#### Are there any benefits?

Participants who do recognize that they might experience stress or anxiety after completing the survey may wish to enroll in the Positive Psychology course which teaches anxiety reduction skills and strategies. Additionally, an appointment with the guidance counsellor can be made to assist further.

If you have any questions or concerns, you may contact me using the information below.

Thank you in advance for your interest and participation in this study.

Sincerely,

**Carolyn McLeod, EdD Candidate**

Psychology teacher

Cochrane High School/University of Calgary

403.932.2542

[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

**Veronika Bohac Clark, PhD**

Associate Professor

Werklund School of Education

University of Calgary

403.220.3363

[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)



## Appendix CC

### Letter of Invitation – PP9 Alumnus



Dear Positive Psychology alumnus,

I am pleased to invite you back to participate in a study investigating the effects of HeartMath biofeedback, social-emotional learning strategies, and study skills on the reduction of anxiety and improvement of academic performance. The study will be used as research conducted in partnership with the Werklund Faculty of Education at the University of Calgary and will take place over one semester. This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board (REB23-0428).

#### **What is involved?**

The study will involve participating in an in-person interview with Ms. McLeod at some point during the school year. Additionally, you will be asked to participate in a small 8-10 person focus group (with your classmates). All data collected will be coded such that your name and personal information will be deidentified and replaced with a pseudonym. None of the data collected will be used in the generation of marks for any course at Cochrane High School.

#### **Confidentiality**

All data collected will remain deidentified and confidential and will be stored in a secure location.

#### **Are there any risks?**

There are no physical risks due to being involved in this follow-up portion of the study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings but may opt out of these situations. Additional supports can be offered to students upon request.

#### **Are there any benefits?**

Participants may have the opportunity to revisit techniques and skills related to the management of stress and emotional regulation. The carry-over effects may lend themselves to other academic class and potentially improve their academic performance. Students have the opportunity to discuss biofeedback, mindfulness, and emotional regulation strategies with Ms. McLeod throughout the interview. Students may request additional supports in any of these areas if wanted or needed.

If you have any questions or concerns, you may contact me using the information below.  
Thank you in advance for your interest and participation in this study.

Sincerely,

**Carolyn McLeod, EdD Candidate**

Psychology teacher

Cochrane High School/University of Calgary

403.932.2542

[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

**Veronika Bohac Clark, PhD**

Associate Professor

Werklund School of Education

University of Calgary

403.220.3363

[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)



## Appendix DD

### Parent/Guardian Consent PP9




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

The purpose of this study is to study the effects of Social Emotional Learning (SEL) and study skills strategies along with HeartMath biofeedback sensors on emotional regulation and coherence to increase coping skills and strategies related to stress reduction. The specific area of study will address the effectiveness and development of key curricular components such as emotional regulation, communication, time management and organization, study strategies, decision making, and stress management for Grade 9 students making the often-times challenging transition into high school. The SEL and study skills strategies along with the HeartMath instruction and practice will take place during a Positive Psychology 9 course during the 2023/24 school year at Cochrane High School.

## What Will My Child Be Asked To Do?

### 1. Surveys:

Your child will take part in classroom activities involving emotional regulation, study skills strategies, mindfulness and calming techniques, as well as other related classroom learning tasks. Your child will complete 3 self-assessment surveys. The Student Opinion Survey (SOS) asks questions about emotional well-being, school and social awareness, anxiety sources and symptoms, and coping strategies. The Perspectives Survey (PS) asks questions about the student's personal and global perspectives. Both of these surveys are online. The Mindful Attention Awareness Scale for Adolescents (MAAS-A) is a paper survey about mindfulness, attention, and awareness. The SOS and MAAS-A surveys will be taken at the beginning of the Positive Psychology 9 (PP9) course and then again at the end of the course (approximately 2 months apart). The purpose of having your child take these surveys twice is to allow for comparison before and after the course, and also to a control group of students who have not taken this course. The PS survey will only be taken once, at the beginning of the course, to determine the personal and global perspectives your child has. The surveys use Likert scales (5- and 7-point) as well as sentence completions. Each survey takes approximately 15-20 minutes to complete.

Sample Questions from the SOS:

- I tend to procrastinate schoolwork which results in me feeling even more stressed out.
- I feel that I have effective strategies to stay organized and on top of my schoolwork.

Sample Questions from the PS:

- I believe that some people start out life at a disadvantage (wealth, race, ability), and should be given more support (money/assistance) than others who are well-off.
- I believe that my health is totally dependent on my behaviour – for example, what I eat or how much I exercise.

Sample Questions from the MAAS-S:

- I could be experiencing some emotion and not be conscious of it until some time later.
- I find it difficult to stay focused on what is happening in the present.

### 2. Interview:

Your child will be asked to take part in an in-person interview with Ms. McLeod at the end of the course (after marks are submitted). This interview will take approximately 30-45 minutes to complete and will examine your child's thoughts and feelings about the class experience.

Sample interview questions:

12. How does knowing about your emotions help you in your daily life?
13. What does "emotional regulation" mean to you?
14. Has the sensor biofeedback helped you? If so, can you describe how?
15. What was your experience in this class like for YOU? Describe how you felt during this class and how you feel about that experience now.

### 3. Focus group:

Your child will be asked to participate in a small focus group with 8-10 of their classmates to discuss their individual and collective experiences. Students will be given equal opportunities to speak and discuss their ideas, however, can also pass or refrain from commenting if they do not feel comfortable. At the beginning of the focus group, your child will be asked to sign a statement of confidentiality to protect the statements issued by the other members of the group.

At the conclusion of the focus group, your student will be given an exit slip to write down any additional information that they might want to add to the focus group discussion. The exit slip is voluntary.

Sample focus group questions:

11. Are there long-term benefits to this type of program? Comment.
12. Where do you see this type of program integrated into school curricula? Should it be a core course or option course?
13. Which grade level might benefit most from this type of program?
14. How did this course make you feel?

The interview and focus group will be conducted at some time during the 2023/24 school year (booked by the student on a Google doc). Both the interview and focus group will investigate thoughts and feelings about the class experience. Both sessions will be audio-recorded and transcripts (written accounts of what was said) will be used to identify themes from the individual and collective experiences. Additionally, both the interview and focus groups will be conducted by Ms. McLeod. Ideally, the interview and focus group sessions will take place in person in a quiet office space at school, however, a Zoom interview or focus group can also be used as a replacement if conditions change.

#### 4. HeartMath sensor data

Your child will learn how to use the HeartMath sensor (a small device that clips on to the earlobe) and measures heart rate variability, which can be used to determine how well the heart, breath, and mind are in coherence (a measure of emotion regulation). The sensor connects to their phone or tablet, with a downloaded (free) app called Inner Balance. Students are able to collect data regarding their level of mental and emotional stress, as well as see in real time their ability to calm down using techniques such as mindfulness and other focusing strategies. At the end of the course, students will have an opportunity to reflect on their data and then hand in their written recordings. Your child's phone will not be accessed directly for data collection. The HeartMath sensors are owned by Rocky View Schools and will be used by the students while at school. If your child does not have a cell phone or tablet, one will be provided for the duration of the course.

Participation in this study is completely voluntary, and you or your child may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time without penalty. It is important to know, however, that statements given during the focus group will not be able to be withdrawn, given the complexity and interaction of students in conversation.

After the interview is complete and transcripts have been constructed, your child will be given the opportunity to meet with Ms. McLeod to review the transcript and add, delete, or edit any statements that were originally made during the interview. Your child will have up to **one month** to make any necessary changes or decide to withdraw from the study altogether. After the month has elapsed, the data will be processed and analyzed and will no longer be able to be withdrawn.

### What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which the student can select) such that data will be kept confidential but will not be completely anonymized. The transcribed statements from the interview and focus group sessions will only be used with the pseudonym, and only after your student has had the opportunity to read through their statements and make changes if needed. Audio files will only be used by Ms. McLeod and will not be shared or used directly in any publication.

There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

**I grant permission for my child to be interviewed:** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission for my child to complete 3 surveys (at 2 time intervals):** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission for my child's HeartMath paper recording to be collected:** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission for my child to participate in a focus group:** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission for my child to be audio-recorded:** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission for my child to use a pseudonym to protect their privacy:** Yes: \_\_\_\_ No: \_\_\_\_

## Are there Risks or Benefits if My Child Participates?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if they wish they can opt out of these situations. If your child becomes upset or anxious during any part of the study, he/she/they will have access to counselling support as part of the regular school mental health and counselling support system.

Your child may learn new techniques and skills related to the management of anxiety and school preparation.

Your child may master the ability to self-regulate their own anxiety, particularly when faced with high stakes tests and performances. The carry-over effects may lend themselves to other academic class and might improve their academic performance. Your child may develop more positive feelings towards test taking and other stressful school-related experiences as they become proficient at the numerous strategies that will be delivered in this course.

If your child agrees to all 4 parts of this study (surveys, interview, focus group, HeartMath data sheet), then he/she/they will be entered into a draw for a \$50 gift card, as well as will receive a small gift bag after the interview as a token of appreciation.

## What Happens to the Information My Child Provides?

The information provided by your student will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer. Student information collected includes pre- and post-course surveys, an individual interview relating to the experience with collected audio files and transcripts, focus group audio files and transcripts, and data collected from your child's hand-written recording of their HeartMath sessions.

Participants are free to withdraw from this study until **one month after data collection**. At this time, if the participant still wants to withdraw, any data that can be destroyed will be at this time. As stated, it is impossible to withdraw data provided in the focus groups, as the statements become intertwined. The pseudonym for that participant, or any quotes given, would not appear in the final thesis, however. Data collected from the surveys, interview, and focus groups will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased. Hard copy data will be kept in a locked filing cabinet in the school's main office.

Would you like to receive a summary of the study's results?

Yes: \_\_\_\_ No: \_\_\_\_

If yes, please provide your contact information (e-mail address, or phone number)

---



---

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

**Parent/Guardian's Name: (please print)** \_\_\_\_\_

**Parent/Guardian's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Researcher's Name: (please print)** \_\_\_\_\_

**Researcher's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your student's participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542  
[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

*or*

Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form

## Appendix EE

### Parent/Caregiver Consent – Options (CG)




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

The purpose of this study is to study the effects of Social Emotional Learning (SEL) and study skills strategies along with HeartMath biofeedback sensors on emotional regulation and coherence to increase coping skills and strategies related to stress reduction. The specific area of study will address the effectiveness and development of key curricular components such as emotional regulation, communication, time management and organization, study strategies, decision making, and stress management for Grade 9 students making the often-times challenging transition into high school. Your child will be participating in the Control group, as they are not currently registered in this Positive Psychology 9 course. They will be completing two surveys to act as a comparison for the students who will be learning SEL and mindfulness strategies.

## What Will My Child Be Asked To Do?

### 5. Surveys:

Your child will complete 2 self-assessment surveys. The Student Opinion Survey (SOS) is an online survey that asks questions about emotional well-being, school and social awareness, anxiety sources and symptoms, and coping strategies. The Mindful Attention Awareness Scale for Adolescents (MAAS-A) is a paper survey about mindfulness, attention, and awareness. The SOS and MAAS-A surveys will be taken at the beginning of the option course that your child is currently registered in and then again at the end of the course. Each survey takes approximately 15-20 minutes to complete. The purpose of having your child take these surveys twice is to allow for comparison before and after the course, and also to a group of students who are currently registered in Positive Psychology 9. The surveys use Likert scales (5- and 7-point) (For example: almost never, not very often, somewhat often, very often, almost always).

Sample Questions from the SOS:

- I tend to procrastinate schoolwork which results in me feeling even more stressed out.
- I feel that I have effective strategies to stay organized and on top of my schoolwork.

Sample Questions from the MAAS-S:

- I could be experiencing some emotion and not be conscious of it until some time later.
- I find it difficult to stay focused on what is happening in the present.

## What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which the student can select) such that data will be kept confidential but will not be completely anonymized. The reason for this is to link the results from the survey taken at the beginning of the course, and the one taken at the end.

There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

I grant permission for my child to complete 2 surveys (at 2 time intervals):	Yes: ____ No: ____
I grant permission for my child to use a pseudonym to protect their privacy:	Yes: ____ No: ____

## Are there Risks or Benefits if My Child Participates?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if they wish they can opt out of these situations. If your child becomes upset or anxious during any part of the study, he/she/they will have access to counselling support as part of the regular school mental health and counselling support system.

Your child will be given a small candy or treat for participating in this study.

## What Happens to the Information My Child Provides?

The information provided by your student will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will



have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer.

Student information collected includes two surveys (SOS and MAAS-A) which will be completed at 2 time points (once at the beginning of the course and then again near the end of the course, approximately 2 months apart).

Participants are free to withdraw from this study until **one month after data collection**. At this time, if the participant still wants to withdraw, any data that can be destroyed will be at this time. Data collected from the SOS survey will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased. Hard copy data (MAAS-A) will be kept in a locked filing cabinet in the school's main office.

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

**Parent/Guardian's Name: (please print)** \_\_\_\_\_

**Parent/Guardian's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Researcher's Name: (please print)** \_\_\_\_\_

**Researcher's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your student's participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542

[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

*or*

Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363

[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

## Appendix FF

### Parent/Guardian Consent – Alumnus




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

The purpose of this study is to study the effects of Social Emotional Learning (SEL) and study skills strategies along with HeartMath biofeedback sensors on emotion regulation and coherence to increase coping skills and strategies related to stress reduction. The SEL and study skills strategies along with the HeartMath instruction and practice took place during a Positive Psychology 9 course when your student was in grade 9 at Cochrane High School. This study will examine any thoughts and feelings that your student might have as a result of taking this course when they were in Grade 9.

## What Will My Student Be Asked To Do?

While in grade 9, your student took part in the Positive Psychology 9 class, which involved classroom activities involving emotion regulation, study skills strategies, mindfulness and calming techniques, as well as other related classroom learning tasks. This study is looking at long-term effects from having been in this class. A 30-45 minute interview will be conducted at some time during the 2023/24 school year (booked by the student) as well as a 45-60 minute focus group involving conversation with 8-10 other classmates from this course. Both the interview and focus group will investigate thoughts and feelings about the class experience. Both sessions will be audio-recorded and transcripts (written accounts of what was said) will be used to identify themes from the individual and collective experiences. Additionally, both the interview and focus groups will be conducted by Ms. McLeod. Ideally, the interview and focus group sessions will take place in person in a quiet office space at school, however, a Zoom interview or focus group can also be used as a replacement if conditions change.

Examples of questions from the interview are:

16. How does knowing about your emotions help you in your daily life?
17. What does “emotional regulation” mean to you?
18. Has the sensor biofeedback helped you? If so, can you describe how?
19. What was your experience in this class like for YOU? Describe how you felt during this class and how you feel about that experience now.

Examples of questions from the focus group are:

15. Are there long-term benefits to this type of program? Comment.
16. Where do you see this type of program integrated into school curricula? Should it be a core course or option course?
17. Which grade level might benefit most from this type of program?
18. How did this course make you feel?

At the beginning of the focus group, your student will be asked to sign a statement of confidentiality to protect the statements issued by the other members of the group.

At the conclusion of the focus group, your student will be given an exit slip to write down any additional information that they might want to add to the focus group discussion.

Participation in this study is completely voluntary, and you or your student may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time without penalty. It is important to know, however, that statements given during the focus group will not be able to be withdrawn, given the complexity and interaction of students in conversation.

After the interview is complete and transcripts have been constructed, your student will be given the opportunity to meet with Ms. McLeod to review the transcript and add, delete, or edit any statements that were originally made during the interview.

## What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which the student can select) such that data will be kept confidential but will not be completely anonymized. The transcribed statements from the interview and focus group sessions will only be used with the pseudonym, and only after your student has had the opportunity to read through their statements and make changes if needed. Audio files will only be used by Ms. McLeod and will not be shared or used directly in any publication.

There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

- I grant permission for my student to be interviewed:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission for my student to participate in a focus group:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission for my student to be audio-recorded:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission for my student to use a pseudonym to protect their privacy:** Yes: \_\_\_\_ No: \_\_\_\_

## Are there Risks or Benefits if My Student Participates?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if they wish they can opt out of these situations. If your student becomes upset or anxious during any part of the study, he/she/they will have access to counselling support as part of the regular school mental health and counselling support system.

Your student will have the opportunity to revisit the techniques and skills previously learned related to the management of anxiety and school preparation. The carry-over effects from this previous course may lend themselves to other academic class and might improve their academic performance. Your student may develop more positive feelings towards test taking and other stressful school-related experiences as they revisit the strategies and techniques learned from the positive psych course.

If your student agrees to both parts of this study (interview and focus group), then he/she/they will be entered into a draw for a \$50 gift card, as well as will receive a small gift bag after the interview as a token of appreciation.

## What Happens to the Information My Student Provides?

The information provided by your student will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer.

Participants are free to withdraw from this study until **one month after data collection**. At this time, if the participant still wants to withdraw, any data that can be destroyed will be at this time. As stated, it is impossible to withdraw data provided in the focus groups, as the statements become intertwined. The pseudonym for that participant, or any quotes given, would not appear in the final thesis, however. Data collected from the interview and focus groups will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased.

Would you like to receive a summary of the study's results?

Yes: \_\_\_\_ No: \_\_\_\_

If yes, please provide your contact information (e-mail address, or phone number)

---

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

**Participant's Name: (please print)** \_\_\_\_\_

**Participant's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Researcher's Name: (please print) \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your student's participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542

[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

*or*

Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363

[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

## Appendix GG

### Student Assent – PP9




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

You are being asked to take part in this research study because I am trying to learn more about the effects of mindfulness biofeedback and study skills strategies on anxiety in the hopes of helping you manage stress and regulate emotions. I am asking you to be in the study because I would like to compare feelings of anxiety and knowledge about school strategies before and after learning the important features of the course. About 65 students will be in this study (from 3 Positive Psychology classes). Your experience in this class is unique and important to me as I am trying to find out which parts are most effective for helping with emotion regulation and stress reduction and why.

## What Will I Be Asked To Do?

### 6. Surveys:

You will take part in classroom activities involving emotional regulation, study skills strategies, mindfulness and calming techniques, as well as other related classroom learning tasks. You will complete 3 self-assessment surveys. The Student Opinion Survey (SOS) asks questions about emotional well-being, school and social awareness, anxiety sources and symptoms, and coping strategies. The Perspectives Survey (PS) asks questions about your personal and global perspectives. Both of these surveys are online and will take approximately 15-20 minutes each to complete. The Mindful Attention Awareness Scale for Adolescents (MAAS-A) is a paper survey about mindfulness, attention, and awareness. The SOS and MAAS-A surveys will be taken at the beginning of the Positive Psychology 9 (PP9) course and then again at the end of the course (approximately 2 months apart). The purpose of having you take these surveys twice is to allow for comparison before and after the course, and also to a control group of students who have not taken the course. The PS survey will only be taken once, at the beginning of the course, to determine the personal and global perspectives you have. The surveys use Likert scales (5- and 7-point) as well as sentence completions.

Sample Questions from the SOS:

- I tend to procrastinate schoolwork which results in me feeling even more stressed out.
- I feel that I have effective strategies to stay organized and on top of my schoolwork.

Sample Questions from the PS:

- I believe that some people start out life at a disadvantage (wealth, race, ability), and should be given more support (money/assistance) than others who are well-off.
- I believe that my health is totally dependent on my behaviour – for example, what I eat or how much I exercise.

Sample Questions from the MAAS-S:

- I could be experiencing some emotion and not be conscious of it until some time later.
- I find it difficult to stay focused on what is happening in the present.

### 7. Interview:

You will be asked to take part in an in-person interview with Ms. McLeod at the end of the course (after marks are submitted). This interview will take approximately 30-45 minutes to complete and will examine your thoughts and feelings about the class experience.

Sample interview questions:

20. How does knowing about your emotions help you in your daily life?
21. What does “emotional regulation” mean to you?
22. Has the sensor biofeedback helped you? If so, can you describe how?
23. What was your experience in this class like for YOU? Describe how you felt during this class and how you feel about that experience now.

### 8. Focus group:

You will be asked to participate in a small focus group with 8-10 of your classmates to discuss your individual and collective experiences. Students will be given equal opportunities to speak and discuss their ideas, however, can also pass or refrain from commenting if they do not feel comfortable. At the beginning of the focus group, you will be asked to sign a statement of confidentiality to protect the statements issued by the other members of the group.

At the conclusion of the focus group, you will be given an exit slip to write down any additional information that you might want to add to the focus group discussion. The exit slip is voluntary.

Sample focus group questions:

19. Are there long-term benefits to this type of program? Comment.
20. Where do you see this type of program integrated into school curricula? Should it be a core course or option course?
21. Which grade level might benefit most from this type of program?
22. How did this course make you feel?

The interview and focus group will be conducted at some time during the 2023/24 school year (booked by you on a Google doc). Both the interview and focus group will investigate thoughts and feelings about the class experience. Both sessions will be audio-recorded and transcripts (written accounts of what was said) will be used to identify themes from the individual and collective experiences. Additionally, both the interview and focus groups will be conducted by Ms. McLeod. Ideally, the interview and focus group sessions will take place in person in a quiet office space at school, however, a Zoom interview or focus group can also be used as a replacement if conditions change.

### 9. HeartMath sensor data

You will learn how to use the HeartMath sensor (a small device that clips on to the earlobe) and measures heart rate variability, which can be used to determine how well the heart, breath, and mind are in coherence (a measure of emotion regulation). The sensor connects to their phone or tablet, with a downloaded (free) app called Inner Balance. You will be able to collect data regarding your level of mental and emotional stress, as well as see in real time your ability to calm down using techniques such as mindfulness and other focusing strategies. At the end of the course, you will have an opportunity to reflect on your data and then hand in your written recordings. Your phone will not be accessed for data collection. The HeartMath sensors are owned by Rocky View Schools and will be used by the students while at school. If you do not have a cell phone or tablet, one will be provided for the duration of the course.

Participation in this study is completely voluntary, and you may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time without penalty. It is important to know, however, that statements given during the focus group will not be able to be withdrawn, given the complexity and interaction of students in conversation.

After the interview is complete and transcripts have been constructed, you will be given the opportunity to meet with Ms. McLeod to review the transcript and add, delete, or edit any statements that were originally made during the interview. You will have up to **one month** to make any necessary changes or decide to withdraw from the study altogether. After the month has elapsed, the data will be processed and analyzed and will no longer be able to be withdrawn.

## What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which you can select for yourself) such that data will be kept confidential but will not be completely anonymized. The transcribed statements from the interview and focus group sessions will only be used with the pseudonym, and only after you have had the opportunity to read through your statements and make changes if needed. Audio files will only be used by Ms. McLeod and will not be shared or used directly in any publication.



There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

- I grant permission to be interviewed:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission to complete 3 surveys (at 2 time intervals):** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission for my HeartMath paper recording to be collected:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission to participate in a focus group:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission to be audio-recorded:** Yes: \_\_\_\_ No: \_\_\_\_
- I grant permission to use a pseudonym to protect my privacy:** Yes: \_\_\_\_ No: \_\_\_\_
- Pseudonym requested:** \_\_\_\_\_

## Are there Risks or Benefits if I Participate?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if they wish they can opt out of these situations. If you become upset or anxious during any part of the study, you will have access to counselling support as part of the regular school mental health and counselling support system. You may learn new techniques and skills related to the management of anxiety and school preparation. You may master the ability to self-regulate their own anxiety, particularly when faced with high stakes tests and performances. The carry-over effects may lend themselves to other academic class and might improve their academic performance. You may develop more positive feelings towards test taking and other stressful school-related experiences as they become proficient at the numerous strategies that will be delivered in this course. If you agree to all 4 parts of this study (surveys, interview, focus group, HeartMath data sheet), then you will be entered into a draw for a \$50 gift card, as well as will receive a small gift bag after the interview as a token of appreciation

## What Happens to the Information I Provide?

The information that you provide will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer.

Student information collected includes pre- and post-course surveys, an individual interview relating to the experience with collected audio files and transcripts, focus group audio files and transcripts, and data collected from your hand-written recording of their HeartMath sessions.

Participants are free to withdraw from this study until **one month after data collection**. At this time, if you still want to withdraw, any data that can be destroyed will be at this time. As stated, it is impossible to withdraw data provided in the focus groups, as the statements become intertwined. Your pseudonym, or any quotes given, would not appear in the final thesis, however. Data collected from the surveys, interview, and focus groups will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased. Hard copy data will be kept in a locked filing cabinet in the school's main office.

Would you like to receive a summary of the study's results?

Yes: \_\_\_\_ No: \_\_\_\_

If yes, please provide your contact information (e-mail address, or phone number)

---



---

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation. Consent from your parent/guardian will also be required in order to participate in this study.

**Name: (please print)** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Researcher's Name: (please print) \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542  
[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)  
*or*  
Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

## Appendix HH

### Student Assent – Control Group




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

The purpose of this study is to study the effects of Social Emotional Learning (SEL) and study skills strategies along with HeartMath biofeedback sensors on emotional regulation and coherence to increase coping skills and strategies related to stress reduction. The specific area of study will address the effectiveness and development of key curricular components such as emotional regulation, communication, time management and organization, study strategies, decision making, and stress management for Grade 9 students making the often-times challenging transition into high school. You will be participating in the Control group, as you are not currently registered in this Positive Psychology 9 course. You will be completing two surveys to act as a comparison for the students who will be learning SEL and mindfulness strategies.

## What Will I Be Asked To Do?

### 10. Surveys:

You will complete 2 self-assessment surveys. The Student Opinion Survey (SOS) is an online survey that asks questions about emotional well-being, school and social awareness, anxiety sources and symptoms, and coping strategies. The Mindful Attention Awareness Scale for Adolescents (MAAS-A) is a paper survey about mindfulness, attention, and awareness. The SOS and MAAS-A surveys will be taken at the beginning of the option course that you are currently registered in and then again at the end of the course. Each survey takes approximately 15-20 minutes to complete. The purpose of having you take these surveys twice is to allow for comparison before and after the course, and also to a group of students who are currently registered in Positive Psychology 9. The surveys use Likert scales (5- and 7-point) (For example: almost never, not very often, somewhat often, very often, almost always).

Sample Questions from the SOS:

- I tend to procrastinate schoolwork which results in me feeling even more stressed out.
- I feel that I have effective strategies to stay organized and on top of my schoolwork.

Sample Questions from the MAAS-S:

- I could be experiencing some emotion and not be conscious of it until some time later.
- I find it difficult to stay focused on what is happening in the present.

## What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which the student can select) such that data will be kept confidential but will not be completely anonymized. The reason for this is to link the results from the survey taken at the beginning of the course, and the one taken at the end.

There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

**I grant permission to complete 2 surveys (at 2 time intervals):** Yes: \_\_\_\_ No: \_\_\_\_

**I grant permission to use a pseudonym to protect my privacy:** Yes: \_\_\_\_ No: \_\_\_\_

**Pseudonym requested:** \_\_\_\_\_

## Are there Risks or Benefits if I Participate?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if they wish they can opt out of these situations. If you become upset or anxious during any part of the study, you will have access to counselling support as part of the regular school mental health and counselling support system. You will be given a small candy or treat for participating in this study.

## What Happens to the Information I Provide?

The information that you provide will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer.

Student information collected includes two surveys (SOS and MAAS-A) which will be completed at 2 time points (once at the beginning of the course and then again near the end of the course, approximately 2 months apart).

Participants are free to withdraw from this study until **one month after data collection**. At this time, if you still want to withdraw, any data that can be destroyed will be at this time. Data collected from the SOS survey will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased. Hard copy data (MAAS-A) will be kept in a locked filing cabinet in the school's main office.

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

Name: (please print) \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Researcher's Name: (please print) \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542  
[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

or

Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form

## Appendix II




---

**Name of Researcher, Faculty, Department, Telephone & Email:**

Carolyn McLeod, EdD Candidate  
 Graduate Studies  
 Werklund School of Education  
 403.932.2542  
[carolynmcleod1@ucalgary.ca](mailto:carolynmcleod1@ucalgary.ca)

**Supervisor:**

Veronika Bohac Clarke, PhD  
 Associate Professor  
 Werklund School of Education  
 403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

**Title of Project:**

Using Integral Theory to Study the Effectiveness of HeartMath Biofeedback and Social-Emotional Learning in Adolescent Emotion Regulation

**Sponsor:** NA

---

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

**Participation is completely voluntary and confidential.**

## Purpose of the Study

The purpose of this study is to study the effects of Social Emotional Learning (SEL) and study skills strategies along with HeartMath biofeedback sensors on emotion regulation and coherence to increase coping skills and strategies related to stress reduction. The SEL and study skills strategies along with the HeartMath instruction and practice took place during a Positive Psychology 9 course when you were in grade 9 at Cochrane High School. This study will examine any thoughts and feelings that you might have as a result of taking this course when you were in Grade 9.

## What Will I Be Asked To Do?

While in grade 9, you took part in the Positive Psychology 9 class, which involved classroom activities involving emotion regulation, study skills strategies, mindfulness and calming techniques, as well as other related classroom

learning tasks. This study is looking at long-term effects from having been in this class. A 30-45 minute interview will be conducted at some time during the 2023/24 school year (booked by you) as well as a 45-60 minute focus group involving conversation with 8-10 other classmates from this course. Both the interview and focus group will investigate thoughts and feelings about the class experience. Both sessions will be audio-recorded and transcripts (written accounts of what was said) will be used to identify themes from the individual and collective experiences. Additionally, both the interview and focus groups will be conducted by Ms. McLeod. Ideally, the interview and focus group sessions will take place in person in a quiet office space at school, however, a Zoom interview or focus group can also be used as a replacement if conditions change.

Examples of questions from the interview are:

- 24. How does knowing about your emotions help you in your daily life?
- 25. What does “emotional regulation” mean to you?
- 26. Has the sensor biofeedback helped you? If so, can you describe how?
- 27. What was your experience in this class like for YOU? Describe how you felt during this class and how you feel about that experience now.

Examples of questions from the focus group are:

- 23. Are there long-term benefits to this type of program? Comment.
- 24. Where do you see this type of program integrated into school curricula? Should it be a core course or option course?
- 25. Which grade level might benefit most from this type of program?
- 26. How did this course make you feel?

At the beginning of the focus group, you will be asked to sign a statement of confidentiality to protect the statements issued by the other members of the group.

At the conclusion of the focus group, you will be given an exit slip to write down any additional information that they might want to add to the focus group discussion.

Participation in this study is completely voluntary, and you may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time without penalty. It is important to know, however, that statements given during the focus group will not be able to be withdrawn, given the complexity and interaction of students in conversation.

After the interview is complete and transcripts have been constructed, you will be given the opportunity to meet with Ms. McLeod to review the transcript and add, delete, or edit any statements that were originally made during the interview.

## What Type of Personal Information Will Be Collected?

Student names (first, last), gender (identified by the student), and age/grade level will be gathered. Personal identifiers will be immediately converted to a pseudonym (which you can select) such that data will be kept confidential but will not be completely anonymized. The transcribed statements from the interview and focus group sessions will only be used with the pseudonym, and only after you have had the opportunity to read through their statements and make changes if needed. Audio files will only be used by Ms. McLeod and will not be shared or used directly in any publication.

There are several options for you to consider if you decide to take part in this research. You can choose all, some, or none of them. Please review each of these options and choose Yes or No:

<b>I grant permission to be interviewed:</b>	<b>Yes: ____ No: ____</b>
<b>I grant permission to participate in a focus group:</b>	<b>Yes: ____ No: ____</b>
<b>I grant permission to be audio-recorded:</b>	<b>Yes: ____ No: ____</b>
<b>I grant permission to use a pseudonym to protect my privacy:</b>	<b>Yes: ____ No: ____</b>
<b>Pseudonym requested: _____</b>	

## Are there Risks or Benefits if I Participate?

There are no physical risks due to participation in this study. Some students may feel uncomfortable self-reporting on emotional well-being and feelings of anxiety. Some students may have difficulty discussing feelings of anxiety in group settings and if you wish you can opt out of these situations. If you become upset or anxious during any part of the study, you will have access to counselling support as part of the regular school mental health and counselling support system.

You will have the opportunity to revisit the techniques and skills previously learned related to the management of anxiety and school preparation. The carry-over effects from this previous course may lend themselves to other academic class and might improve your academic performance. You may develop more positive feelings towards test taking and other stressful school-related experiences as you revisit the strategies and techniques learned from the positive psych course.

If you agree to both parts of this study (interview and focus group), then you will be entered into a draw for a \$50 gift card, as well as will receive a small gift bag after the interview as a token of appreciation.

## What Happens to the Information I Provide?

The information that you provide will be deidentified with a pseudonym and will only be accessible by the student investigator (Ms. McLeod) and the principal investigator (Dr. Bohac Clarke). Only Ms. McLeod will have access to the original personal identifiers. The personal identifiers (original name) will not be shared anywhere in the research and will be kept confidential on an encrypted computer.

Participants are free to withdraw from this study until **one month after data collection**. At this time, if you still want to withdraw, any data that can be destroyed will be at this time. As stated, it is impossible to withdraw data provided in the focus groups, as the statements become intertwined. The pseudonym for that participant, or any quotes given, would not appear in the final thesis, however.

Data collected from the interview and focus groups will be stored for five years on an encrypted computer hard drive, at which time, it will be permanently erased.



Would you like to receive a summary of the study's results?

Yes: \_\_\_\_ No: \_\_\_\_

If yes, please provide your contact information (e-mail address, or phone number)

## Signatures

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

**Participant's Name: (please print)** \_\_\_\_\_

**Participant's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Researcher's Name: (please print)** \_\_\_\_\_

**Researcher's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Carolyn McLeod, EdD Candidate  
Graduate Studies/Werklund School of Education  
403.932.2542  
[carolyn.mcleod1@ucalgary.ca](mailto:carolyn.mcleod1@ucalgary.ca)

*or*

Veronika Bohac Clark, PhD  
Associate Professor  
Werklund School of Education  
403.220.3363  
[bohac@ucalgary.ca](mailto:bohac@ucalgary.ca)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email [cfreb@ucalgary.ca](mailto:cfreb@ucalgary.ca). A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

**Appendix JJ**  
PP9 Interview Codebook

Name	Description	Files	References
Class Activities, Strategies, Tools	The student describes or comments on various class activities	27	65
Continued use of strategies learned in class	The student describes continued use of a particular strategy learned in the class	17	30
Strategies and Tools learned in class	Student describes learning new strategies or tools for emotion regulation	18	32
Stress Regulation Tools and Strategies	Student's own tools and strategies to manage their stress and anxiety	38	75
Classroom Affective Experience	The student's description of the feeling or affect felt in the physical classroom	25	65
Coherence	The connection between heart, breath, mind or between each other	0	0
Classroom coherence	Student's experience of collective feelings, class coherence, mood, ambience	18	35
Relationships	The student's description of relationships within the classroom - student-student or student-teacher	10	21
Understanding of coherence	Coherence of brain, heart, breath and connectivity as measured by HeartMath sensor	17	26
Emotions	Understanding feelings and emotions, and regulation of emotion	0	0
Emotional Intelligence	The student's personal understanding of emotion - how to read others and themselves emotions	36	82
Emotional Regulation	The student's understanding of emotional regulation and their understanding of how they manage it	25	45
Feelings about breathwork practice	How students feel about heart-focused breathing practice	16	24
Feelings about the course	The student's perspective of the course itself	28	66
Positioning of the course - per 4 or 5	The student's thoughts and feelings on having the class either in per 4 or 5 and any noticeable change in state	17	25
Understanding of the brain anatomy	The student can describe and provide a function for several parts of the brain	3	4
HeartMath sensor	The student's understanding of the sensor/app	0	0
Effectiveness of Sensor	The student's description/understanding of the effectiveness of the sensor/app for them	33	65

Name	Description	Files	References
Focussing Strategies		35	44
Heart-focused Breathing First Impressions	First impressions of the sensor/app - what did the student think/feel when they first started using this biofeedback tool?	33	45
Mechanics of sensor and app	The student's understanding of how the sensor and app work and what they are measuring	27	47
Understanding of HRV	The student's understanding of heart rate variability or just heart rate changes	28	54
Mindfulness	The student's understanding of mindfulness	28	29
Recommendation of Course to Others	Does the student recommend this course to other grade 9s, and if so, why, or if not, why not?	36	52
School beliefs, feelings	What are the student's thoughts, beliefs, feelings about school in general?	12	15
Self-Efficacy and Coping	The student's belief in their ability to regulate their emotions, master the sensor/app, calm themselves down when needed, handle their stress	0	0
Confidence in managing stress	How the student feels about their own stress management	34	90
Effects of Breathing practice	What changes are present as the result of this learned breathing practice?	29	67
Stress Effects	Physiological effects of stress on the body and situations that trigger stress	0	0
Physiological symptoms of stress	What stress feels like in the body and mind Physiological symptoms described	43	100
Stress-inducing Situations	What situations induce stress - describe all that apply	34	97

**Appendix KK**  
Alumni Interview Codebook

Name	Description	Files	References
Class Activities, Strategies, Tools	The student describes or comments on various class activities	30	68
Continued use of strategies learned in class	The student describes continued use of a particular strategy learned in the class	34	63
Memory of Class	A sense of how much is remembered from the course, class activities	23	35
Strategies and Tools learned in class	Student describes learning new strategies or tools for emotion regulation	37	72
Stress Regulation Tools and Strategies	Student's own tools and strategies to manage their stress and anxiety	59	128
Classroom Affective Experience	The student's description of the feeling or affect felt in the physical classroom	48	134
Coherence	The connection between heart, breath, mind or between each other	0	0
Carryover of Positive Feelings from grade 9	Evidence of carryover of feelings of coherence and positive affect from grade 9	8	11
Classroom coherence	Student's experience of collective feelings, class coherence, mood, ambience	27	56
Relationships	The student's description of relationships within the classroom - student-student or student-teacher	27	89
Understanding of coherence	Coherence of brain, heart, breath and connectivity as measured by HeartMath sensor	23	34
Emotions	Understanding feelings and emotions, and regulation of emotion	0	0
Emotional Intelligence	The student's personal understanding of emotion - how to read others and themselves emotions	57	126
Emotional Regulation	The student's understanding of emotional regulation and their understanding of how they manage it	32	55
Feelings about the course	The student's perspective of the course itself	48	115
Feelings about being in grade 9	How does the student feel about their grade 9 self	35	65
SEL as Option vs Core	Thoughts on whether SEL/mindfulness should be offered as an option class or integrated into core components like CALM, PE	21	50
Stigma of Mental Illness		7	12

Name	Description	Files	References
Understanding of the brain anatomy	The student can describe and provide a function for several parts of the brain	11	18
Universal Wellness vs Prescriptive Therapy	Feelings about wellness for all, less stigma vs students who are “broken” needing to be pulled out and sent into therapy	19	44
HeartMath sensor	The student’s understanding of the sensor/app	0	0
Effectiveness of Sensor	The student’s description/understanding of the effectiveness of the sensor/app for them	18	33
Focussing Strategies		52	74
Heart-focused Breathing First Impressions	First impressions of the sensor/app - what did the student think/feel when they first started using this biofeedback tool?	45	64
Mechanics of sensor and app	The student’s understanding of how the sensor and app work and what they are measuring	43	68
Understanding of HRV	The student’s understanding of heart rate variability or just heart rate changes	42	77
Mindfulness	The student’s understanding of mindfulness	33	36
Miscellaneous		5	11
Personal Growth	Reflections of the student’s cognitive, social, emotional growth since grade 9	39	131
Recommendation of Course to Others	Does the student recommend this course to other grade 9s, and if so, why, or if not, why not?	56	82
School beliefs, feelings	What are the student’s thoughts, beliefs, feelings about school in general?	22	43
Self-Efficacy and Coping	The student’s belief in their ability to regulate their emotions, master the sensor/app, calm themselves down when needed, handle their stress	4	6
Confidence in managing stress	How the student feels about their own stress management	54	133
Effects of Breathing practice	What changes are present as the result of this learned breathing practice?	48	102
Stress Effects	Physiological effects of stress on the body and situations that trigger stress	0	0
Diagnoses of Anxiety, Others	Indications of anxiety diagnosis, or others such as ADHD, OCD, PTSD, etc	14	32
Physiological symptoms of stress	What stress feels like in the body and mind Physiological symptoms described	52	113
Stress-inducing Situations	What situations induce stress - describe all that apply	58	174

**Appendix LL**  
DPS Codebook

## Nodes\\Perspectives PP9 UL

Name	Description	Files	References
LL - Feelings about inclusion	What the participant thinks/feels about inclusion	0	0
Diversity, race, disability	Themes of diversity, race, ethnicity, ability	1	5
Emotions associated with inclusion	Emotions associated with inclusion/exclusion	1	5
Feelings of belonging	Feeling as though you are part of something larger and more important than just yourself	1	9
Feelings of mutual respect	Feelings of mutual respect	1	6
Helping others		1	5
Including everyone, equity	Equity and inclusion of all	1	16
Inclusion in peer groups	Including people in peer groups, not being left out, being excluded from peer groups	1	10
Not judging others		1	2
Other	Miscellaneous	1	3
LL - Feelings about relationships	When I think of relationships, I think of	0	0
Emotions attached to relationships	Emotions, feelings, around relationships	1	9
Importance, necessity of relationships	Feelings of importance, need for relationships	1	12
Other	Miscellaneous	1	4
Relationship as a bond	Bond connecting 2 or more people	1	8
Safety in relationships	Feeling of being safe in a relationship	1	3
Trust in relationships	The feeling of trust and honesty in relationships	1	8
Type of relationship - friend, family, partner	The participant describes a particular relationship	1	22
LR - Feelings about schools and education	Feelings about the education and school institution, ways to improve	0	0
Emotions around school, education	Feelings of fun, sad, stress, joy in school	1	4

Name	Description	Files	References
Feeling safe and cared for in school		1	4
Feelings about curriculum	Feelings about subjects, curricular components	1	4
Feelings about fairness, equity, inclusion	Feelings around being treated fairly	1	9
Feelings about rules, expectations of system	Feelings about rules and expectations from teachers and admin	1	14
Feelings about school schedule, time	Feelings about amount of time for school, homework, free time	1	8
Feelings of stress from school, testing	Feelings of stress and anxiety directly related to school stress and testing	1	6
Relationships with other students, peers	Feelings about relationships with other students, peers	1	7
Relationships with teachers		1	12
LR - Feelings about society	The best kind of society would be	0	0
Feelings of empowerment	Feelings of wanting to make a difference, make a positive change	1	2
Feelings of hopelessness	The participant feels unable to contribute or make a difference	1	2
Feelings of inclusion, equity, diversity, fairness	A society that is fair, diverse, equal, inclusive	1	17
Feelings of safety and security		1	10
Financial security	Feelings that money helps to ensure security	1	2
One that is peaceful and harmonious		1	13
Other	Miscellaneous	1	6
Our current society is divisive and scary		1	1
Societal structure, politics	Descriptions of type of society, political system	1	4
UL - Feeling about growing up	How participants feel about themselves and growing older	0	0
Activities or behaviours	activities or behaviours associated with growing up	0	0
Changes in self, identity	Changes in self as a result of growing up/older	0	0
Getting older	Getting older physically	1	3
More mature	Developing maturity as one grows older	1	9

Name	Description	Files	References
More responsible	Feeling more responsible, having to be accountable	1	11
No longer a kid	No longer a kid, loss of innocence	1	2
Feelings about growing up	Feelings about growing older, becoming an adult	0	0
Feeling hopeful, excited, optimistic	Positive feelings around growing up, becoming an adult	1	6
Feeling scared, nervous, worried	Negative feelings around growing up	1	13
Mixed feelings	Mixed feelings around growing up	1	15
Other	Miscellaneous	1	3
UL - How I feel about me	Individual Subjective perspective	0	0
Activities and Behaviours	Specific activities or behaviours that the individual has chosen to do to feel better	0	0
Art and Music	Activities involving art and music	1	3
At work or volunteer	Individual is at work or volunteering	1	1
Being outside, in nature	Feeling connected to nature, being outside	1	4
Meditation and mindfulness practice	Activities involving mindfulness practice	0	0
Sports and being active	Activities involving sports	1	13
Video games, social media	Individual is playing video games, online social media engagement	1	1
Being alone	Individual feels better when alone	1	7
Healthy mind and body	Individual feels healthy	1	3
Low stress; no pressure	Times of low stress and little pressure	1	4
Other	Miscellaneous	1	2
Relationships with others	Mention of specific relationships to help the individual feel better	1	30
Safe environment	Feeling safe in that environment	1	3
Well rested, lots of sleep	Individual feels well rested	1	2
UR - Feelings about Human Behaviour		0	0
Behaviours as choices	Humans have the ability to choose their own behaviours	1	2
Behaviours caused by emotions	Link between behaviours and emotions	1	9



Name	Description	Files	References
Behaviours caused by evolution	Evolutionary traits	1	1
Behaviours caused by experience - nurture	Participants believe human behaviours are caused by experience, nurture	1	21
Behaviours caused by genetics - nature	Participants believe genetics, brain chemistry, nature	1	5
Behaviours influenced by others	Behaviours are influenced by other people	1	5
Nature and nurture		1	14
Other	Miscellaneous	1	6
UR - Feelings about science		0	0
Emotions associated with science	Participants feel a certain way towards/about science	1	1
Other	Miscellaneous	1	1
Science and the natural world	Participants mention nature, life, organisms	1	9
Science as explanatory	Science as a tool to explain how the world, universe works	1	17
Science as Medicine	Science in the context of health/sickness and western medicine	1	2
Science as Truth	Participants think of science as fact, truth, objective knowledge	1	10
Science as uncertainty and mystery	Science as not having all the answers	1	1
Science school subjects	Participants think about Biology, Chemistry, Physics, cells, molecules, etc	1	23

## Appendix MM

## HeartMath Sensor Student Tracking Data Record Sample (Jill)

HeartMath Coherence Tracking Data

Name: [REDACTED]

Date	Level 1,2,3 or 4 ★	Low %	Med %	High %	Average Coherence	Length of Session	Achievement	Your Mood
Feb 9 <sup>th</sup>	1	2%	18%	80%	2.0	5:01	115	Peaceful
Feb 20 <sup>th</sup>	1	5%	20%	75%	1.5	5:00	84	Happy
Feb 12 <sup>th</sup>	1	5%	9%	86%	1.8	5:00	101	Content
Feb 13 <sup>th</sup>	1	2%	35%	63%	1.9	5:01	107	Peaceful
Feb 26 <sup>th</sup>	1	7%	36%	55%	1.5	5:00	84	Peaceful
Feb 27 <sup>th</sup>	1	3%	18%	79%	2.0	5:00	113	Happy
Feb 28 <sup>th</sup>	1	0%	0%	100%	5.9	5:00	329	Happy
Feb 29 <sup>th</sup>	1	0%	0%	100%	5.1	5:00	289	Happy
Feb 29 <sup>th</sup>	2	0%	7%	93%	3.5	5:01	201	Peaceful
Mar 1 <sup>st</sup>	2	3%	18%	79%	3.8	5:00	217	Content
Mar 4 <sup>th</sup>	2	0%	2%	98%	4.6	5:00	263	Happy
Mar 5 <sup>th</sup>	2	0%	14%	86%	3.7	5:00	209	Peaceful
Mar 7 <sup>th</sup>	2	0%	2%	98%	4.5	5:00	250	Calm
Mar 7 <sup>th</sup>	2	0%	11%	89%	4.7	5:00	261	Peaceful
Mar 8 <sup>th</sup>	2	0%	2%	98%	5.7	5:00	319	Calm
Mar 12 <sup>th</sup>	2	2%	52%	46%	2.5	5:00	133	Stressed
Mar 13 <sup>th</sup>	2	0%	2%	98%	5.3	5:00	302	Relaxed
Mar 14 <sup>th</sup>	2	0%	5%	95%	4.9	5:00	281	Content
Mar 14 <sup>th</sup>	2	0%	12%	88%	3.0	5:00	174	Trying to catch breath

Date	Level 1,2,3 or 4 ★	Low %	Med %	High %	Average Coherence	Length of Session	Achievement	Your Mood
Mar 15 <sup>th</sup>	2	0%	2%	98%	5.7	5:00	328	Relaxed
Mar 15 <sup>th</sup>	2	0%	2%	98%	4.9	5:00	281	Calm
Mar 16 <sup>th</sup>	2	0%	9%	91%	4.0	5:00	230	Relaxed
Mar 20 <sup>th</sup>	2	0%	2%	98%	5.3	5:00	298	Calm
Mar 21 <sup>st</sup>	2	0%	5%	95%	5.6	5:00	315	Calm
Mar 22 <sup>nd</sup>	2	0%	2%	98%	6.1	5:00	345	Refreshed
Mar 22 <sup>nd</sup>	2	0%	1%	99%	4.9	5:01	280	Tired
Mar 23 <sup>rd</sup>	2	0%	4%	96%	5.1	5:00	287	Relaxed
Mar 24 <sup>th</sup>	2	0%	5%	95%	4.8	5:00	272	Calm
Mar 24 <sup>th</sup>	2	0%	2%	98%	6.1	5:00	345	Peaceful
Mar 25 <sup>th</sup>	2	0%	9%	91%	4.1	5:00	232	Calm
Mar 29 <sup>th</sup>	2	0%	12%	88%	3.0	5:00	180	Stressed
April 1 <sup>st</sup>	2	0%	2%	98%	5.0	5:00	288	Relaxed
April 9 <sup>th</sup>	2	0%	2%	98%	4.4	5:01	277	Calm
April 10 <sup>th</sup>	2	0%	2%	98%	4.9	5:00	276	Peaceful
April 11 <sup>th</sup>	2	0%	16%	84%	3.9	5:00	197	Distracted
April 12 <sup>th</sup>	2	0%	9%	91%	3.5	5:01	199	Tired
April 12 <sup>th</sup>	2	0%	2%	98%	4.7	5:00	267	Relaxed
April 15 <sup>th</sup>	2	0%	2%	98%	5.0	5:01	285	Calm
April 15 <sup>th</sup>	2	0%	9%	91%	4.7	5:00	270	A little exhausted
April 16 <sup>th</sup>	2	0%	2%	98%	5.5	5:00	309	Refreshed
April 18 <sup>th</sup>	2	0%	2%	98%	5.0	5:00	286	Calm
May 1 <sup>st</sup>	2	0%	2%	98%	5.0	5:00	283	Calm
May 1 <sup>st</sup>	2	0%	2%	98%	5.8	5:00	332	Happy

## Appendix NN

### Sample PP9 Teaching Activities to Support SEL Competencies

SEL Competency	Students can:	Classroom activity	Ongoing strategies
Self-Awareness	Name emotions	Emotions wheel, emotions poster	Talk about emotions openly, ask questions, one-on-one support
	Emotions affect beh.	Role play scenarios, stories	Journalling – describe emotions and feelings
	Emotions have physical effects	Discussion of physical effects paired with emotions Movies – Inside Out, Turning Red	Stories, movies, docs to discuss how people are feeling
	Identify strengths	Who are you? Poster	Feedback to students about their interests, hobbies, etc
	Master tasks	Tying a tie, Play-Doh/art projects	Student strength presentation, super powers
Self Management	Calm down, regulate emotions, reduce stress/anxiety	Use HeartMath sensor/app and heart-focused breathing to get into green zone	5-min of daily heart-focused breathing practice at the beginning of every class
	Decision-making activity	Practice decision-making scenarios, personalized decision	Body breaks and routine walks
	Use various coping strategies	Try other methods – yoga, walks, art/colouring, music, puzzles, board games, etc	Getting outside when weather permits, connect with nature
	Goal-setting practice	Use the STAR format to work through a real-life goal setting exercise	Regular praise for emotion regulation and conflict management – for gr 9s
	Identify small goals that can be met within the course period	Use small groups as peer support teams to help with goal adherence	
	Discuss a goal you have and how you achieved it	Role modelling your own personal goals	Praise for students who have achieved personal goals
	Self-assessment of personal goals	Class activities for self-assessment and monitoring of goal achievement	
	Persevering and grit Use lived experiences, Share stories	Help students overcome challenges and move through difficult things with support Class presentation with friends, no grades, low risk	Class discussions about barriers in school, issues that arise, injustices, problems, worries, etc Help access resources for support
	Mental health lived experiences	Supporting those who are struggling, removing stigma of mental health/diagnoses	Class conversations routinely discussing mental health struggles, mental wellness, offer support
SEL Competency	Students can:	Classroom activity	Ongoing strategies
Social Awareness	Perspective taking, Put themselves in another's shoes	Use lived stories (real people or movies) to depict specific situations	Class discussion about how others are feeling, experiencing
	Perspective taking	Senses lab – blindfolded, smell/taste Nervous system impairment – tying shoes with impairments (Bio 30 lab)	Role play with characters in different life situations, discussions on how it felt to be that person
	Appreciating diversity – sharing cultural traditions, stories, events	Create a poster or project where students share their ancestry traditions (or that or a celeb if they are uncomfortable)	Discussions of other cultures, practices, etc.  School-wide initiatives of diversity and cultural recognition (holiday traditions?)
	Bring in Indigenous knowledge keepers to share stories	Indigenous speakers, blanket exercises, smudging, other ways of knowing	Use journalling to reflect on thoughts/feelings about other cultures, traditions
	Respecting others – through classroom expectations, treatment of others	Role modelling from teacher Reinforcement of respect in group projects, activities	Continual modelling, encouragement of mutual respect
	Community service project – helping others outside classroom/school	Community initiatives – foodbank, helping hampers, Bethany Care, SPCA	Looking for ties to the community for service and volunteering

		- Bring in volunteers from community (FCSS – Douw) BGCC -	
	Modelling acceptable behaviour, expectations, PBIS expectations	Class discussions of school expectations, code of conduct, behaviours, leadership	Morning announcements – positive messaging, encouraging positive behaviours, rewarding champions of citizenship
Relationship skills	Teacher-student relationship – role model kindness, empathy, respect	One-on-one conversations with student in class to model positive teacher-student relationships	-acknowledging students in hallways and other school spaces -supporting students by watching school plays, sports teams, other classes
	Peer relationships can be fostered through group work	Facilitating group work process, helping to solve inner conflicts in productive ways, mediating when needed	Continual support for peer relations, recognition of seating arrangement and classroom spaces
	Social boundaries	Teach lessons on healthy relationships, toxic, and boundaries Bring in support coaches to run modules on healthy relationships	Support coach programs Projects, role playing for healthy relationships and how boundaries (in-person and online)
	Meeting someone new, talking to adults	Help students practice talking to teachers they don't know, asking for help, directions, guidance	Design projects where students need to access other adults (or older students) in the building Scaffold how to talk to adults they don't know (role play practice sessions)
	Have students participate in focus groups	Present a topic and run small focus groups for students to learn how to give and take feedback and constructive criticism, engage in meaningful and purposeful conversations, try to solve a problem or come up with a workable solution	Focus groups for real, school-based topics/concerns Role playing focus groups for simulations
	Communication – written and verbal	Practice with emails/texts to friends – what are you trying to say – is that what came across?	Role play, small group practice sessions
	Communication – listening skills	Use the Chinese symbol for “listen” – have students draw, colour, and explain each of the components	Listening activities, telephone, games, online simulations?
	Greeting students each class, saying goodbye at the end	Making contact with each students every class – gathering and validating each one	Modelling a caring attitude of seeing each student every day, communicating how you are feeling as a role model
	Peer pressure and negative behaviour discussions	Teaching lessons on assertive as opposed to aggressive behaviours	Peer pressure and bullying workshops, speakers, activities Creating a safe space to discuss these peer conflict issues
	Conflict resolution practice	Role playing situations for students to practice conflict resolution	Class discussions about conflict, collaboration skills
Responsible Decision Making	Decision making practice with scenarios	Freeze Frame technique, decision making practice with simulations and real	Class discussions around ethics, responsibility, different types of decisions
	Cooperative role in classroom/school decisions	Focus groups to discuss and propose ideas for expectations (PBIS)	Continued student input into classroom/school-wide decisions
	Modelling responsible decision-making	Journalling, self-reflection about decisions made	Positive feedback, praise for student decisions

Source: <https://casel.s3.us-east-2.amazonaws.com/Sample-Teaching-Activities-to-Support-Core-Competencies.pdf>

