WHEN THE SELF DWELLS IN THE HEART:

HOW A HEART-LOCATED ATTENTIONAL STANCE FACILITATES A FELT SENSE OF CONNECTION

by

Marie Sester

A Dissertation Submitted to the Faculty of

the California Institute of Integral Studies

in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy in Integral and Transpersonal Psychology

California Institute of Integral Studies

San Francisco, CA

2024

CERTIFICATE OF APPROVAL

I certify that I have read WHEN THE SELF DWELLS IN THE HEART: HOW A HEART-LOCATED ATTENTIONAL STANCE FACILITATES A FELT SENSE OF CONNECTION by Marie Sester, and that in my opinion this work meets the criteria for approving a dissertation submitted in partial fulfillment of the requirements for the Doctor of Philosophy in Integral and Transpersonal Psychology at the California Institute of Integral Studies.

____

Glenn Hartelius, PhD, Chair

Professor and Founder, Integral and Transpersonal Psychology

____

Courtenay Richards Crouch, PhD

Assistant Professor, Integral and Transpersonal Psychology

____

Helané Wahbeh, ND, MCR

Director of Research, Institute of Noetic Sciences (IONS)

© 2024 by Marie Sester

PARTIES:

1. **INFORMA UK LIMITED** (Licensor); and

2. **Marie Sester** (Licensee).

Thank you for your recent permission request. Some permission requests for use of material published by the Licensor, such as this one, are now being facilitated by PLSclear.

Set out in this licence cover sheet (the **Licence Cover Sheet**) are the principal terms under which Licensor has agreed to license certain Licensed Material (as defined below) to Licensee. The terms in this Licence Cover Sheet are subject to the attached General Terms and Conditions, which together with this Licence Cover Sheet constitute the licence agreement (the **Licence**) between Licensor and Licensee as regards the Licensed Material. The terms set out in this Licence Cover Sheet take precedence over any conflicting provision in the General Terms and Conditions.

Free Of Charge Licence Terms

Licence Date: 28/12/2023

PLSclear Ref No: 89263

The Licensor

Company name: INFORMA UK LIMITED

Address: 4 Park Square, Milton Park, Abingdon Oxon OX14 4RN GB

The Licensee

Licensee Contact Name: Marie Sester

Licensee Address: [withheld for privacy]

Licensed Material

title: The Art and Science of Embodied Research Design

ISBN: 9781138367074

publisher: INFORMA UK LIMITED

Are you requesting permission to reuse the cover of the publication?	No
Figure number & title	FIGURE 8.1 Somantic phenmenology report forms
Page numbers	94
Name of illustrator	Glenn Hartelius
Are you the author of the content that you are requesting to reuse?	No

Additional Information

I would like your permission to reprint this Figure in my dissertation titled "When the self dwells in the heart: How a heart-located attentional stance facilitates a felt sense of connection" which I defended on December 7, 2023 in the Integral and

Will you be changing or editing the image?	No

For Use In Licensee's Publication(s)

usage type	Book, Journal, Magazine or Academic Paper-Thesis or Dissertation

Will your dissertation be placed in an online repository? Yes

Author	Marie Sester
Estimated publication date	Spring 2024
Language	English

Title of dissertation/thesis: When the self dwells in the heart: how a heart-located attentional stance facilitates a felt sense of connection

University or institution	California Institute of Integral studies
Unlimited circulation?	No

Rights Granted

Exclusivity:	Non-Exclusive

Format:	Thesis or Dissertation
Language:	English
Territory:	
Duration:	Lifetime of Licensee's Edition
Maximum Circulation:	3

GENERAL TERMS AND CONDITIONS

1. Definitions and Interpretation

1.1 Capitalised words and expressions in these General Terms and Conditions have the meanings given to them in the Licence Cover Sheet.

1.2 In this Licence any references (express or implied) to statutes or provisions are references to those statutes or provisions as amended or re-enacted from time to time. The term including will be construed as illustrative, without limiting the sense or scope of the words preceding it. A reference to in writing or written includes faxes and email. The singular includes the plural and vice versa.

2. Grant of Rights

2.1 The Licensor grants to Licensee the non-exclusive right to use the Licensed Material as specified in the Licence Cover Sheet.

2.2 The rights licensed to Licensee under this Licence do not include the right to use any third party copyright material incorporated in the Licensed Material. Licensee should check the Licensed Material carefully and seek permission for the use of any such third party copyright material from the relevant copyright owner(s).

2.3 Unless otherwise stated in the Licence Cover Sheet, the Licensed Material may be:

2.3.1 subjected to minor editing, including for the purposes of creating alternative formats to provide access for a beneficiary person (provided that any such editing does not amount to derogatory treatment); and/or

2.3.2 used for incidental promotional use (such as online retail providers' search facilities).

2.4 Save as expressly permitted in this Licence or as otherwise permitted by law, no use or modification of the Licensed Material may be made by Licensee without Licensor's prior written permission.

3. Copyright Notice and Acknowledgement

3.1 Licensee must ensure that the following notices and acknowledgements are reproduced prominently alongside each reproduction by Licensee of the Licensed Material:

3.1.1 the title and author of the Licensed Material;

3.1.2 the copyright notice included in the Licensed Material; and

3.1.3 the statement "Reproduced with permission of The Licensor through PLSclear."

4. Reversion of Rights

4.1 The rights licensed to Licensee under this Licence will terminate immediately and automatically upon the earliest of the following events to occur:

4.1.1 the Licensed Material not being used by Licensee within 18 months of the Licence Date;

4.1.2 expiry of the Licence Duration; or

4.1.3 the Maximum Circulation being reached.

5. Miscellaneous

5.1 By using the Licensed Material, Licensee will be deemed to have accepted all the terms and conditions contained in this Licence.

5.2 This Licence contains the entire understanding and agreement of the parties relating to its subject matter and supersedes in all respects any previous or other existing arrangements, agreements or understandings between the parties whether oral or written in relation to its subject matter.

5.3 Licensee may not assign this Licence or any of its rights or obligations hereunder to any third party without Licensor's prior written consent.

5.4 This Licence is governed by and shall be construed in accordance with the laws of England and Wales and the parties hereby irrevocably submit to the non-exclusive jurisdiction of the Courts of England and Wales as regards any claim, dispute or matter arising under or in relation to this Licence.

Marie Sester
California Institute of Integral Studies, 2023
Glenn Hartelius, PhD, Committee Chair

WHEN THE SELF DWELLS IN THE HEART:
HOW A HEART-LOCATED ATTENTIONAL STANCE FACILITATES A
FELT SENSE OF CONNECTION

ABSTRACT

Prior studies demonstrate that self-location in the heart or in the head is associated with particular measures of personality and behavior. This quantitative study seeks to extend existing knowledge by asking how self-location impacts perceptions of self and relationship in individuals who have had an intense felt sense of connection to others. In order to identify self-location in participants, a 14-item survey measure was developed and tested based on empirical results from prior studies that indicated specific behavioral correlations with head-located and heart-located individuals. This measure was expected to be largely congruent with, but potentially more objective than, self-location as identified on a body map. This measure was used to divide 218 participants into heart-located (*n* = 115) and head-located (*n* = 103) participants and was found to have better than 90% correlation with participant self-location on a body map, confirming expectations. All participants completed measures of self-construal (Self-Construal Questionnaire; Metapersonal Self Scale); self-expansiveness (Self-Expansiveness Level Form); connectedness with self, others, and world (Watts Connectedness Scale; Inclusion of Other in the Self); and qualities of relational connection (Qualities of Connection Measure).

Results showed significant differences between head and heart self-location in relationship to a metapersonal self-construal, connectedness with self and world, and association of relational connection with terms such as *warmth* and *heartfelt*. These results provide evidence that self-location impacts additional dimensions of personality, along with degrees and qualities of connection. This finding suggests that self-location may substantively impact the constructed interface between self and other, such that head-located and heart-located individuals may differ in their understanding of what connectedness entails.

ACKNOWLEDGEMENTS

I am deeply grateful to my committee members who have greatly improved my work. I especially thank Glenn Hartelius, my dissertation chair, for his presence, guidance, patience, and support. I thank Courtenay Richards Crouch and Helané Wahbeh for their distinct expertise that extended my initial draft. Without the support and insight of my committee, and their encouragement to go further, this study would not exist.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Countless individuals, past and present, have shared the experience of a *felt sense* of expansion and raw tenderness, longing, and bonding located in the heart area. Heart metaphors abound in daily life (Lakoff & Johnson, 1980), covering a wide range of qualities, from kindness and generosity to compassion, forgiveness, intuition, courage, and appreciation (Ferrer, 2008; Hofmann et al., 2011; Kang et al., 2015; Kristeller & Johnson, 2005). “Listen to your heart,” “follow your heart,” and “trust your heart” are among the adages revealing that the heart has inner guidance virtues (Smith, 1997; Whitney, 2017). To have “a heart of stone,” “a heart of gold,” or to be “a sweetheart” refer to the coldness or the kindness of a person. To have “a heavy heart” expresses sadness; to have “a broken heart” reveals distress and grief; to “speak from the heart” displays sincerity and authenticity; to feel that “my heart goes out to you” indicates sympathy; to have “a heart-to-heart conversation” establishes a close connection between individuals. The list goes on, illustrating that the heart often seems to be the place where the self freely expresses itself, is unadorned, relates to, and bonds with others.

Some cultures, such as the Chinese, also locate the mind or cognitive functions in the heart area (Espinosa, 2014; Yu, 2007, 2009). Even though Western mainstream scientific approaches mainly regard the heart as a pump that circulates blood within the body, the fields of cardiology, neurology, physiology, and health are contributing to a compelling body of evidence for the heart and its neural networks as a primary center of bodily coordination, regulation, and synchronization (Schievink et al., 2017; Song et al., 1998; Yount et al., 2021), as emitter and receiver of electromagnetic energy (Alabdulgader et al., 2018; Hammerschlag et al., 2015; Jain et al., 2015; Janashia et al., 2022; Wahbeh, Niebauer, et al., 2021; Wahbeh, Radin, et al., 2021), as generator of emotions (Critchley et al., 2002; Mather & Thayer, 2018), as a locus of selfhood (Babo-Rebelo et al., 2016; Fetterman et al., 2020; Hartelius, 2021), and as potentially able to make operative decisions independently of the brain, through the heart's neural afferent feedback (Armour, 2007; Lacey & Lacey, 1978). The heart has also been shown to be the strongest source of visceral information, that is, interoception (Azzalini et al., 2019). However, these findings remain largely isolated within each of the fields. At the same time, the phenomenon of a felt sense of interconnection with other than self, which has abundant literature in phenomenology and neurophenomenology (Gendlin, 2000; Levinas, 1969; Merleau-Ponty, 1968; Varela, 1996), and the ample phenomenological investigations of the traditionally heart-related phenomenon of a felt sense of expansion and connection with other beings have so far been the subject of little empirical research. With such data combined, the capacity for establishing connection and relationality might be greatly correlated to heartbeats, heart rate variability, heart coherence, and therefore to the physiological cardiac state (Reed, 2022). Little has been done to attempt to link the objective findings with the experiential data. This research seeks to address one of these gaps and posits that a heart-located attentional stance may facilitate an expansive felt sense of connection to other than self.

In my own experience, when I place my hand(s) on my heart, or breathe into my heart, relaxing my head and belly, my state of consciousness changes and expands. It is as if my heart physically grows bigger, stretching outwards. Something wants out and to reach beyond the individual self. I soon feel a bond with something wider than myself. Appreciation and peace follow, which further confirm a feeling of integration. An expansive space (state) opens when the inside reaches out, radiates, vibrates, and pulses in some symbiosis with what is greater than oneself, that is, with the transpersonal. "Out there" binds with "in here." The heart seems to be in vibrational conversation with other beings, and other situations. Such consistent change in my state of consciousness when my attention comes from my heart has been puzzling me for a long time. I am thus interested in investigating the nature of that shift. The present investigation's overarching inquiry asks the following: What, if any, is the relationship between a heart-located attentional stance and an expansive felt sense of connection to other than self? Based on a purposive sample of individuals having experienced a strong felt sense of connection with others, the current investigation aims to compare how the two self-locations that have been identified as most recurrent to date, head location and heart location, impact emotion and relationship differently. It further aims to inquire about the felt sense of connection in the phenomenological heart location and to point to the unexplored relationship between phenomenal body and biological body.

For many people, heart metaphors refer to something more than just a mechanism, a pump in this case, and speak to or of an "I" or "me," that is, some “center” located within an individual—a center that is feeling, acting, and conscious of its presence, location, and dimension, holding attention and projecting intention (Fetterman & Robinson, 2013; Hartelius, 2007). Such a state of being designates a singular entity differentiable from “other” and qualifies as the subject that perceives—the self.

This view resonates with Gendlin’s (2003, 2018) practice of focusing and process model. Gendlin (1999b) acknowledged the subjective by including the person observing in the process of knowledge, an approach of self that encompasses the living self and the situations it attends, and whose entanglement defines lived experience. The current investigation will use Gendlin’s definition of consciousness as “*the self-sentience of making and re-making itself-and-its-environment*. It is an organismic-environmental interaction process” (p. 233, emphasis in the original) to describe the extent of the awareness of the lived experience. Similarly, the current investigation will use Gendlin’s (2000) definition of focusing, or paying attention, as “spending time sensing something as yet undefined that comes in one’s body in connection with some specific problem or aspect of one’s life” (p. 266). This undefined “something” is what Gendlin defined as a bodily *felt sense*. The body, experienced from inside, senses “the whole of each of your situations” (Gendlin, 2003, p. vii). This intuitive bodily felt sense arises preverbally, enabling the whole wider situation, or context, to unfold. It establishes a deeper connection to an expanded environment inseparable from the body and its felt sense of a self. Gendlin’s (1992) philosophy was based on Merleau-Ponty’s (1968) corporeal philosophy, which also served as the foundation for Abram’s (1988) ecophenomenology, which extends the body to include its environment, positing in the same way the body as a primordial element for the understanding of all phenomena, and thus defining a phenomenal self. Through this primacy, the body is constituted, “intertwined” (p. 19) with the larger world, be it internal (inside the body, subtle) or external (other species, matters, systems, or dimensions), interacting with all living fields, as do all living fields interact with the human body, reciprocally. Merleau-Ponty’s construct of intertwining describes the constitution of self, other, and world and serves as the referent for the construct of interrelatedness or connection.

In the meantime, Varela (1996) applied Laughlin’s (Laughlin & Rock, 2013; concept presented by Laughlin at a conference in Osaka, Japan, in 1986 that Varela attended) term *neurophenomenology* to the study of subjective experience in a mindful state alongside scientific neuroscience. In order to study consciousness, neurophenomenology uses the method of phenomenological reduction (Cogan, 2015), or bracketing, the suspension of conceptualization and of one’s habitual way of thinking about events and oneself to allow reflection on the emergence of the thoughts and sense experiences themselves. This orientation considers mind, lived body, and world as reciprocally overlapping and characterizes the relational as direct knowledge, or in Varela’s (1996) words, “embodiment as lived experience” (p. 346). In the context of this discussion, embodiment will thus be defined as bodily direct knowledge, or the felt sense of the unfolding potential of the living self in the situations it is experiencing.

Thereafter, the concept of self-expansiveness proposed by Friedman (1983, 2018) will be used to define an expansive felt sense, which refers to the degree to which a person identifies with their body, others, the environment, and beyond. A distinction is needed to be made with the self-expansion model and theory advanced by Aron and Aron (1996). The theory, originating in social psychology, argued that interpersonal relationships are motivated by the primary desire of the self to expand, and the self does so by annexing others, their identities, their perspectives, and their resources, to grow and be efficient in achieving its goals. This process of self-expansion results in a sensation providing satisfaction. Whereas the self-expansion model proposed by Friedman (1983) used Maslow's (1966/1991) construct of self-actualization, the last stage of the basic human needs, to anchor the origin of the self's motivation, Aron et al. (2003), on the other hand, argued that the motivation of efficiency—getting one's motivation achieved—is primary, and that the motivation of efficiency emanates from the cognitive self. However, the present investigation chooses a different path and argues that self-expansion might originate in the biological self and is expressed by the phenomenal self. Self-expansion is subsequently interpreted by cognitive or psychological processes, which in turn influence the biological. In this sense, the approach here remains closer to the construct of self-expansiveness put forward by Friedman (1983), which, although based on a cognitive approach to the self, a self-concept, nevertheless opens to a transpersonal level that does not necessarily require an ego-center with a motivated agenda. In Friedman's construct, the level of self-expansiveness corresponds to "the amount of the self which is contained within the boundary demarcating self from oneself through the process of self-conception" (p. 38). The transpersonal level introduces an additional phenomenological dimension, at once spatial, temporal, and emotional, to the possibility of self-expansion, thus designating an expansive felt sense. This transpersonal level has been mostly absent in the close, parental, and social relationships as presented in mainstream studies concerned with connection and expansiveness. Measuring the individual level of self-expansion allows for the establishment of differences between individuals, and thereby, in Friedman's construct, provides an indication of the degree of self-actualization or the transpersonal actualization of the individual. It could be inferred that the phenomenological aspect of self-expansion could be associated with the felt sense of connection, in the sense of a "reaching out." It could further be speculated that the felt sense of expansion, when sensed precisely in the chest and heart areas, is an aspiration, rather than a motivation. Sensorially, aspiration is closely related to inhalation, or inspiration, a bodily lung function of the cardiopulmonary system, which this investigation regards as an inseparable organic unit.

Based on phenomenology and somatics combined, Hartelius (2007) proposed a method of somatic phenomenology, a first-person graphical investigation of subjectivity. Hartelius suggested that if every element in consciousness has its own bodily feel, and every sensation has its own bodily location, then they are potentially measurable in their size and shape within "the felt space of the body" (p. 32). This paper will follow the definition of *seat of attention* introduced by Hartelius et al. (2022) as the body region from where the subjective experience of attention feels to be coming from, that is, the source of attention, rather than the target toward which the attention is directed. Each seat of attention carries its own "attentional perspective" (p. 2); thus, a shift in seat of attention entrains a specific attentional stance, described as any specific deployment of the seat of attention. This variable "has been shown to affect state of consciousness, emotional temperament, self-construal, and social and moral attitudes" (p. 2), suggesting that attentional stances are related to specific states of consciousness (Tart, 1972, 2004; Varela & Shear, 1999). Hence, somatic phenomenology may enable a reliable way to define and study the self, and this postulation may further support the specificity of an investigation into a heart-located attentional stance.

The research on the location of the self in the body has mainly focused on finding where precisely the self-concept is located, presumably located in one single place, which was most found in the head, between the two eyes or in the midline of the forehead just behind the eyes (Alsmith & Longo, 2014; Anglin, 2014; Bertossa et al., 2008; Limanowski & Hecht, 2011; Starmans & Bloom, 2012). However, the findings showed that some of the individuals could also localize their self in other body parts, such as the heart. The percentage of head versus heart locators varied study by study; nevertheless, it showed almost always a majority of head-located individuals, which could be explained as a tendency of Western culture to favor cognitive states of consciousness. Correspondingly, self-location was defined as a "construct that identifies a bodily organ (head vs. heart) to represent self-concept" (Seih & Lepicovsky, 2020, p. 379). In turn, neuroscience has located neural correlates of the experience of self and others in the brain's midline structures and neuronal mirror networks (Uddin et al., 2007). Yet, neurophenomenology and studies related to the theory of embodied cognition relate that multiple areas of the body participate in cognitive processes, not only brain areas and brain cells (Babo-Rebelo et al., 2016; Barsalou, 2008; James, 1890; Lakoff & Johnson, 1999; Varela et al., 1993).

Several empirical self-location studies and methods laid the groundwork for a more inclusive approach to the sense of self, on which this investigation will build, including Fetterman and Robinson (2013), Adam et al. (2015), Hanley et al. (2021), and Hartelius et al. (2022). These studies proposed that the location of the sense of self is variable within the body, depending on a number of factors and the varying situations an individual is experiencing. The focus shifted toward the study of the differences in qualities emanating from the various self-locations, the lived experience of self-location, and the personal emotional impact of the location of the self.

This study's research paradigm will be informed by somatic psychology, cognitive psychology, and phenomenology, since phenomenology is congruent with the lived body and its interrelationality with the world, rather than skewed toward cognition and behavior (Abram, 1996; Gendlin, 1992; Merleau-Ponty, 1968). The study will use a quantitative approach to gather self-report data related to the body-located sense of self, the conceptual extension of self in space and time, self-construal, and qualities of phenomenological experience associated with emotional connection to others.

The hypothesis for this quantitative study is as follows: Individuals with self-location at the heart will score differently than those identified as having a head-located self-location on the Transpersonal and Personal subscales of the Self-Expansiveness Level Form (SELF), the Metapersonal Self (MPS) scale, the Independent and Interdependent Self-Construal Scale (SCS), the Somatic Phenomenology Body Maps (SP Body Maps) of felt location of self, the Watts Connectedness Scale (WCS), the Inclusion of Other in the Self (IOS) scale, and the Qualities of Connection Measure (QCM), and these differences will be statistically significant (see hypothesized direction for each scale in Chapter 3). The study predicts that the ability to connect and the extent of embodied awareness—the bodily direct knowledge of the whole of the situation—are related and that the heart area might be a favorable bodily locus for this state of being. The heart area might be the place where an intertwining between the inner bodily sensations and the outer world can be felt and refined. I thus speculate that the heart area contributes to sentient beings' capacity to bond and connect, allowing them to interact, interrelate, and be present together.

When assessed within its state of spontaneity, outside the context of cultural value judgment, research on a heart-centered expansive felt sense of connection can be of value to the fields of psychotherapy, self-development, neurophenomenology, phenomenology, meditation processes, spiritual processes, and health for a number of reasons: (a) for individual health, wellbeing, and emotional balance; (b) for greater intimacy with the body and its intelligence; (c) for self-transformation, allowing expanded awareness of the intrapersonal, the interpersonal, and the transpersonal aspects of lived experience and their integration leading to embodied consciousness; (d) for the cultivation of compassion and empathy; (e) for its impact on relationality, with others and the earth; (f) and for helping humanity become aware of the intertwining of our consciousness and the whole of the environment. The current investigation, which is phase one of a planned mixed methods study, aims to be a first step in bridging pieces together, trying to disentangle the literal from the analog, the visceral from the symbolic, the metabolic from the metaphorical, and organismal agency from laws of physics or, perhaps, to posit their intricacy.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews relevant literature related to self-concept, the phenomenal self, the experience and impact of phenomenal self-location, phenomenological experiences associated with the heart area of the phenomenal self, the neurobiology of the biological heart, and the relationship of the phenomenal self to the biological body. The evidence related to phenomenal self-location is the most relevant for this study, but the other aspects are included for context.

Self-Concept

Cognitive psychology views the self-concept as a construct central to cognition as well as to memory, one that defines personhood and is often referred to as an information processor (Oyserman, 2001). In this view, a distinct cortical network promotes self-representation (Turk et al., 2003), with a left brain hemisphere module or mechanism known as an “interpreter” (Gazzaniga, 2005) that is capable of rationalizing even improbable data about the self and a right hemisphere mechanism that holds more closely to veridical facts (Gazzaniga, 2005; Turk et al., 2003). A series of studies with split-brain survivors whose task was to recognize their face versus the face of a familiar person among morphed images ranging from the familiar person to self, showed that the left hemisphere recognized the image of self even with only a low percentage of self in the image; in contrast, the right hemisphere required 80% of self-features for the image to be recognized as self (Gazzaniga, 2005, p. 657). Although the self-knowledge processing network is distributed between the hemispheres and provided that even in split-brain condition there appears to be only one self, Turk et al. (2003) concluded that this left hemisphere interpreter "may also give rise to a unified sense of self" (p. 65).

Within this rational interpretation of cognitive science, the left-hemisphere interpreter not only makes sense of the perceptual world by generating a belief system but also makes sense of behaviors, traits, and self-biography by constructing a self-concept, which is the self produced by the brain (Gallagher & Gazzaniga, 1998). The continuity over time of self-identity is based on the ability of the subject to use language and form a narrative to construct meaning (Gazzaniga, 2005), continually confronting and integrating the new information perceived from new experiences into the memories of past experiences. The salient content brought forth from this content in response to a specific situation is a mixture of sporadic, pragmatic, and abstract information that subsequently influences the individual's thoughts, behavior, actions, mood, and feelings (Oyserman, 2001); generally, the self-concept operates to satisfy the gratification needs of an individual encompassing self-esteem, self-improvement, self-worth, self-consistency, or self-verification, among yet other cognitive principles. And information, it seems, is better memorized when it is related to the self, according to Oyserman.

This line of cognitive science thus presents the self as abstraction or narrative constructed by the cortex of the brain's left hemisphere (Gallagher & Gazzaniga, 1998), which contrasts with research associating selfhood with other cortical areas such as the frontoparietal mirror neuron areas, or subcortical resources in the limbic system (Babo-Rebelo et al., 2016; Qin et al., 2020; Uddin et al., 2007). Gallagher (2018) has gone further and questioned the ability of the brain to manage by itself the inter-relational dynamics of perception, motion, gesture, action, emotion, and expression of the living body without involving these bodily processes, concluding that the brain is one aspect of an interconnected system that also encompasses body and environment. In a similar way, Damasio (1998) has argued for a multilayered nonlinguistic self based in the whole of the organism rather than constrained within cognitive representation. In this view, emotions are actions occurring unconsciously and autonomically in the body when responding/reacting to stimuli, triggering changes in the body state via somatic markers—signals derived from the neural mechanisms underlying emotion—that activate retroactive information back to the sensory system to assist with response options to events, thus acting as information processing parallel to cerebral processes (Damasio 1999; Damasio et al., 1991). Although emotions might stay unconscious, often they are followed by feelings, the awareness of their occurrence (Damasio & Carvalho, 2013). Damasio (2003) has proposed that self-processing emerges from the relationship between the mental self and the biological self, originating in the brain's alleged homunculi, or neural mappings of the body. At these locations, the brain senses the body, recording mappings that continually reflect the organism's internal state and represent an enduring, albeit changing, self that occurs cognitively as a mental self. The cortical homunculi, as represented in neuroanatomy, were recently challenged by advances in developmental biology that focus on cognition processed by cells, rather than only neural processing, showing that cognition—and the notion of a self—might operate on a diversity of layered scales and through complex network systems distributed throughout the entire body, proposing to shift the understanding of mental processes from neuronal to cellular (Ciaunica et al., 2023; Levin, 2023). All cells are capable of generating and conveying electric potentials. Levin (2019) suggested that a self is a continuum of multilayered scales with organizational levels of competencies and goals.

Phenomenal Self

The self that is felt phenomenally as the immediacy of lived experience in the body extends beyond conceptual self-representation (Oyserman, 2001). This aspect of self is conscious of its moment-to-moment experiences that depend on various factors such as situation, mood, and motive, giving rise to the experience of a fluctuating *phenomenal self* (Metzinger, 2010). Through the lens of phenomenology, the self is neither a fixed object nor a mere narrative constructed over time by social conditions, but "an integrated part of our conscious life, which has an immediate experiential reality" (Zahavi, 2003, p. 59)—a process of ego syntonic experiences, measured against personal values and self-image.

Gallagher (2000) contrasted the narrative self (housing the endurance of personal identity over time) supported by cognitive sciences with the minimal self (embedded in the moment). Whereas the narrative self was defined as "a more or less coherent self (or self-image) that is constituted with a past and a future in the various stories that we and others tell about ourselves" (p. 15), the minimal self was defined as the phenomenological experience of "consciousness of oneself as an immediate subject of experience, unextended in time" (p. 15). The minimal self operates exclusively in the immediacy of an experience and involves the phenomenal senses of self-agency, defined as "the sense that I am the initiator or source of the action" (p. 16), and self-ownership, defined as "the sense that it is my body that is moving" (p. 16) during action. The two senses occur usually simultaneously during voluntary action, whereas in involuntary action the two senses can be dissociated. For instance, when the action is acknowledged as performed by "my" body (ownership: "I" am moving) but was not initiated nor controlled by "me" (no agency: "my" body was pushed). The experience of possessing a body with parts, feelings, and thoughts, or sense of ownership, and the experience of controlling the body's actions, or sense of agency are prereflexive perceptions serving as the basis for emotions, thoughts, and actions (Braun et al., 2018; Gallagher, 2000; Tsakiris et al., 2007).

The research on sense of ownership, mostly using limb or body illusions as settings, experimentally differentiated "self-identification (i.e., global body-ownership), self-location (i.e., the experience of where 'I' situate myself in space) and first person-perspective (i.e., the experience of the position from where 'I' perceive the world)" (Braun et al., 2018, p. 3) and showed that this multifaceted phenomenal experience of self escapes ontological substantiation. The debate continues between the bottom-up and top-down theories attempting to explain the emergence of the sense of ownership, where bottom-up theories infer the importance of multisensory integration with minimal involvement of internal body maps, whereas top-down theories attribute stronger participation to internal/cerebral body maps. As regards the neural correlates of the sense of ownership, the insula appeared to be involved, as did the premotor cortex and the intraparietal sulcus. With respect to the research on sense of agency, the settings used included the intentional binding effect (the measurement of time perceived between an action and its sensory results, i.e., pressing a button and subsequently hearing its sound) and self-reports on the intensity and quality of authorship experienced during an action. The sense of agency often includes the intentionality, reason, and purpose of an action. Thus, the sense of agency can be seen as having two levels, a prereflexive feeling of agency, at the margin of consciousness, based mainly on motor control, and a “higher-order, belief-like process” (Braun et al., 2018, p. 5) that involves contextual and judgmental processes. The neuronal processes underlying the sense of agency included sensorimotor areas, the parietal cortex, and the insula. Corroborating Gallagher’s (2000) assertion, Braun et al. (2018) suggested that the sense of ownership and sense of agency, when occurring simultaneously, support and encourage each other. Predictive coding, a theory initiated by Hermann von Helmholtz, has recently been applied as a model to explicate perception and self-awareness, suggesting that both phenomenal experiences, sense of ownership and sense of agency—and therefore our sense of who we are and how we engage with the world—are probabilistic, malleable, empirically controllable and predictable (Braun et al., 2018). Brain function, Buzsáki (2019) suggested, can bypass received information and proceed by testing hypotheses, proposing an inside-out framework that is action-based, involving brain and world at large, to be distinguished from the top-down/bottom-up dichotomy, circumscribed to the anatomical space.

An earlier review by Tsakiris et al. (2007) argued that both senses—owning a body and acting—are prereflexive experiences emanating from sensorymotor processes. The experience of a coherent, unified body is created by the integration of multiple efferent and afferent signals during action. Efferent signals, which contribute to self-agency, allow for the integration and coherence of the experience, whereas afferent signals generate the content of the body's experience (Tsakiris et al., 2007). In a broad summary, the sense of self is built from multiple elements. The prereflexive state of body awareness carries both the recognition of self and the recognition of others, as well as the resemblance of the two.

In addition to the personal self-concept, centered on distinguishing between self and other, a transpersonal self-conception was proposed, which extended the concept of self beyond the individual's perception of self as an isolated organism delineated in space and time (Friedman, 1983). The self can expand and dissolve the self-concept's perception of isolation and delineation. In Friedman's conceptualization of self-expansiveness, it is assumed that the self is expansible by nature and that "the relationship between self and nonself is inherently unlimited to such an extent that all absolute distinctions between the two are untenable" (p. 38). The self is interconnected with the universe, and its expansion varies from situation to situation, impacting the self-concept. Whereas the self-concept is not measurable, the level of the expansion of the self-concept, moment to moment, however, is measurable on three levels: the personal level (behavior, body, feelings, in the present), the middle level (social, ecological, in past and future), and the transpersonal level (atoms, ancestors, descendants, cosmos, beyond time; Friedman, 1983). The transpersonal level opened a dimension that was disregarded in mainstream self-expansion theory (Aron & Aron, 1986; Aron et al., 1992; reviewed in a later section).

Thus, the self, and furthermore, the phenomenal self, is constructed of multiple aspects (Braun et al., 2018; Gallagher, 2000, 2003, Tsakiris et al., 2007; Friedman, 1983). In Gallagher's (2000) words, "this extended self is decentered, distributed and multiplex" (p. 20). The aspects of the self presented in this section have been selected among a multiplicity for their relevance to the current thesis. They serve to delineate the ground of this inquiry. Other potentially relevant aspects of the self are reviewed later in the chapter. It is of interest to the study at hand to notice that research on self-ownership and self-agency defined the first-person perspective as "the experience of the position from where 'I' perceive the world" (Braun et al., 2018, p. 3). This definition posits a sensing container, a constituent in dialogue with the world it perceives.

The perception of inner bodily visceral signals has been labeled *interoception*. Monti et al. (2021) reviewed the evidence of interoceptive constraints on the four categories of self as described by James (1890): the material self, the social self, the spiritual self, and the *pure ego* (i.e., "the thinking and acting subject"; Monti et al., 2021, p. 2). The material, social, and spiritual self correspond to the "Me" (the objectified self), whereas the pure ego corresponds to the "I," the subjectified or agentic self. The evidence reviewed by Monti and colleagues showed a strong impact of interoception on the various facets of the "Me," as well as preliminary evidence that interoception also impacts the "I," suggesting that interoception is a solid basis of self, and furthermore, that

> across all levels of analysis, a common thread is the fact that the most intimate, unique, unchanging features of our selves seem to be those which are, quite literally, closest to our heart, i.e., most influenced and shaped by interoceptive signals. (p. 5)

Hence, core visceral physiological perceptions shape the core self-conceptions and contribute to stabilizing the self over time. The overview thus contributed to drawing together evidence of an embodied self, proposing that "whenever we think of ourselves, we think with our body and not just with our mind" (p. 6). As far as evidence goes at this time, the reviewed evidence showed that (a) respiratory constraint impacted the material self and the spiritual self, (b) gastric constraints had no (evidenced) impact on the self, and (c) cardiac constraints impacted all four self (material, social, spiritual, and the pure ego, or "I"), showing the heart as the organ having possibly the strongest visceral input, followed by, or in conjunction with, the lungs (Monti et al., 2021, Figure 1, p. 6). If the self is modulated by visceral signals, it is simultaneously sensing the world it is immersed in.

In itself, the concept of self designates the concept of nonself, that is, other than self, thus establishing boundaries. Studies on the boundaries between self and nonself highlight the plasticity of these boundaries (Dambrun et al., 2019; Dor-Ziderman et al., 2016; Lindahl & Britton, 2019; Lindahl et al., 2017; Nave et al., 2021; Trautwein et al., 2016). Von Mohr et al. (2021) presented affective audiovisual stimuli at either cardiac systole or diastole to participants (N = 46; 31 female), asking them to report either their own emotions related to the stimuli they were presented or to report the (supposed) emotions of their dyadic partner related to the pictures and audio they were simultaneously seeing on a screen. The study's purpose was to examine how cardiac interoception modulates the emotional egocentricity bias (the projection of one's own emotions on another person). The cardiac impact was combined with self-construal levels (independent vs. interdependent) to measure interoceptive accuracy. Results showed that higher interoceptive accuracy increased the emotional egocentricity bias when the stimuli were presented at systole. This effect was modulated by the participant's self-construal type. More specifically, low interoceptive accuracy was linked to a feeling of being overwhelmed by the other's emotions in the context of emphasized physiological information, whereas high interoceptive accuracy tended to prevent self-overwhelming by the other's emotions. Von Mohr and colleagues concluded that "fluctuations in interoceptive activity may provide the physiological context within which we negotiate self-other boundaries" (p. 337).

Studies on the impact of meditation practices on the self in relation to others, such as that conducted by Trautwein et al. (2016) with loving-kindness meditators (22 practitioners and 22 controls with no meditation experience), evidenced that the more the participants practiced loving-kindness meditation, the more the sense of self and other would be integrated. A decreased distinction between self and others was accompanied by an increase in compassion. Dambrun et al. (2019) found that body scan meditation resulted in shifting the participants' state of self from narrative to minimal self, and furthermore, shifted the minimal self toward “a state of more unified consciousness characterized by both self-loss and oneness” (p. 1530), which not only decreased mind wandering but also increased decentering and happiness. The authors concluded that “happiness is intimately related to self-consciousness states such as self-centeredness and selflessness” (p. 1530). Hence, self-centeredness generates a feeling of separation or disconnection with other, whereas selflessness, when the sense of self is altered or dissolved to some extent, provides a feeling of expanded connection with other, unity, and inner peace (Dambrun et al., 2019).

Attentional practices can change the self/nonself distinction by altering the self-specific processes—the processes that determine the self by establishing perceptual, cognitive, emotional, and agentive boundaries between self and nonself (Dor-Ziderman, et al., 2016). Neuroimaging data recorded during Vipassana meditation showed that the sense of boundaries, defined as “the fundamental experience of being an ‘I’ (self) separated from the ‘world’ (nonself)” (p. 1), can be graded on the phenomenal level as well as on the neural level. Changes in the sense of boundaries involved changes in beta oscillation and activation of the lateral and medial parietal areas of the brain. Dor-Ziderman and colleagues indicated that the flexibility of the boundaries between self and world implies that the self is not a predefined entity but is malleable, constantly remade by neural and other processes, and trainable. This study, however, was based on a single long-term meditator’s experience. It was successfully replicated by Nave et al. (2021) with a sample of 46 (19 females) long-term meditators, using brain activity recording via magnetoencephalography and micro-phenomenological interviews. The phenomenological account of the findings showed evidence that self-boundaries can indeed be softened—if not dissolved—by meditation practices and that neurophenomenological-based experimental settings can operationalize processes at the basis of self-processing. Evidence of the impact of meditation in altering the sense of self was similarly found by Lindahl et al. (2017) in a study with Buddhists of various traditions.

The micro-phenomenological approach applied by Nave et al. (2021) further allowed the disentanglement between self-boundary and body-boundary, showing how self-boundary relates to the sense of self. In most cases, in the boundary dissolution state the form and sensations of the body boundary became undefined. However, the sense of self altered in various ways depending on the technique used by each meditator, resulting either (a) in an enhanced agentic and experientially centered self or (b) in an expansive self, encompassing the span of a widened space-driven attentional dimension associated with alterations in the sense of ownership, or then (c) in the dissolution of the subject–object duality into a unified, nonlocalized space. These transformations concurrently altered the sense of agency, ranging from intense to diminished to passive (attentional disengagement), which impacted in turn the structure of the experience. The sense of boundaries dissolution condition provided generally "a sense of opening of awareness, release of tension and letting go of control" (Nave et al., 2021, p. 26). The study also found that both positive as well as negative emotions were more intense in the sense of boundaries dissolution state and could range from bliss to distress since the vulnerability involved in letting go of control might reveal fragility and provoke fear of death. Thus, increased sensitivity to the world and to others when experiencing sense of boundaries dissolution shows the intricate relationship between the flexibility of the sense of boundaries and affective responsiveness. The degree of sense of boundaries dissolution was linked to the length of the participant's meditation experience, therefore showing that the flexibility of self-boundaries can be trained.

Hence, in most cases, the notion of dissolution of the sense of boundaries relates to self-expansiveness. Ataria et al. (2015) reported on the phenomenological inquiry part of the Dor-Ziderman et al.'s (2016) sense of boundaries dissolution study, seeking to capture the prereflective experience by asking "how" instead of searching for a causal explanation. The study by Ataria et al. (2015) aimed to define the nature of the fluctuation leading from closeness and rigidity to expansiveness and interconnectedness. In the default state (the daily habitual state), the body was defined as a zero point from which the outer world was considered through a series of phenomena such as internal versus external, time, location, self, agency, ownership, and center, and the sense of boundaries was reported as defined, closed, and rigid, which implied a sense of separation between "me" and "other." The body as zero point was related to the first-person perspective and defined as the epicenter of the sense of self, constituting the minimal self. In the sense of boundaries dissolving state (intermediary between the default state and the sense of boundaries disappearing state), all these categories weakened, and the body was described as a bubble, expanded, flexible, and spacious. The sense of center was weak. Finally, in the sense of boundaries disappearing state, all the phenomena defining the default state disappeared, except for the touching/touched structure and the bodily feelings—which were weak—but still present; the body was merged in the background, the center was gone, and the world was acting of itself, without any egocenter. The notion of boundaries (separation) became irrelevant.

These findings led Ataria et al. (2015) to conclude that "the sense-of-boundaries is a protective shield. It is for this reason that during trauma one becomes dissociated, closing off one's boundaries as a defense mechanism" (p. 142). The sense of boundaries dissolving state might occur when an individual feels more secure. And finally, the sense of boundaries may disappear entirely as the need for protection subsides and be replaced by an overriding consciousness of belonging to the world. It follows that the sense of boundaries is flexible. Thus, the study provided evidence that self-expansion is a state of consciousness dependent on the sense of boundaries. Self and other can be distinct entities, clearly delimitated, or entirely merged, united. Moreover, it infers that the sense of self is not a requisite for awareness. However, the ability to dissolve the sense of boundaries, or to make it disappear, is not an average human achievement at will. Further examination of the felt sense of connection may be necessary for a better understanding of relational qualities and abilities.

Overall, growing evidence from social neuroscience and neurophenomenological research showed an affective and conceptual intertwining of self and other at the level of representation, providing a basis for human intersubjectivity (Trautwein et al., 2016). Christoff et al. (2011) proposed that self-specifying processes define the self as a “cognitive–affective agent” (p. 310), evoking the notions of bodily interactionality and interconnection. Various theoretical models of self and self-awareness have been proposed, without reaching consensus (Berkovich-Ohana & Glicksohn, 2014; Braun et al., 2018; Tsakiris et al., 2007). Neuroscience as well as philosophy only offer speculations on the understanding of self-processing at this time (Damasio, 1999). Terms such as embodiment, corporeal awareness, or bodily self-consciousness have served to describe the feeling of intimacy or complicity with the body, which carries not only the constructs of body ownership and body agency but also body location (inhabiting the body; Monti et al., 2021).

Self-Location

Bodily awareness—how the body perceives and knows—challenges the relationship between bodily sensations (kinesthetic, proprioceptive) and the spatial location of the sensations in Euclidean space (Bermúdez, 2005; Hartelius et al., 2022). Early attempts to empirically locate the self, or observer, originated in the field of optics, which designated a point between the two eyes, portrayed after the image of a cyclops who sees the world through a single aperture, and this observer’s point was thereafter called the visual egocenter (Limanowski & Hecht, 2011; Shimono et al., 2001). However, the central visual axis experienced by the observer does not correspond to the two optical axes that objectively construct binocular vision in Euclidean space (Hartelius et al., 2022). Similarly, a pain felt in a finger is not transmitted to the foot when that finger touches the foot; the pain does not move but remains unchanged in the finger, which contradicts the laws of the Euclidean frame (Baier, 1964; Holly, 1986; Vesey, 1964). Thus, bodily sensations may not intrinsically correspond to spatial coordinates: the geometrical frame is distorted not only on the visual level but also on the perceptual and sensory-motor levels (Bermúdez, 2005; Merleau-Ponty, 1968). Emotional pain might be felt in the heart area, for instance; however, science has no evidence that the pain is generated by or takes place in the biological heart; the spatiality of the phenomenal self is a body-relative construction (Hartelius et al., 2022). The mapping of the body-relative space is supramodal and encoded by the cortex (Hartelius et al., 2022; Likova, 2012). The interoceptively sensed phenomenal self is not a direct perception of the body, but rather a qualitative projection. The phenomenal self, which comprises the egocenter along with all other sensory information, is situated and constructed within this body-relative space.

In this context, self-location (i.e., the location of the phenomenal self within the constructed felt space of the body) can be understood as source of attention (i.e., the place within the body where the attention is felt to originate) and contrasted with self-concept (i.e., the mental construction of beliefs, thoughts, attitudes, and narratives about the self). The phenomenal self appears to be impacted by self-location, which in turn affects the state of consciousness (Adam et al., 2015; Fetterman et al., 2020; Hartelius et al., 2022). Whereas self-concept is conceptual and analytical, the phenomenal self appears to be prereflexive, based on sensations and sensorimotor resources, but exceeding them in the malleable body-relative space. Self-location, as a feature of the phenomenal self, has broad implications for self-concept, as the following section shows.

The Experience and Impact of Phenomenal Self-Location

As seen, the sense of self has traditionally been associated with the body. Although the world can be experienced from an outside-of-the-body perspective, as in out-of-body experiences (Blanke et al., 2016; Herrero et al., 2023; Ma et al., 2023; Shaw et al., 2023), the self is commonly superimposed on the spatial location of the body and more precisely placed in a permanent, though individually variable, part of the localized body (Bertossa et al., 2008; Limanowski & Hecht, 2011; Starmans & Bloom, 2012). For instance, Aristotle placed the self in the heart, Descartes placed it in the pineal gland, and most contemporary scientists locate it in the brain (Limanowski & Hecht, 2011). The review of the major self-location studies that follow shows that, although the head was reported in the majority of cases—potentially revealing a trend in Western culture—there is no agreement on a single stable location; the location can move (Hartelius, 2015; Hartelius et al., 2022). Furthermore, location has implications: self-location in the heart area, for instance, appears to impact emotions and social behavior (Fetterman & Robinson, 2013), judgments and decision-making (Adam et al., 2015), and psychological wellbeing (Hanley et al., 2021). Most recently, a single-sourced focused location interpretation has been questioned (Hanley et al., 2021; Hartelius et al., 2022). Moreover, differences in self-location are more than a belief system and appear to reflect differences in cognitive processes (Hartelius et al., 2022).

Seat of Attention and Attentional Stance

Typically referred to as self-location or egocenter, the construct of self-location has relied mainly on self-report. The source of attention was reported most commonly in the head or in the upper torso (Alsmith & Longo, 2014; Bertossa et al., 2008; Fetterman & Robinson, 2013) but sometimes also lower in the body, in multiple bodily locations, or outside the body (Adam et al., 2015; Hanley et al., 2021; Hartelius et al., 2022; Limanowski & Hecht, 2011; Nave et al., 2021; Starmans & Bloom, 2012; Van der Veer et al., 2019).

The felt sense of the location of self was more recently defined by Hartelius et al. (2022) as the *seat of attention*, corresponding to the location within body-relative space from which the experiencer has the sense of projecting their awareness. This seat of attention exists within the phenomenal self, as the location within the body where sensations, feelings, and emotions are felt, and actions taken, and differs from the abstract cognitive notions of self-concept. The seat of attention impacts the "attentional perspective" (Hartelius et al., 2022, p. 2). As such, a shift in the location of the seat of attention leads to a shift in the perspective of the observer/perceiver and defines a different *attentional stance*, which corresponds to variations in the qualities and intensities of awareness and impacts the person's state of consciousness (Hartelius & Goleman, 2016).

The current review of literature uses the terms localized self, self-location, or embodied sense of self when reviewing studies using these terms—but considers these terms to be interchangeable. Similarly, the terms heart, heart area, chest, and upper torso will be used interchangeably.

The Impact of Phenomenal Self-Location

The empirical study of self-location in the body began in the 1920s, initially defining self-location as a "construct that identifies a bodily organ (head vs. heart) to represent self-concept" (Seih & Lepicovsky, 2020, p. 379). Western psychology has generally assumed that self-location is in the head (Gazzaniga, 2005), as do the social sciences, which examine the self-concept "as a set of memories, attributes, personality traits, or autobiographical stories" (Adam et al., 2015, p. 75) independent of the sensory body. Neurophenomenology and studies related to the theory of embodied cognition—a theory linking the concept of self with physicality (e.g., purity is linked to cleanliness)—argue too that the body might be involved in the sense of self (Babo-Rebelo et al., 2016; Barsalou, 2008; James, 1890; Lakoff & Johnson, 1999; Varela et al., 1993: Stapleton, 2011), referring to afferent multisensory inputs to the prereflexive minimal self, which in turn informs the narrative self.

In most of the studies, self, mind, and consciousness are used without distinction, exposing an overlap or confusion in their respective definitions. They broadly designate the "I" who perceives, the "I" who is aware (Bertossa et al., 2008). A study conducted by Anglin (2014) explored the distinction of these notions and their respective bodily location, as perceived by individuals in the present day. The study stated that "90% of adults worldwide believe humans have souls" (p. 106), but little empirical research has been conducted on the nature of the soul. In order to examine whether soul and mind are different entities, and which of them is defining the self, the study asked a sample of 206 students (135 women) from Rutgers University, to first describe in free writing the bodily location of the self, soul, and mind, respectively, and thereafter choose a location on a body chart proposing eight body regions along a central line on the body, with additional options for “not located in a centralized region” or “does not exist” (Anglin, 2014, p. 107) to represent the location of self, the soul, and the mind, respectively. Self, soul, and mind were perceived as distinct by many of the participants. Head and chest were designated most often, to the detriment of other body locations. The head was chosen most often as the location of the mind (97.6%; p. 110) and to a lesser extent of the self (39.7%; p. 108), which showed that there might be some overlap aligning mind and self, whereas the chest was chosen most frequently as the location of the soul (42%; p. 109) and could possibly align with the self for some of 27.0% (p. 108) of the heart- or chest-located participants. However, it should be noted that the third biggest response was in favor of not centralized in the body for 10.2% (p. 109) to 22.1% (p. 108) of the participants depending on the entity considered, leaving open the option that perhaps the location could vary depending on certain factors.

The head-location was further found in Marolt-Sender’s (2014) study using somatic phenomenology and phenomenological inquiry as its methods. Twenty-four athletes, selected commensurate with their experience of flow states during intense exercise, were first requested to read a news story, then identify the location of their “I” and report it on body charts. The brain was designated in 65% of the cases (p. 185). However, a majority of the same participants, while in a flow-like state, reported their “I” in their trunk (p. 187). Hartelius (2015) suggested that the shift “provides preliminary evidence that central attention has a considerable range of variation in terms of its somatic location and suggests that *attention posture may be specific to particular states of consciousness*” (emphasis in the original, p. 1276). The study by Marolt-Sender (2014) counts among a few inquiries designed to investigate specific attentional stances that comprise psychological and emotional aspects of the subjective experience, thus starting to contribute a map of states of consciousness relative to bodily self-locations.

In this line of thinking, and challenging the cognitive convention, Limanowski & Hecht (2011) stated that there is more to solely mental cognition, since “the self-centeredness of human consciousness manifests itself in action and space perception” (p. 313), an approach that had been instigated by neurophenomenology (Laughlin & Rock, 2013; Varela et al., 1993; Varela & Shear, 1999). In Limanowski and Hecht’s (2011) study, 87 participants were asked to locate the self on human body maps and on nonhuman abstract silhouettes. In Phase 1, participants reported the location of their self on three different body charts (front view, side view, and top view) not displaying any organs. In the second phase, participants reported the location of their self on 11 nonhuman simple rectangular charts containing the representation of four human-like organs (brain, eyes, ears, heart) in permutated locations. Findings on the human body charts showed two distinct clusters: the head and the chest area. Most of the participants (72.3%; p. 314), when asked the question, believed that the self has one single bodily location. And, when reporting on the most important organs related to the self, the brain was chosen 34 times, the heart 18, and then came the stomach and the eyes (p. 314). The position of the heart in the rectangles had no significant effect, whereas the location of the brain had a strong effect ($p < .001$; p. 315), highlighting a brain-located self regardless of its location vis-à-vis the other organs. The authors, however, warned about issues inherent to a spatial approach to the self and consciousness, since a person is a complex entity that exceeds body locality. Yet, they asserted that, in the view of the results, this intuitive geometrical approach to the self "seems to capture one of the fundamental conditions of being a self: the first-person perspective" (p. 316). Whether on body charts or on abstract forms, similar results were found regarding the two main clusters: the brain and the heart. The participants' ease in projecting a self onto an abstract form may potentially show that the self is a construct that can be recognized in other entities. It could be commented that—given the purpose of the study—the precisely restricted number of organs displayed coarse-grained findings, as did the limitation to choose a single point.

Pursuing this vein of investigation, Starmans and Bloom (2012) chose to explore the intuitive location of the self with 50 children (aged 4 and 5), considering that young children have less cultural conditioning than adults who are inclined to be influenced by religious considerations or scientific answers, and compared with the responses of a group of 52 adults (aged 18–64). Both groups were asked at which position, among a series of five possibilities (eyes, mouth, chest, stomach, and feet), an object was closest to a person. The instrument consisted of two cartoon images: a fly and a little girl. The fly would fly around the girl. Both children and adults chose most frequently the closest location of the object when close to the eyes of the subject. The second closest location was the mouth. A second experiment, where the fly was similarly superimposed on a body, showed an alien with the eyes on its chest and the mouth on its stomach—testing a potential confusion between head at large and eyes as an organ. Findings revealed that both groups chose the fly next to the eyes (on the chest) most frequently, though tightly followed by the fly next to the upper head for the children. In Experiment 3, participants were presented with the profile view of another little girl superimposed with a snowflake in five locations: the eye, the stomach, the feet, behind the upper head, and behind the feet—thus testing if the vision of the object was a consideration. Again, the snowflake next to the eyes was chosen most frequently by both groups, followed by the snowflake behind the head, which confirmed that vision was not a consideration. The overall similarity of the answers by both children and adults indicated that the findings "do not reflect a culturally learned understanding of the role of the brain in producing mental states but might instead be rooted in a more intuitive or phenomenological sense of where in our bodies we reside" (Starmans & Bloom, 2012, p. 318). The findings focused on the similarities between child and adult responses; however, examining the differences might have provided valuable complementary information. The authors, instead, extrapolated that when a child claims that they cannot be seen when they cover their eyes, this could imply that they consider the eyes to be the locus of their self. In Starmans and Bloom's methods, the body of the participant was entirely bypassed and replaced by a cartoon serving as an avatar. Nonetheless, the subjects seemed to easily project the sense of self onto abstract and extraneous entities, perhaps because of the strength involved in surrogates under the guise of organs: eyes, mouth, brain, heart. It could be criticized that, again, the organs were limited to a very short list, which may restrict more authentic choices, and therefore, self-locations. However, even with limited choice, the repeated concentration of results on the head and heart at the expense of other areas seems to indicate a stable trend. In addition, the study raised the question of whether a self is personal and restricted to a person's body or is an agent or entity that exceeds the physicality of the person and can be perceived in others (and therefore by others), thus corroborating Limanowski and Hecht's (2011) findings.

To counter previous studies and their contradictory results, Alsmith and Longo (2014) assigned sequentially the participants (N = 10; with 6 females, aged 24–48 years, from the UK) to either a haptic condition (blindfolded) or a visual condition, testing whether there is one single location where "I" resides within the body. Participants were asked to point at themselves to indicate their self-location, either by manually moving a metal pointer attached to a pole in front of them (blindfold condition) or by telling the experimenter who was moving a metal pointer at regular motion in their direction when to stop. The pointer had four possible starting locations and pointed either up or down. A total of 98 permutations were conducted per participant, each trial being documented by a photograph of the participant's self-location and then coded within five body regions (lower torso, upper torso, neck, lower face, upper face). The results showed no significant difference between the haptic and visual conditions, inferring that these are not determinants for self-location. Across conditions, the responses pointed especially toward the upper torso and more predominantly toward the upper face (effect of region: $p < .0001$; p. 73). However, these responses were qualified by the starting location of the pointer ($p < .0001$, p. 73), showing the pointer (i.e., the self-location) ending in whichever, upper torso or upper face, it reached first. Alsmith and Longo inferred that the functional salience of the head and the chest area may intuitively lead the decision, moderated by external factors, such as to which of them is contextually paid attention to first. However, perhaps due to the understated data reported in the article, the study did not provide details about alternative contextual factors and therefore provided no conclusive evidence for the variation in the impact of contextual factors. If attention is focused on money, or fame, or caring, how do these respectively impact self-perception and self-processing? Alternatively, if the sense of self is located in the heart, for instance, do the objects of attention tend to change? Nonetheless, they showed evidence that haptic and visual conditions are not making a difference in the sense of self-location. This study was special insofar as the body locations were strictly spatially described (i.e., up/down), and attempted to locate the self using external means (a pointer).

The methods reviewed to this point helped evidence an intuitive innate sense of self with a location; this location is variable, tending to favor the upper face and the upper torso, but not limited to them, and subjected to contextual factors. However, they did little to investigate the lived experience and the impact of self-location, nor did they compare the various locations. Four studies were chosen within this line of investigation as rigorous bases to build upon by the following researchers: Fetterman and Robinson (2013), Adam et al. (2015), Hanley et al. (2021), and Hartelius et al. (2022).

In popular culture, head and heart seem to be competing organs whose divergences are translated and transmitted by metaphors (Lakoff & Johnson, 1999). For instance, it is commonly stated that the head is interpersonally cold and rational, compared to the heart, which is interpersonally warm and emotional. This apperception coincides with the division between reason and emotion, mind and passion, objective and subjective, and agency and authenticity or vulnerability. The conceptual metaphor theory (Lakoff & Johnson, 1980, 1999) was used by Fetterman and Robinson in 2013 to examine whether body metaphors induce cognitive, emotional, and performance differences in personality processes. The theory stated that mind (the thought's structure) proceeds metaphorically, and metaphors arise from bodily experience. As seen, prevailing metaphors suggest "that the heart, relative to the head, is the seat of emotionality … [and] is associated with caring and empathy" (p. 318), and that "metaphorically, people who 'have hearts' are intimate in their interpersonal functioning" (p. 319). Thus, Fetterman and Robinson's study hypothesized that body metaphors are related to self-locations and impact individual personality differences. The study design replaced the term "head" by brain to align with the heart as an organ, and also controlled for analogies of bodily self-location with the personality traits of the Big Five.

In Fetterman and Robinson's (2013) study, a series of eight experiments were conducted (*N* =725 undergraduates from North Dakota State University; *n* = variable) using the same self-location evaluation instrument forcing participants to locate their self either in their brain or in the heart by clicking on the corresponding button on their computer screen. With samples ranging between 36 and 127, most of the experiments found about 52% of heart-locators (with typically 62% of the women and about 44% of the men) and 48% head-locators (p. 321). Findings showed that heart-locators scored higher than head-locators on affect intensity ($p < .01$; p. 318), on caring and empathy ($p < .01$; p. 318), and on likings of intimacy-related activities ($p = .01$; p. 319). Heart-locators scored higher in attention to feelings and emotions ($p < .01$) and in experiential thinking ($p < .05$), whereas head-locators favored rational thinking ($p < .01$; p.320). Heart-locators reported higher emotionality, higher interpersonal warmth ($p < .01$ and $p = .01$, respectively), and higher agreeableness ($p = .01$), and self-location was not predicted by neuroticism (p. 321). Head-locators reported being more logical and more interpersonally cold, ($p < .05$ and $p = .01$, respectively; p. 321). Head-locators scored higher on accurate knowledge ($p = .05$) and possessed higher GPAs ($p < .05$) than heart-locators (p. 322). Heart-located individuals were more emotional (i.e., ethical) in social decision-making ($p < .05$) than head-locators, and the conscientiousness characteristics of the Big Five showed no significant results in self-location (p. 323). Heart-locators, when presented with distressing situations, were more impacted by negative stressors ($p < .01$), whereas head-locators, when subjected to daily provocations, tended to exhibit antisocial behavior, and therefore disagreeableness, more strongly ($p < .01$) than heart-locators ($p = .01$; p. 325).

Study 7 ($n = 74$, 42 female) randomly appointed participants to either a head-pointing group or a heart-pointing group (Fetterman & Robinson, 2013). With their dominant index finger, they touched either their temple or the left side of their upper torso while completing questionnaires of true/false general knowledge and moral dilemmas, using a mouse with the other hand. Head-pointers responded with greater accuracy in the general knowledge test ($p < .05$), whereas heart-pointers responded more emotionally to social dilemmas ($p < .05$; p. 327). The findings thus showed that attention to the head or the heart caused head-pointing to facilitate intellectual performance and heart-pointing to facilitate emotional decision-making. Fetterman and Robinson considered Study 7 to be causally determinant and argued that "drawing attention to the heart leads to weighting emotional over rational factors in decision making, likely because it increases the salience of one's feelings when deciding what one would do" (p. 327). The final experiment ($n = 36$, 22 female), conducted one year after the initial study, found that up to 75% of the volunteering participants responded to the tests consistently with their previous responses ($p < .01$), suggesting that self-locations are natural, lasting inclinations, and a trait-like variable (Fetterman & Robinson, 2013, p. 328). Sex was not a predictor, except for interpersonal warmth and agreeableness.

Together, these results showed persistent individual differences confirming the relevance and accuracy of head and heart metaphors, and the predictive value of self-location in terms of a person's emotions, thinking styles, task performance, and social decision-making (Fetterman & Robinson, 2013). Findings uncovered an almost equal percentage of head versus heart-locators, with a slight majority for heart-locators in most cases, which contrasted with many previous studies. Women were more likely to be heart-located than men. Fetterman and Robinson (2013) made a point to suggest no correlation of value outcomes between head-location and heart-location since positive and negative outcomes were found for both self-locations. The Big Five traits were not systematically assimilable to bodily self-location, positing self-location as a trait variable of individual difference (p. 328). Heart-locators, showing more intense affectivity, tended to think intuitively, in experiential terms. Assimilation as interpersonally warm versus interpersonally cold introduced the possibility for extrapolations related to the ability of an individual to connect with others, suggesting that coldness might lead to more antagonist relationships. Finally, attention drawn to a specific body location (brain or heart) moved the self to the elected location, and it followed that the characteristics of that specific body-location became prevalent or enhanced.

In a follow-up study, Fetterman et al. (2020) investigated the correlations between the location of the self, as captured by the conceptual metaphor theory, and religious beliefs. The study (N = 2575) found consistent results with the Fetterman and Robinson's (2013) study regarding the almost equal proportion of head versus heart locators. The hypothesis that heart-locators would be more inclined to be religious than head-locators was confirmed. Consistently with the

2013 study, the heart-locators' beliefs were mediated by intuitive and emotional thinking (experiential and warm) rather than by analytical and rational thinking (intellectual and cold), establishing the extent of affective factors in religious beliefs. Since conceptual metaphors are shared cross-culturally, one of the studies was conducted in Germany and in German instead of in the United States in English, to control for cultural and linguistic variables, as well as various religions. The results were consistent cross-culturally, cross-language, and cross-religions.

Thus, distinct behavioral and cognitive results were found for head- versus heart-locators in their motivational and thinking capacities, which have consequences on people's feelings, wellbeing, actions, and commitments. In these studies, metaphors were posited as the origin of behavioral and cognitive differences, and self-locations were postulated as a consequence, allotting self-locations with a metaphorical nature (Fetterman et al., 2020; Fetterman & Robinson, 2013). It could be argued that self-locations might be primarily to bodily metaphors since these metaphors arise from bodily experiences as psychological interpretations of physiological knowledge (Lakoff & Johnson, 1980). This prime physical knowing, established by Fetterman and Robinson's (2013) study, is a significant constituent of the current investigation whose purpose is to explore the effects of a heart-located attentional stance. Although the authors did not question that the brain was capable of its metaphorically attributed faculties, they denied the capacity of the heart to contribute physiologically to the qualities that metaphorically described it. Their statement revealed adequacy with a cognitive psychological point of view, without further deliberation.

Whereas Fetterman and Robinson (2013) used body metaphors as a mediator to determine self-location, Adam et al. (2015) used self-construal. Three sets of studies (*N* = variable, ranging from 95 to 156), with participants from the United States and from India in one of the experiments, investigated whether self-location in the head and self-location in the heart had different antecedents and whether, in consequence, self-location impacted people's judgments and decisions. Hypotheses were as follows: individuals with an independent self-construal tend to locate their sense of self in the brain rather than the heart more often than individuals with an interdependent self-construal, and stimuli compatible with the individuals' self-location would be received more favorably and would influence judgments and decisions.

Men chose the brain over the heart more often than women in all the studies (Adam et al., 2015). When asked to report which body part, among the brain, eyes, heart, stomach, hands, arms, legs, and spine, felt the most strongly related to their sense of self, findings reported 46% for the brain, 16% for the heart, and less than 10% for each of the six other body parts listed (p. 76). Consequently, the overall study thereafter focused on comparing brain and heart locations. When asked to distribute a fictive net worth of $100 million among fictive organ recipients according to the strength of the connection between the organ received and the sense of self, the brain receiver obtained $22.16 million, and the heart receiver $15.21 million. Men gave the most to the brain. When asked to give the $100 million to a single receiver, the brain was chosen significantly over the heart (53% and 29%, respectively; $p = .01$; p. 77). When told that they wanted to be cloned and were requested to choose which body part would be used, the brain was chosen by 44% of the participants, the heart by 25%. However, Americans ($n = 43$) chose the brain more often ($p = .001$) than Indians ($n = 73$; $p > .57$; p. 77). When assigned randomly to either an independently primed self-construal group or an interdependently primed self-construal group, the independent self-construal primed participants chose the brain as the body part with the best fitted cells to clone their self, "but participants [primed] with interdependent self-construals did not exhibit a definitive preference for either the brain or the heart" (p. 81). Similarly, when asked which body part was most strongly connected with their sense of self, the independent primed participants chose the brain more likely ($p < .00$) than the interdependent primed participants ($p = .03$; p. 78).

Exploring the impact of brain versus heart self-location on the participants' judgments concerning two controversial medical issues (the biological definition of death—cessation of brain versus heart functioning—and the legislation of abortion—according to a controversial act, life begins at week 12 of pregnancy), results showed that brain-located participants chose the brain definition of death more often ($p < .001$) than heart-located participants, who more often preferred the heart death definition ($p = .05$) and brain-located participants agreed less often with the legislation of abortion act ($p < .001$) than heart-located participants ($p = .19$; Adam et al., 2015; p. 79). Finally, after being randomly primed either brain or heart-located and assigned to a charity focus condition—supporting either Alzheimer's disease or coronary artery disease—participants primed with a brain-located self donated more money to an Alzheimer's disease charity (p = .04) than the participants primed with a heart-located self, and donated less money to a coronary disease charity (p = .07) than the participants primed with a heart-located self (p. 80). Thus, Adam and colleagues found a relationship between self-construal and self-location, and their study reinforced evidence that self-location in the brain versus the heart impacts the participants' psychological processes (their judgments and decision-making).

Whereas Adam et al. (2015) asserted that self-construal is antecedent to self-location in the brain or the heart, the study did not measure the initial self-construal of participants nor did it provide evidence that self-construal was a causative factor. Similarly, Fetterman and Robinson (2013) argued that metaphors determine self-location—yet it is equally possible that metaphors express qualities of location in a phenomenally-sensed self. Importantly, Adam et al.'s (2015) study omitted consideration of the recently described metapersonal self-construal (DeCicco & Stroink, 2007), which may, for example, have yielded subgroupings within those identifying as interdependent in self-construal and who, in the current study, "did not exhibit a definitive preference for either the brain or the heart" (Adam et al., 2015, p. 81). Although self-construal appears to have important correlations with self-location, conclusions of causation should be set aside pending further research. However, whereas current research on the impact of self-construal on self-related processes mainly focuses on social traits of the self and disregards the physical characteristics of these processes, the study by Adam and colleagues contributed to the investigation of the overlooked somatic aspects of the self. The authors suggested future research exploring how individuals locate abstract concepts in the physical body.

The size and shape of self-location, the possibility of multiple simultaneous bodily locations, and the implications of self-location for wellbeing have all been explored by Hanley et al. (2021). Based on previous evidence showing correlation between increased happiness and self-boundaries attenuation or dissolution (Ataria et al., 2015; Dambrun et al., 2019; Dor-Ziderman et al., 2016; Nave et al., 2021), the study hypothesized that a diffused distribution of the sense of self in the body will result in increased psychological wellbeing. The survey was conducted online with 156 participants recruited from MTurk who first reported their self-location and its distribution on a digital chart by clicking on all the pixels in the chart corresponding to the location of their sense of self, which then turned the pixels green (Hanley et al., 2021). Each pixel selected on the chart (among 469 total) had a value of 1 and served to determine the self-distribution score globally (counting all selected pixels throughout the whole body) and locally (counting the pixels in the head, torso, arms, and legs areas, respectively). The higher the score, the wider the distribution of the embodied self. The head and the chest areas were chosen most frequently, and on average the embodied self was only covering 8% of the whole-body surface. The head had the highest percentage of designated pixels (26%), the torso 10%, the arms 3%, and the legs 1% (p. 5). However, 70% of the respondents designated several body regions: 51% designated two locations (head and torso), 12% designated three locations (head, torso, and arms, most commonly), and 7% designated all four locations simultaneously (p. 5). Sex, race, and age were not a moderator in total self-distribution results, except that females scored higher on self-distribution in the torso (p = .03; p. 6). After this first evaluation, Hanley et al. (2021) used psychological wellbeing and life satisfaction scales to determine psychological and subjective wellbeing, respectively. The findings suggested that although self-location can take place in any part of the body, when located in the torso wellbeing is enhanced, indicating therapeutic value.

Hanley et al. (2021) contributed to showing (a) the value of a spatial investigation of self-location, (b) the extent of multiple simultaneous self-locations (70% of the participants), (c) the rather small area(s) the self occupies in the entire body space (8% on average), (d) the positive correlation between diffuse spatial self-location and psychological wellbeing, (e) the chest area having the highest correlation with wellbeing, (f) no correlation with psychological or subjective wellbeing for head-location, and (g) psychological benefits resulting from a diffused self, independently of whether it is diffused inside the body or spread outside the body, as in connection to other. The latter part of this last claim was not measured by the study per se but was stated by the authors relative to former self-boundaries studies. The strength of the positive correlation between diffused self-location and wellbeing, however, was small and "appears to be principally driven by more psychologically well individuals being more likely to locate their sense of self in their torso" (p. 90), thus suggesting that future studies could further investigate how the sense of self can be shifted out of the head and dropped down to the chest.

As suggested by Hartelius and Goleman (2016), neural activity may reflect changes in attentional states, thus “supporting the potential importance of attentional variables in defining states of consciousness” (p. 164). In this direction, Hartelius et al. (2022) used electroencephalography (EEG) to measure changes in neural activity relative to distinct attentional stances. Eight participants (5 female) recruited for their capacity to shift rapidly between specific seats of attention, were instructed to move their attentional focus through 11 different locations, three times for 20 seconds in each stance, while the EEG recording ran uninterrupted. The stances were either focused on a specific location in the body or diffused over a broader area and distributed as follows:

- focused at a point 10–15 cm above the crown of the head
- diffused in the upper head
- focused in the center of the head behind the eyes
- focused in a point 3–4 cm to the left of the center of the head
- focused in a point 3–4 cm to the right of the center of the head
- focused in the center of the chest
- diffused in the center of the chest
- focused in the core of the torso and head in front of the spine
- diffused in the area of the torso and head, extending about 50 cm beyond the body
- focused in front of the spine at the level of the low abdomen

- diffused in the low abdomen (Hartelius et al., 2022, p. 6).

The order of the stances was random. The participants followed the instructions provided by Hartelius (2007) for shifting attentional stance.

Results showed that (a) participants moved with ease from one attentional stance to another (each shift was achieved on average in less than one minute); (b) all stances were performed by all participants, including switching between focused and diffused modes; and (c) each attentional stance displayed a unique EEG activation pattern in at least one frequency bandwidth, thus confirming the study's hypotheses that the seat of attention can be identified within the body-relative space and shifted voluntarily. The 11 attentional stances EEG data were compared with the EEG data collected by Hu et al. (2017) relative to neural patterns of 10 positive emotions (amusement, awe, gratitude, hope, inspiration, interest, joy, love, pride, and serenity) and four affective dimensions (arousal, valence, familiarity, and liking), scanned within five frequency bands and among 32 scalp locations, allowing for a 11 x 14 x 5 correlation matrix (Hartelius et al., 2022, p. 6). Results found that (a) the higher the seat of attention was located on the body vertical axis, and the more focused, the higher the frequencies displayed; (b) diffused stances or stances extending beyond the body boundaries correlated with at least one positive emotion in four cases out of five (at the exception of chest diffuse), whereas only two out of six focused stances did (chest focused and core-of-body focused); (c) arousal correlated with three focused seats of attention along the body midline (focused above head, focused in center of head, focused in core of body); (d) inverted correlations were seen in the beta and gamma bands between diffused and focused stances relative to positive emotions and arousal (only the chest diffused/focused stances did not show inverse correlation); and (e) six out of 11 stances showed significant EEG signature correlation with the signatures of positive emotions or affective dimensions. Chest focused showed correlation with serenity in the low alpha band. Of note, the chest area, whether focused or diffuse, seemed to behave as an outlier in several of these measurements.

Hartelius et al. (2022) brought neurological evidence showing that attentional stances have varying locations, can be voluntarily controlled, and display unique and stable patterns of neural activity that are often associated with distinct patterns of emotional states, suggesting that "the construction and regulation of the seat of attention is a novel cognitive process not previously assessed" (p. 12). Accordingly, this indicates that a deliberate shift of attentional stance may open reliable "access to specific cognitive and emotional resources" (p. 1). It implies the need for a mapping of the body's seats of attention in association with mental states and their underlying emotions and cognitive faculties (or impairments), thereby mapping "the anatomical geography of psychological constructs" (Adam et al., 2015, p. 82). The measurements in Hartelius et al.'s (2022) study were performed in the context of individuals with the specific task of shifting their seat of attention quickly from one body location to another, without them reporting their experience or emotions. It would be informative to simultaneously gather self-reports of the experience (feelings, sensations, emotions) in each of the attentional stances and to recreate the experiment in the context of different states of consciousness, such as within a felt sense of connection to other, for instance, or a felt sense of expansion in the heart area and see how these data intersect (or not). In contrast with this previous section, which considered experiences of self-locations—some of which related to the heart—the next section looks at phenomenal experiences associated with the heart area of the phenomenal self.

Phenomenological Experiences Associated With the Heart Area of the Phenomenal Self

Research found the upper torso to be one of the two main areas where most individuals locate their sense of self (Hanley et al., 2021). The core part of the upper chest has been commonly associated with the heart, valued for its continuous pulsating activity that distributes oxygen, hormones, and electrical inputs throughout the body as well as for the emotional and spiritual symbols and metaphors that have been attributed to it. A brief survey of historical and cultural views of the heart shall help distinguish cardiac metaphorical attributes from biological properties and from phenomenal qualities.

Historical and Cultural Views of the Heart

Cultural and religious traditions or belief systems offer a rich depiction of the meanings that the heart, as a metaphorical organ, has accrued. The earliest known metaphorical representation of the heart was found in a prehistoric cave in Spain, depicting a mammoth with a cordate shape in the area of its heart, conceivably indicating the target to aim for killing the prey (Hajar, 2018). The drawing is believed to date from 15,000 B.P. The earliest known text associating the heart with metaphorical property is the Sumerian epic of Gilgamesh, around 2600–2100 B.C.E., describing hearts as broken with sorrow or filled with mercy (Bowman, 1987); the epic also refers to pulse-taking and to the heart as the organ sustaining life (Boyadjian, 1980; Hajar, 2018).

Heart-focused healing was shaped in Africa several millennia ago and informed the traditions developed later in India, such as in Hinduism and the Chakra system (Edwards, 2017). The Zulu people, based in Southern Africa described three layers of the heart: "(a) as physical organ; (b) as seat of emotions, feelings, hope, courage, desire and appetite; and (c) as conscience, will or patience respectively" (p. 33). As with most indigenous communities, Zulus believe that the heart has a spiritual dimension; it is the locus that links the individual to their ancestors and to all living beings, past, present, and future, as expressed in the notion of *ubuntu*: "I am, because you are." Thus, considering the heart as the center for consciousness, spirituality, and care, Zulu and other Indigenous peoples regard the heart as a sacred organ, capable of transforming disease into integrated wholeness. This belief is an example of wider use in primal belief systems that honor ancestors, nature, and the supernatural, all seen as intertwined, to maintain interrelational balance, that is, the harmony of the universe, and thus avoid attracting harm or disease from angry deities (Abram, 1996; Edwards, 2017).

Ancient Egypt provided what is thought to be the first description of the cardiovascular system in the Book of the Dead (ca. 1,600 B.C.E.; Budge, 1967). The heart was considered to be the center of the individual's personality, thoughts, intelligence, memory, emotions, and consciousness. Two of the papyri that constitute the book offer the most advanced medical knowledge about the heart of ancient times, endowing the heart with the vital function of circulating fluids and air throughout the body, as well as soul, thus making it the center of control and coordination of the entire anatomical (real) and spiritual (metaphorical) body (Roberts et al., 2019; Ziskind & Halioua, 2004). Ancient Egyptians viewed the heart as a spiritual and religious symbol: it was the only organ preserved in the mummies, to be weighted and judged by the deities after the person's death; a light heart was considered virtuous and therefore bestowed eternity (Boisaubin, 1988; Roberts et al., 2019; Ziskind & Halioua, 2004).

In a similar way, in ancient Greece, classical philosophers together with physicians believed that the heart was the locus of reason and emotions and the host of the soul, namely the pneuma, the vital spirit (Bestetti et al., 2014; Roberts et al., 2019). Although Aristotle (3rd century B.C.E.) and his followers corroborated this belief and persistently stated that the heart was the main organ in the body and the first to form, Hippocrates (5th century B.C.E.), who is credited with establishing medicine as a discipline, had begun—along with Plato—to promote the brain as the center of rational thinking and hence relegated the heart to a secondary role (Bestetti et al., 2014; Roberts et al., 2019). The Greeks improved the knowledge of the anatomy and physiology of the cardiovascular system based upon the knowledge they inherited from ancient Egypt (Bestetti et al., 2014). However, the debate about the role of the heart continued, and the school of Kos, for instance, although originally guided by

Hippocrates, maintained that the heart—the left ventricle, precisely—was the seat of the soul. Until the mid-medieval period, and reinforced by primal indigenous apperceptions, true knowledge was considered to come from cosmogonic, mythological, or theological faith, therefore anatomical knowledge was not valued (Roberts et al., 2019).

The view that the body was the temple of the soul or vital spirit and that the heart provides its dwelling prevailed during the Roman periods. As the Roman empire declined, this knowledge was displaced toward the East, in the Islamic world, where the endangered Greek texts were translated into Arabic, and research continued to some extent (Bestetti et al., 2014). For Avicenna (980–1037 A.D.), in accord with Greek literature, emotions were seated in the left ventricle, where the vital spirit (pneuma, i.e., breath) was transformed and then circulated throughout the body with the blood. Hence, the heart, producing breath and distributing the spirit, was the vital command directing all other body parts (Bestetti et al., 2014; Roberts et al., 2019). There, in the Islamic world, and contrary to the Islamic ascetic approaches (Williams, 1997), Sufism, the mystical tradition of Islam, celebrated the body and especially the metaphoric heart in order to transcend the physical body and unite with the divine (Coakley, 1997; Schimmel, 1997). In Sufism, the heart, as an organ, is the center of intuition and perception, and thus humans' deepest knowing comes through the heart (Helminski, 2000). As organ of perception, the heart is the seat of imagination, holding visions in creative tension (Corbin, 1997). A knowing heart is a way of transformation and can be cultivated by purifying it and listening to it (Helminski, 2000; Schimmel, 1997). Rumi, the poet of ecstasy and bonding, was dedicated to, and conveyed a transmission of the mystical union through the opening of the heart (Rumi, 2003).

The Arabic-translated ancient Greek texts were later reintroduced to Europe and translated into Latin starting the 10th century (Bestetti et al., 2014). Ultimately, the role of the heart in blood circulation was thoroughly described in 1628 by William Harvey at the University of Padua. Despite his discovery, Harvey reinforced Aristotle's cardiocentric view of the heart as the spiritual organ of the body, the seat of emotion, and the source of life energy, the life breath: the heart possessed both corporeal and ontological qualities, and inextricably combined them.

The mystical sacred heart is also at the core of Buddhist loving-kindness meditations (Edwards, 2013), the Tantra yogic approach (Feuerstein, 2001; Wallis, 2013), and the Vajrayana approach (i.e., Tibetan Buddhist; Ray, 2008). Broadly, Hinduism, Buddhism, Tantra yoga, and Zen all sustain abundant literature on the heart, its role, and its significance. In Indian philosophy, the mind and the heart are not separated. If mind is regarded as the locus of thought and heart as the locus of feelings, these are just the two ends of the same gamut; they are the same vibrations expressed differently. Sanskrit language has only a single word for mind and heart (Wallis, 2013).

The heart, as a visceral organ and as a symbol, is central to the ancient Chinese medical tradition as well, for which the heart is the locus of cognitive functions, spirit, consciousness, and the very source of life (Yu, 2007, 2009). This primordial role of the heart is still prevalent in both Chinese current philosophy and current medicine (Yu, 2007), as well as in popular beliefs.

Christianity has also bestowed symbolic attributes to the heart, developing extended imagery, in particular that showing the wounded heart, a symbol of the sacred heart, and an object of worship (Bowman, 1987). In the Old Testament as well as in the New Testament, the heart is the center of intelligence, moral action, and wisdom (Ware, 1997). Moreover, the heart "represents the spiritual center of the human subject in its totality, the place where we find our personal unity and where at the same time we experience divine grace" (p. 100). Later on, the objectification of the heart as representing kindness and love, further sustained by various myths and legends, gained popularity and transformed into artifacts exchanged yearlong as signs of bond and affection.

From regional, cosmogonical, and theological traditions to cultural and medical schemes, heart symbolism seems to have survived ages and ideologies. The cordate symbol of the heart is well alive today in commercial, political, social, and spiritual contexts. The metaphoric heart is often a supporting vehicle in the search for peace, care, bonding, and meaning making. Heart symbolism has been accompanied and sustained using spoken heart metaphors. A brief review of several underlying meme-like expressions may be useful. Coming from the tantric tradition, which sees the body, its impulses, and its inclinations as a means to connect and unite with the divine. Wallis (2013) offered a brief insight indicating how to analyze and use common metaphors contextually:

> The Indian tradition holds that the locus of emotion and the locus of thought are one and the same, and therefore subconscious thoughts

> frequently manifest as emotions, and subconscious emotions as thoughts. It takes a few minutes (or years) to fully assimilate the implications of this. For one thing, it thoroughly undermines the American tendency to privilege feeling over thought or vice versa. (p. 358)

To illustrate this assertion, Wallis took the examples of heart versus brain and reason versus feeling metaphors. A few decades ago, emotions were considered irrational and unreliable whereas reason was trustworthy and dependable. More recently, these assertions turned around, and people are now told to "listen to your heart" and "follow your heart," which, respectively, mean "get in touch with your deeper programming" and "do what you want, putting aside reason, regardless of the consequences" (p. 358). Similarly, reasoning seems now to be disregarded when people are being asked to give their opinions, in favor of having them give their feelings, as illustrated in the following: "'What's your feeling on that' 'I really feel that …' which is usually just a way of giving an unthinking opinion that the person won't be obliged to defend because, after all, it is [their] feeling" (p. 358).

Wallis (2013) emphasized that both trends—brain over heart and heart over brain—are on some level equally flawed within specific cultural contexts. Such an approach serves as a model for contextualizing (geographically, historically, culturally, and ideologically) the meanings and implications of some of the heart-related metaphors still alive—or reactivated—today around the world and is part of a critical approach to the nature of a heart-located lived experience.

This brief overview of heart symbolism and insight into heart metaphors broadly sketches a historical/cultural/ideological baseline where the heart is referred to as a sacred bodily place, be it the locus of the soul, of affectivity, of bonding and care, of cognitive awareness, bodily knowing, or simply as the center of the human body's life force. Such persistent and consistent beliefs throughout time and ideologies deserve some attention and scrutiny furthermore that the latest technologies might provide means to decipher their accuracy, abandoning them as myths and folk tales, or supporting them as valuable intuitions, visions that can reveal relevance in understanding relationality and interconnectedness. These beliefs have in common metaphorical qualities that come from somatically sensed experiences. One of the dimensions of these experiences in the chest region of the body is the felt sense of connection, which may be informing some of these metaphors. That particular felt experience of connection is one among those for which there is some literature.

The Felt Sense of Connection

It will be helpful to briefly situate the felt sense of connection, and its often associated felt sense of expansion, as approached in current social sciences. In modern psychology, the felt sense of connection has mostly been equated with the condition of being in a relationship. A noticeable shift in the social sciences and psychology fields' evaluation between independent and interdependent valences occurred in the two decades following the mid-1980s. Townsend and McWhriter (2005) conducted a review of the literature on the construct of connectedness published between 1984 through 2003, including empirical studies and theoretical discussions, and examined the implications for counseling, assessment (i.e., evaluation of "disease"), and research, with the purpose of providing a framework for addressing the problem of disconnection from others.

The valorization of social connectedness stemmed from a reaction against the suggestion for the American Psychiatric Association to classify codependency (the fact of being dependent on someone else) as a psychological disorder, a failure to act independently. In response, the felt sense of connection has been reassessed as “an aid in helping to resolve inter- and intrapersonal concerns” (Townsend & McWhriter, 2005, p. 192) and regarded as a tool for healing from emotional pain. Connectedness, as a psychological construct, synonym of relatedness and associated with interdependence, was defined as “when a person is actively involved with another person, object, group, or environment, and that involvement promotes a sense of comfort, wellbeing, and anxiety-reduction” (Hagerty et al., 1993, p. 293). The ability to connect with others was thereafter associated with psychological growth and wellbeing and was valued as a positive trait. From denigrating codependency (thus valuing independence and individualism) to valuing interdependency, social science and counseling psychology seem to have only shifted between two poles. Indeed, low social connectedness has since been labeled as a disorder, whereas connectedness has been regarded as a fundamental human need that, when not met, can lead to psychological distress and health deterioration.

This shift has prompted extensive literature examining close relationships, social relationships, parent–child relationships, school relationships, and work relationships. Relationships, argued Aron and Aron (1996), are fostered by the desire to self-expand as a way to experience efficacy and satisfaction. Aron and Aron explained that

> Self-expansion is the desire for enhanced potential efficacy—greater material, social, and informational resources. Such self-expansion leads both to the greater ability to achieve whatever else one desires (i.e., both to survival and to specific rewards), as well as to an enhanced sense of efficacy. (pp. 333–334)

Accordingly, the motivation to enter or develop relationships is to self-expand, and when the self is no longer expanding through a relationship, that relationship is no longer felt as satisfactory. Self is at the core of the relational processes, and satisfaction—by creating positive affect—leads relationships to their intensity and their duration (Aron et al., 2003). In this context, the felt sense of relatedness is correlated with—and conditional to—the benefits a relationship provides.

This self-expansion model of motivation (Aron & Aron, 1986) may appear satisfactory as a rational explanation within the framework of cognitive and social psychology. For instance, the concept of social connectedness, examined under the angle of communication media, has been defined as "a short-term experience of belonging and relatedness, based on quantitative and qualitative social appraisals, and relationship salience" (Van Bel et al., 2009, p. 67) and subsequently applied to advance the development of communication technologies. However, the emphasis on the motivational aspect for explaining relationship and connectedness may narrow the range of experiences associated with the felt sense of connection, and the theory may feel reductionist on an experiential level, especially when viewed from a phenomenological perspective. The motivational explanation persistently insists on the annexation of other in self, not considering alternative options such as the inclusion/presence of self in other, self-boundaries weakening, or self-dissolution altogether, which—as seen in previous sections—

are pursued in spiritual, religious, or indigenous traditions. These later self–other states can also be experienced spontaneously. Thus, this review will turn toward the phenomenological experience of the felt sense of connection to contrast with the social science and cognitive psychology methodologies.

The felt sense of connection and the notion of connectedness as experienced by the phenomenal self were described and analyzed in detail by phenomenologists Husserl and Merleau-Ponty. Merleau-Ponty (1968) enhanced and expanded the notion of perception by grounding it in the body and interaction. Influenced by phenomenology, Gendlin (2000) defined the *felt sense* as the sensing of something undefined "that comes in one's body in connection with some specific problem or aspect of one's life" (p. 266). Gendlin (1992) drew on—and extended—three specific ideas from Merleau-Ponty related to perception: (a) there is a pre-verbal and preconceptual state of expression, that Merleau-Ponty defined as in the body and in perception; (b) there is a knowing that has no defined form yet, located within perception; and (c) perception is primarily based on interaction. An interaction occurs prior to verbal exchange, and this form of interaction continues after the use of language. This form of interaction is prior to perception.

Gendlin (1999b) further proposed that "we humans live from bodies which are self-conscious of situations" (p. 233) so that the body senses itself, its surroundings, and its situations. Gendlin advocated for a process-based model of being sentient, whereby process drives content, endlessly changing it. Moreover, the body's sensing is a knowing that is more holistically inclusive than cognition.

This knowing is first undefined, a felt sense, which can then be “carried forward” (p. 234) by the process. In this bodily sense, “life-process implies and enacts its own next steps” (p. 235). A felt sense is sense-making inside the body and can be focused upon, first by noticing it, then by questioning it and listening to it, letting it speak from its bodily location, in incremental little steps. The felt sense is a concrete feeling within the body and can more likely be located in the stomach and chest areas (Gendlin, 1999a).

Gendlin (1999a) proposed bypassing postmodernist and materialist preoccupations with definitions and instead argued for speaking from the self, that is, from the undefined felt sense inside the body, thus establishing a philosophy of experiencing, implicitly. Gendlin’s philosophy of experiencing engages with the relationship between objects (or concepts) and subject (self, the body). For example, examining relationships between cognitive formulation and felt self multiplies their respective capacities. These are not equivalent; they can, together, carry forward. Human beings have interactional capacities:

> The only real relation is when you are in touch with yourself and you can feel that the mysterious other has the power to look at you and find you in a way that is totally unknown to you from moment to moment. (p. 84)

In words that transpose to the felt sense of connection, only a person intimate with their felt self can connect (relate to and be in a relationship) with others who are looking at them. Else, when not speaking from the very location of self, one cannot recognize self in someone’s look, and therefore even feel the look (Levinas, 1969). This observation is an opportunity to refer back to Aron and Aron’s (1996) motivational explanations of relationship and self-expansion and highlight a divergence of views. It is not (only) because of a need to self-expand, but because someone is seeing our self, thus enthralling us and enabling us to expand forward. And it is not (only) because someone seeing us will bring our self some expansion, but because they compel us to enter more intricate dimensions.

Mainstream approaches to intersubjectivity were criticized as being representationalist and reducing the concept to third-person paradigms or models of social cognition, such as theory of mind and the mirror neuron system (Fuchs & De Jaegher, 2009). Rather, an interaction process approach to intersubjectivity was suggested, which argues that the interaction, not the mental model or the passive observation (simulation), is the source of the interconnection. Intersubjectivity, or social understanding, was primarily defined as “an interactional and intercorporeal process in which both partners are immersed and in which the process of interacting itself plays a leading role for the understanding” (Fuchs & De Jaegher, 2009, p. 470), which corresponds to a participatory process of sense-making. The process is dynamical, involving agents engaged in the second-person perspective. In interaction, as process connecting two parties together, the self and the other are equally involved; their embodied reciprocal engagement or intertwining generates the intersubjective experience. The body and its exchanges with others (social interaction) or with the world (environmental, situational interaction) are essential for interacting and connecting and the basis for effecting intercorporeality—defined as “a pre-reflective intertwining of lived and living bodies, in which my own is affected by the other's body as much as his by mine, leading to an embodied communication" (Fuchs, 2017, p. 200)—and interaffectivity (one's body being impressed by the other's emotion or expression).

In an argumentation proposing that intercorporeality and interaffectivity are primary to social cognition, Fuchs (2017) elaborated on the main concepts that underly social connection, thus contributing to an understanding of social empathy by suggesting that "emotions may not primarily be localized within a single individual, but should rather be conceived as phenomena of a shared intercorporeal space in which the interacting partners are involved" (p. 196). The term *empathy*, which has no operational definition so far (Deutsch & Madle, 1975; Hall & Schwartz, 2022), will refer to Fuchs's (2017) approach, with cognitive, affective, and embodied connotations. Thereafter emotions were defined as all-inclusive spatial phenomena connecting bodies and situations (their affective affordances, i.e., the valence features made available by the environment, such as drinkable and breathable) in a reciprocal interaction. By extension, emotions are the experience of the affective qualities of the lived situation.

A definition of connection could use Fuchs's (2017) suggestion that "In face-to-face encounters, each partner's lived body reaches towards the other to form an overarching system through inter-bodily resonance and mutual incorporation" (p. 205). Infants already relate to the expressions and intentions of their caregivers and to the shared situation without resorting to mental representations, showing that "social understanding and empathy develop as a practical sense, a musicality for the rhythms, dynamics and patterns of interactions with others” (p. 205). Additional skills develop later, which add layers to social understanding and empathy needed when situations or intentions reveal ambiguous, such as representations of the other, projection and questioning, or imaginary transposition in the other’s state. However, “empathic intersubjective relations” (p. 206) and the felt connection rely primarily on prereflexive embodied intersubjectivity, that is, the integration of embodied intercorporeality and interaffectivity. The same process is at work when interacting with nature, plants, animals, or any dimension broader than self. Bypassing the need for mental representations in order to understand and connect has biological and psychological implications relative to the bodily location from where the attention comes and where knowledge resides, as seen through this phenomenological and enactive approach to connectedness.

The body incorporates the dimension of the sensible (the objective body, visible and tangible) and the dimension of the sentient (the phenomenal body). The body is a thing among many other things and simultaneously perceives these things. Within itself, the body unites object and subject; they are intertwined (Merleau-Ponty, 1968). It could be argued that the flesh (the body and the body of any living entity, be it a boulder), that fundamental element, shares properties with what is often called consciousness and succeeds to inscribe consciousness in the material world, holding both the sensible and the sentient in a common substance and state, reversible and reciprocal, rendering the world sentiently sensible to itself. It could also be argued that the intertwining (the chiasm, or reversal, as defined by Merleau-Ponty, 1968) proceeds in essence by connection and resonance: the intertwining as interactional contact that effects the states of the linked entities. Merleau-Ponty defined the chiasm, or intertwining, as follows: "Like the natural man, we situate ourselves in ourselves and in the things, in ourselves and in the other, at the point where, by a sort of chiasm, we become the others and we become world" (p. 160). This accounts for a description of the felt sense of connection.

The Phenomenal Body

The philosophical debate around the body's role in cognitive processes or in experiences has a long history. Although the argument has existed at least since Aristotle, dissensions between behaviorists and cognitivists have more recently sharpened it. It can be viewed as a debate around primacy: instinctual body versus cognitive self. Coming from a phenomenological viewpoint, Varela et al. (1993) addressed the intelligence of the organism in a way that integrates both perspectives; the phenomenal body, therefore, is a fusion of the cognitive self and the instinctive body, that is, a reconciliation of them and the enunciation of a larger system that generates a whole different from the sum of the parts, in a gestaltian way. Varela and colleagues suggested that cognition is embodied and enactive, an interplay between body and environment. *Enaction* holds that "(1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided" (p. 173). In a process of reciprocity and reversal, the sensate body actuates the world while it is simultaneously molded by the world. They perform and transform each other. Cognition is defined as an “embodied action” (p. 172), and every action enacts new knowledge. Varela and colleagues defined *embodied* as the sensorimotor faculties of the body—embedded in a biopsychocultural framework—to generate experiences that translate into cognition. The enactive approach claims that action is perceptually guided, and “cognition is not simply a matter of representation but depends on our embodied capacities for action” (p. 180). Flor and Hutchins (1991) proposed the term *distributed cognition* to describe how cognition involves not only a person but also external structures such as programs, tools, and collectives, especially in task performing. This proposal was followed by Clark and Chalmers’s (1998) suggestion of an *extended* mind arguing that the environment is actively determinant in cognitive processes.

Together, these various approaches were gathered under the appellation “4E cognition,” which defends the view that “cognition was not limited to processes in the head, but was embodied, embedded, extended, and enactive” (Newen et al., 2018, p. 4). A debate runs on whether other claims shall be included. For instance, Ward and Stapleton (2012) argued that cognition is also essentially related to affect—the intimate value that the object of cognition represents to the cognizer—and suggested adding *affective* (or emotive) cognition to the 4Es, making them 5Es. Disagreements on the nature of cognition continue not only between internalists versus 4E cognitivists but also among the advocates of the 4E embodied processes themselves. As seen above, mainstream cognitive science has been based on “the representational and computational model of cognition" (Newen et al., 2018, p. 5) occurring in the brain, and the brain only. Contesting this view, enactivism and the 4E approaches advanced that cognitive processes "essentially rely on the body's system and its dynamical and reciprocal real-time interaction with its environment" (p. 5). Enactivist approaches view cognition as "affordance-based, where affordances are always relational" (Newen et al., 2018, p. 9) and perception as oriented toward action, and not inferential (p. 10), favoring a scale-free collective, or shared intelligence, a distributed cognition—the ways beliefs are shared and communicated among self-organizing systems. This view is currently further explored by Friston et al. (2022) in neuroscience and Levin (2023) in developmental biology, for instance.

This broad picture of the debate about the nature of cognition and whether neural representations suffice to represent cognitive embodiment, or how cognition is constructed, without being the central concern of the current investigation, serves, in turn, to delineate the ground on which this study seeks to be based. Cognition and mind seem not to be solely located in the brain; the perceiver's body and its environment at large seem to play a central role. In other words, the body knows.

Two concepts, derived from phenomenological analysis, are central to defining the phenomenal body, that is, how embodiment structures self and experience:

> *Body image* [emphasis added] is a (sometimes conscious) system of perceptions, attitudes, and beliefs pertaining to one's own body.
> *Body schema* [emphasis added] is a system of processes that constantly regulate posture and movement—sensory-motor processes that function without reflective awareness or the necessity of perceptual monitoring. (Gallagher, 2003, p. 4)

These two distinct behavioral systems interact together and coordinate intentional action. The distinction between body image and body schema has been endorsed by neuroscience in clinical studies of unilateral neglect and deafferentation (p. 13) and has helped clarify the results of neonate imitation and aplasia studies (Field et al., 1982). Body image entails the subject's body "perceptual experience, conceptual understanding and emotional attitude" (Mishara, 2005, p. 133). Body schema involves the body's preconscious motor functions performing in a coordinated manner automatically without the necessity for a bodily monitoring (Gallagher, 2003) and thereby contributes to deliberate actions and to structure the experience. Since the body is inscribed in an environment, the body schema needs the guidance of the body image's awareness and intentionality to perform its movements and postures smoothly. When reaching out for a book on the other side of the room, Gallagher explained, "I am aware of my bodily action not as bodily action per se, but as action at the level of my intentional project" (p. 9), that is, reaching out for a book, whereas the walking through the room is performed automatically. The body image, however, can be distorted and perceptually inaccurate and, in turn, needs the prenoetic dynamical precision of the body schema to perform its intentions.

The Phenomenal Heart

Within the phenomenal body, the heart area has been associated with emotional, compassionate, and bonding qualities (Adam et al., 2015; Fetterman & Robinson, 2013). Concurrently, the bodily location where the experience of the metaphorical heart is felt corresponds to the upper chest. Thus—invoking the emotional properties associated with the physiological heart—the upper chest defines the locus of the phenomenal heart. The phenomenal heart has been shown to be a possible location where the phenomenal self resides, a center of identity impacting the lived experience at the cognitive, emotional, psychological, and behavioral levels (Adam et al., 2015; Fetterman & Robinson, 2013; Hanley et al., 2021; Hartelius et al., 2022). Besides being a center of identity, the heart area has also been associated with caring and bonding (Gentile et al., 2020; Kang et al., 2015). Somatic psychotherapies typically work with the phenomenal body to address both psychological and physiological patterns simultaneously.

Bowen (2008) suggested that core patterns of stress and limitation might be efficiently identified through inquiry into sensations of the chest area identified as heart in this practicum, but more accurately defined as the area in the phenomenal body associated with the physical heart. Bowen's approach distinguished three aspects of the heart area, each of which can be affected differently: (a) the emotional heart, which can be touched through a voice, a gesture, movement, posture, images, feelings, or memories; (b) the psychological heart, which can be touched through the meaning of words and actions, aligning beliefs, stories, thoughts, and meanings with the person's psychological identity and core experience; and (c) the phenomenal space of the physical heart, which can be touched through physical and energetic intervention and can bring the person's experience directly into the present moment. For example, direct contact of the person's hand over their chest can reveal and release bodily tensions associated with emotional or psychological patterns. In a therapeutic setting, the emotional heart, when touched, typically responds with experiences of joy, empathy, caring, affection, gratitude, and connection (p. 8). The fusion of these three aspects (emotional heart, psychological heart, and phenomenal space of the physical heart), their interplay, and dynamic define the larger system that constitutes the phenomenal heart.

The phenomenal heart, experienced in the felt space of the body, or even in a dream, can be metaphorically associated with interpersonal connection, connection with the world, and knowing. Within the context of a dream, Deslauriers (in press) experienced a hug with a friend as a “subtle quasi-electrical current being exchanged heart-to-heart” (p. 2) when their chests touched. Because the heartfelt connection was still sensitive in the chest of the dreamer upon awakening, and lingered, Deslauriers inquired whether there is something like “being in one’s heart” (p. 2) or acting from it. This felt metaphor of a connection, a shared feeling located in the heart area, pointed to a heart-specific knowing and led to the suggestion that in a culture of cerebral knowledge where objectivity and detachment are advocated, heart-knowing, in contrast, has a relational nature, favoring sharing and connecting. Compassion, empathy, relational awareness, or co-feeling—when one’s interior encounters another’s interior—occur when one’s fragility meets the other’s vulnerability and is experienced in a somatic feeling of metaphorical heart-opening (Deslauriers, in press). This co-feeling can extend to the world that contains the individuals and the larger matrix of experiences.

Recognition of the interconnectedness of all things can lead to, or can be encouraged by, the cultivation of loving-kindness. Loving-kindness is also a

Buddhist mental meditation technique, which describes loving-kindness as a virtue associated with the heart, a quality of the heart denoting generosity, relatedness, and caring (Salzberg, 2011). These qualities clearly refer not to the biological heart but to the phenomenal heart. By suspending self-judgment and one's habitual way of thinking, reacting, and behaving, loving-kindness meditation, similarly to some other contemplative prayer practices, encourages the loosening of self-centeredness (i.e., the preoccupation with self) and fosters openness to others. Some meditation studies tend to use the terms loving-kindness and sense of connectedness reciprocally, or even crosscut them into "loving connectedness," a state which is said to emerge when the heart is opened (Kristeller & Johnson, 2005, p. 404).

Loving-kindness thus starts with opening one's heart (Chödrön, 2010) and accepting oneself and one's weaknesses, after which it becomes possible to extend this heart opening to one's surroundings, and ultimately to the whole universe (Chödrön, 2010; Leppma, 2012; Salzberg, 2011; Schroter & Jansen, 2022). Indeed, the instructions tell the loving-kindness practitioner to first bring their attention to their physical heart area (Leppma, 2012). In a study on loving-kindness meditation implying an initial three-day retreat, some of the participants consecutively reported a "muscle soreness of the heart … due to extensive training" (Przyrembel et al., 2019, p. 119), which may more accurately refer to a tenderness felt in their phenomenological heart, since the muscles of the heart are not directly accessible by sensory nerves.

More specifically, loving-kindness meditation aims to develop compassion and prosocial feelings through benevolent intentions (Przyrembel et al., 2019) and has been shown to significantly increase feelings of empathy, caring, and social connectedness (Gentile et al., 2020; Hofmann et al., 2011). The practice also increases subjective wellbeing and happiness while reducing anxiety. To test the extent to which loving-kindness meditation affects social connection and emotional disposition, 496 undergraduate students (39% male; mean age 19.3; 72% White, 7% Latino, 4% African American, 4% Asian, and 13% other) participated in a randomized study comparing four conditions: loving-kindness (LK; $n = 127$), interconnectedness ($n = 125$), downward social comparison ($n = 109$), and control ($n = 135$; Gentile et al., 2020, p. 768). After completing a series of scales measuring feelings of contentedness and connectedness, the participants were given instructions accordingly to their condition and requested to walk down the halls in the building for 12 minutes, practicing the manipulation. For the LK condition, participants were instructed to notice every person they encounter and mentally wish them to be happy. The control group was asked to walk around for 12 minutes observing people's clothes and styles. After 12 minutes, upon returning to the lab all participants completed an additional series of measurements.

The results showed that the LK condition, compared to the control condition, had lower anxiety ($p < 0.5$), higher happiness ($p < 0.5$), higher empathy ($p < 0.01$), higher feelings of caring ($p < 0.01$), and higher feelings of connectedness ($p < 0.5$; Gentile et al., 2020, p. 773). The interconnectedness condition (noticing all the ways one is connected to another), compared to the control condition, showed higher empathy ($p < 0.5$; p. 773) and higher feelings of connectedness ($p < 0.01$; p. 773). Finally, the downward social comparison condition (noticing how one is better off than another person), compared to the control condition, showed no beneficial effects, not even enhanced mood. Measured individual differences in traits did not have a significant effect across conditions.

While examining the effects of LK discussion (i.e., focusing on a theoretical understanding) versus LK meditation (i.e., focusing on the practice and cultivation), it was found that discussions about LK alone increased positive attitudes toward self, but the practice of the meditation was needed to additionally induce benevolent attitudes toward others (Kang et al., 2015). The authors explicitly associated the results with a head versus heart interpretation, attributing discussion to head and practice to heart. Furthermore, neuroimaging studies have shown that LK meditation as well as compassion meditation "enhance activation of brain areas that are involved in emotional processing and empathy" (Hofmann et al., 2011, p. 1126), in which the heart, as an organ, might well be involved (see next section) by boosting "the emotional and somatosensory brain representations of other people's emotions" (p. 1131). Traditionally, these types of meditation do not pair well with anger, hatred, envy, and jealousy.

The Biological Heart

The impact of the biological activity of the heart on emotions and on the brain has been evidenced, and this biological evidence is often uncritically conflated with evidence issued from the phenomenal heart. However, these phenomena are distinct: evidence for the activity of the biological heart needs to be considered separately and can only be associated with evidence related to the phenomenal heart when research demonstrates that connection. It remains therefore important to turn toward the physiological and bioenergetic aspects of the heart as evidenced by current science and subsequently examine to which extent these aspects support and explain—both or in part—the traditional wisdom and the phenomenon of expansion and connection that can be felt in the chest area.

Heart in a Dynamic Relationship With the Brain and Heart Impact on Emotions

Emotional states are reflected in the heart's rhythms, or heart rate variability patterns (Dannecker, 2005). Myogenic expansion and contraction are triggered by electrical impulses: negative emotions likely cause disruptive cardiac rhythms, whereas positive emotions such as caring, gratitude, and compassion trigger coherent and smooth rhythms, showing that pressure waves "represent yet another language through which the heart communicates with the rest of the body" (p. 202). This language, conveying emotional information, influences how a person perceives, and responds to, their environment. Every cell in the body is influenced by that pressure wave and its variation, moment to moment (Glass, 2001). The heart has thus been described as a locus of spontaneity, where every impulse received is immediately responded to by pulsations, within this constant state of physical, emotional, and psychological interconnectedness (Dannecker, 2005). By extrapolation, in Dannecker's view, the heart offers an organic example of a place and function where opposites (i.e., contraction/expansion) are connected and unified, going from conversion to conversion. Hence, this cardiac myogenic movement presents transformative capacities:

> The common belief is that we need to do something, go somewhere different or have certain experiences in order to transform ourselves. But real transformation happens right here in the awareness of our emotions and the ability to drop into the heart. (p. 341)

This dropping into the heart is the core dynamic examined in this thesis.

Concisely stated, (a) the heart rate amounts to the number of heartbeats per minute; (b) heart rate variability (HRV) is the measure of the change in the duration between heartbeats; and (c) the greater the inconsistency of the interval, the higher the HRV, and the more capable the individual is of regulating their emotions and responses to stressors, which in turn increases their attention and decision-making skills (Elbers & McCraty, 2020). HRV is primarily stimulated by the sympathetic and parasympathetic nervous systems.

As seen with myogenic expansion and contraction (Dannecker, 2005), and based on studies by Lacey and Lacey (1978) and Armour (1991, 2007) ascertaining the cardiac neural network (reviewed below), Elbers and McCraty (2020), while summarizing earlier studies conducted at HeartMath Institute (HMI), restated that the cardiac rhythm's patterns communicate emotional information to the brain through a bottom-up process using an afferent neural pathway. These HRV waveforms reveal specific patterns of emotional states such as anger, fear, appreciation, and so on. If this is so, then emotional experience is modulated by cardiac input, impacting cognitive function and self-regulation. It has thus been claimed that heart-centered attention supplemented by an emphasis on positive emotions such as appreciation or loving-kindness increases cardiac coherence, which enhances self-regulation of mental and emotional states (Childre & McCraty, 2001; McCraty et al., 1993; McCraty et al., 1998). HMI defined the notion of coherence, or psychophysiological coherence, as the degree of stability and order displayed in the rhythmic and regulatory physiological systems within the body such as the rates of heartbeats, respiration, and blood pressure. As seen, cardiac coherence, measured by HRV scans, or electrocardiograms (ECG), shows a more orderly, sine wave-like heartbeat at a rate of about 0.1 Hertz (McCraty, 2011, p. 88). The degree of coherence was adapted from the degree of synchronization between two or more oscillating systems coupled together, as measured in physics; increased coherence in one system can increase synchronization between coupled systems. Overall, the HMI has been repeatedly conducting studies showing that coherent intrapersonal and interpersonal cardiac modes correlate with reduced stress, anger, anxiety, and depression and increased resilience, appreciation, peacefulness, and spiritual connectedness (Childre & McCraty, 2001; McCraty, 2011, 2017; McCraty et al., 1993; McCraty et al., 1998).

Although studies in this area are associated with promising and tantalizing claims, it should be noted that some of those conducted by the HMI appear to use poorly defined terms in a way that may inflate the resulting claims. According to Reed (2022), if coherence and synchronization have been precisely defined in physics, these terms have been transposed into biology by HMI without adhering to a rigorous description according to scientific criteria. Reed alerted against the conflation of different forms of interpersonal synchrony, which come in at least three distinct arrangements: physiological (oscillatory patterns in bodily functions), behavioral (synchronized behavior), and shared affect (similarity of emotional states). These forms of interpersonal synchrony are often further aggregated with other forms of oscillatory patterns such as coherence. Other definitions were recently proposed, such as mathematical coherence and synchrony (measurement of the coherence and synchrony between two hearts; Yount et al., 2021).

Caution having been expressed, this preliminary evidence has suggested a direct correlation between the physiological mode of cardiac coherence and emotional states of caring and bonding (Mandel, 2007; McCraty, 2004; Russek & Schwartz, 1994). Additionally, the electric and magnetic fields in the heart are said to be 60 times (McCraty, 2004, p. 211) and 100 times (McCraty, 2017, p. 6) greater, respectively, than the fields emanating from the brain and are detectable in nearby individuals (Mandel, 2007; Russek & Schwartz, 1994). To summarize, through the research conducted by HMI, the heart appears to be a central communication system, a generator of oscillatory patterns in continuous interaction with the brain and other parts of the body through various pathways, including "neurologically (through the transmission of neural impulses), biochemically (through hormones and neurotransmitters), biophysically (through pressure and sound waves), and energetically (through electromagnetic field interactions)" (Elbers & McCraty, 2020, p. 71).

The phenomena of cardiac coherence and body–brain synchronization have triggered a surge of studies, often linked to the reexamination of ancient practices that had recently become popular in the West. Many Eastern traditions have established practices that help focus on bodily sensations in specific locations, such as the belly, or in specific functions, such as breathing, to anchor awareness (e.g., samatha meditation, or Qigong). Song et al. (1998) conducted a study to examine if self-attention to the heartbeats during attentional postures enhances heart–brain synchronization and brain–body connectivity, and therefore physiological homeostasis, a major factor of health and healing. The authors hypothesized that two processes, energetic and physiological, are involved. Twenty-two healthy students (age 18–22, 10 female) were recruited from a psychology class, with no further criteria provided. After a baseline resting phase was conducted in two steps, eyes closed and eyes open, a focused attention phase asked the participants to first focus on their heartbeats, counting the beats, and next on their eye movements and counting them. Finally, an enhanced awareness phase instructed the participants to repeat Phase 2, but with sensing their pulse during heartbeat trials and sensing their eyes during the eye movement trials by placing a hand or finger on the area (Methods, para. 1). An EEG measured brain activity, an ECG measured heartbeats rate, and a 2-channel electrooculogram monitored eye movements, while two scales measured self-reported intensity and accuracy.

Findings showed that the perception of heartbeats was reported four times more often than that of eye movements (Song et al., 1998). Two times more heartbeats were reported during the touching trials, while no increase in the reported eye movements was observed. Attention to the heart pulsations increased synchronized EEG and ECG activity. Connectivity and synchronization were further increased with self-touch of the pulse, showing significant effects on mind–body integration. Two mechanisms seemed to interact simultaneously at the brain level: a physiological neural registration of the heart’s activity as peripheral feedback (at the start of atrial contraction) and an energetic resonance that harmonized closely with the heart’s activity (throughout and after ventricular contraction). The findings thus confirmed the effect of focused attention on systemic coherence, suggesting that heart-focused attention facilitates heart–brain coherence. The authors encouraged further research to open avenues in energy medicine and energy healing.

Limitations reported by Song et al. (1998) include the difficulty of sensing eye movements and the risk of confounding them with heart pulsations felt in the eye. However, the study had further limitations. The sample was small, and the researchers’ language seemed to assume that body and brain are separated, which may be a common tendency in many of the studies on this subject. Despite these limitations, the study was one of the first to demonstrate the cardiac mechanisms underlying body–mind integration and wellbeing induced by meditation and relaxation techniques. Such findings have since been refined and applied in the emerging domains of energy and bioelectromagnetic medicine, biofield science, and biofield physiology (Foletti, 2013; Hammerschlag et al., 2015; Oschman, 2015; Rubik et al., 2015). Likewise, the phenomenon of heart–brain synchronization has gained attention and has become focused research in the fields of neuroscience and neurocardiology, impacting cognitive functioning and health (Mather & Thayer, 2018; Schievink et al., 2017; Thayer et al., 2012), whereby new biomedical imaging technologies, along with advanced analytical and computing tools, enable targeted noninvasive measurements with the goal of revealing the biological correlates of heart–brain physiology (Valenza et al., 2016).

In contrast, studies using self-reported heartbeats tracking tasks were criticized by Sze et al. (2010), because the reliability and validity of their counting are uncertain. Furthermore, these tasks were often performed in a nonemotional state, which does not permit inference of awareness in emotional states (p. 805). Sze and colleagues are part of a line of research that investigates emotional experience. The connection between emotion and visceral sensations, especially emotion and heart, has been evidenced for some time (Alshami, 2019; Critchley et al., 2002; Garfinkel et al., 2014; Kemp & Quintana, 2013; Mather & Thayer, 2018; McCraty et al., 1993). Theories of emotion consider the concepts of *response coherence* and *awareness of bodily sensations* as essential (Sze et al., 2010). When in response coherence, emotions synchronize and coordinate the response of the behavioral and physiological systems. Relatedly, awareness of bodily sensations, that is, visceral or somatic information deriving from the body, is an intrinsic factor in emotional experience and may be the reason for its occurrence.

As such, Sze et al. (2010) conducted a study examining whether specific body-focused training can increase the degree of coherence between emotional experience and cardiac response. The purpose of the study was to understand how the experience of emotion is generated by the interaction of response coherence and awareness of bodily sensations. To do so, the study examined whether training that stimulates attention to body sensations, such as Vipassana meditation (visceral awareness) and dance (somatic awareness), increases coherence between emotional state and cardiac response during emotionally charged movie screenings. Participants included 21 Vipassana meditators (61.9% female), 21 dancers (61.9% female), and 21 controls (66.7% female), ages ranging from 18–40 years, located in San Francisco Bay Area, recruited either by flyers or by online announcements (77.8% of them were Caucasian; p. 805). Participants were seated in front of a TV monitor and shown four movies for a duration of 90 minutes. Movies alternated between emotionally neutral and two to three intensely positive or negative scenes lasting 55–65 seconds each. Participants were asked to continuously position a rating dial with a pointer graduated from –4 (very negative) to +4 (very positive), which was used to register a continuous rating of the participants' subjective emotional state. An ECG measured the times between heartbeats.

Findings showed that coherence between emotional experience and cardiac response was greatest with visceral training followed by somatic training and weakest with no bodily-focused training (Sze et al., 2010). This linear relationship confirmed the critical function played by organs in emotion via their afferent feedback to the autonomic nervous system, and thus their instrumental role in subjective experience. Moreover, among all autonomous organs, the heart was shown to be the strongest source of visceral information, playing a metabolic essential role in behavioral adaptations (Azzalini et al., 2019). Thus, specific body-focused training can increase the degree of response coherence (Sze et al., 2010). Greater coherence promotes positive emotions and physical wellbeing. Stronger coherence was also positively correlated to greater emotional intensity (Brown et al., 2020). Conversely, higher degrees of emotion suppression correlated with lower levels of coherence. Hence, these emotion-related findings support the theories that postulate the importance of bodily sensations in the embodiment of lived experience (Sze et al., 2010). Sze and colleagues pointed to the limitation that, perhaps, individuals who have initially greater coherence are also the ones attracted by some form of bodily-focused training. The study was based on a large overview of prior studies, with an extended critique of the methodologies formerly used. However, among many variables to consider, life events and film-induced events might register differently on a psychophysiological level, as might ethnic, cultural, and constitutional differences. Finally, visceral awareness, and individual sensitivity to it, remained an undefined notion.

Both Song et al.'s (1998) and Sze et al.'s (2010) studies indicated that heart–brain synchronization and heart–brain connectivity are induced by body visceral sensations, expressed in emotions, and communicated by afferent responses from the heart to the brain, which, then, encodes them. Furthermore, it appears that a heart-located attentional posture can be trained, affecting emotional and physiological health and wellbeing.

The connection between heart and emotion was also explored in a study by Critchley et al. (2002), where peripheral autonomic denervation patients and a healthy control group were subjected to fear-inducing images (masked and unmasked angry faces versus neutral faces) and scanned with fMRI. Whereas healthy individuals showed increased activity in the amygdala and the insula, the denervation between the heart and the brain resulted in the attenuation of peripheral autonomic arousal in patients with pure autonomic failure, thus pointing toward internal visceral physiology as primary to emotion and cognition. Similarly, Garfinkel et al. (2014) examined the impact differential between systole and diastole during threat stimuli. The study found that fear is increased at systole, thereby inferring that those emotions are correlated with interoception, and that visceral states affect the neural processing and perception of sensory stimuli. Furthermore, visceral physiology affects decision making and memory by means of the sensitivity of the amygdala, pons, hippocampus, medial prefrontal cortex, and insula, all of which correlate with the cardiac cycle. The authors concluded that internal physiological states are in a dynamic relationship with cognition. A recent empirical study by Tallon-Baudry et al. (2018) proposed that "the neural monitoring of bodily state, and in particular the neural monitoring of the heart, affects visual perception" (p. 139), concluding that visceral inputs, and not visual attention, initiate conscious perception.

In a recapitulation, Seth (2013) argued that “subjective feeling states (emotional experiences) arise from active interoceptive inference, extending previous theories based on cognitive appraisal of perceived physiological changes and contemporary frameworks that emphasize bottom-up elaboration of interoceptive representations with perception and motivation” (pp. 570–571). This heart–brain connection and the role played by the heart’s afferent feedback on emotions and on brain connectivity were first revealed by Claude Bernard in the mid-19th century (Thayer & Lane, 2009), but it was only more recently researched by Lacey and Lacey (1978) and Armour (1991, 2007), who conducted studies establishing the heart’s neural system. This line of research established that the heart has its own neuronal network, described as a complex information processing center, communicating with the brain as well as coordinating the whole body (Armour, 2007; Dal Lin et al., 2018; Dal Lin et al., 2021). The heart’s neural network, or intrinsic nervous system, is composed of the intrinsic cardiac ganglia and the intrathoracic extracardiac ganglia that dialog by efferent and afferent pathways with the central nervous system (Armour, 2008, Figure 1, p. 168). Extending their studies to comprehend the electrophysiologic properties and neurochemical substances interacting with the neurocardiologic dynamics that govern cardiovascular regulation, Armour (2007) defined characteristics of cardiac neuroaxis, which

> transduce[s] cardiac mechanical and chemical milieu to cardiac motor neurons on a beat-to-beat basis. Centrally derived parasympathetic efferent neuronal outputs to the heart are dependent to a considerable degree on arterial baroreceptor afferent neuronal function. Cardiac sympathetic efferent neurons, in contrast, depend to a considerable extent on intrathoracic reflex modulation. (p. 850)

The intrinsic cardiac neural network and the intrathoracic extracardiac ganglia together form a dynamic system, a neuroaxis in the chest, which may be closely associated with what has been popularized as the solar plexus (at least in the martial arts) and further associated with the core—which refers to the etymology of heart as from Greek kardiā and Latin cordis or cor, as in cordial and courage (the etymology of the word also refers to *con*cord or *dis*cord, and to *re*-cord, or memory, as in learning by heart; Perloff, 2010). The heart also serves as a metaphor for "core," designating the center of oneself, "the inmost or most intimate part" (Merriam-Webster, n.d., def. 2c), or the deeper emotional resources of a person, adding a conscious or spiritual component, that is, meaning, to the biological body.

Heart as a Possible Center of Intelligence

Based on some of William James's (1890) early theories, a recent line of thinking analyzes emotions on multiple levels—physiological, chemical, informational, and mental—and integrates the findings to better understand how biology and mind may intrinsically be linked (Mesquita & Barrett, 2017). For instance, Pert et al. (1998) pointed to "biochemical substrates of emotion" (p. 30) found at the cellular level throughout the body and called neuropeptides. The limbic system, long associated with emotions (Garfinkel et al., 2014; Mather & Thayer, 2018; Nicotra et al. 2006; Wang et al., 2018), was found by Candace Pert in the 1980s to host the highest number of neuropeptide receptors compared to other areas of the brain. However, Pert et al. (1998) established that the limbic system is not only located in the brain, primarily the amygdala and the hypothalamus but also in other locations throughout the body, called “nodal points” (p. 31), such as the back horn of the spinal cord, all of which process emotional information.

Pert et al. (1998) indicated that neuropeptides are electrochemical signals made of associations of amino acids generated by nerve cells that convey emotional information to corresponding receptors able to receive and transmit that information to the nuclei of the cells they are located on, and thereby, these neuropeptides affect the cells’ function. The purpose of Pert and colleagues’ article was to summarize the evidence that emotions serve as the bridge merging mind and body, and that emotional manifestation can lead to physiological healing. Peptides originate directly from the nucleus of the nerve cells, the DNA blueprint. The receptors, too, are made from this peptide substance, which makes them a fit when the neuropeptide is released, and “thus, the receptors serve as the mechanism that sorts out the information exchange in the body” (Pert, 2002, p. 31). Furthermore, the receptors are “the keys to the biochemistry of emotion” (p. 31). Neuropeptides and their receptors form a parasynaptic system acting as a psychosomatic network, that is, “a unified body-mind network designed to foster homeostasis, informational flow, and psychophysical regeneration” (Pert et al., 1998, p. 30). The receptors do not need to be in the vicinity of the emitting nerves, but rather, it is their specificity that enables them to receive the information, according to Pert and colleagues. In Pert and colleagues’ observation, the neuropeptide-receptor system offered an interpretation describing the interconnection of mind and body, and the body–wide emotional manifestation.

Emotions, the signals carried by the neuropeptides, are not only chemical substrates such as opioids but also have an electrical charge that emits vibrations (Pert et al., 1998). Thus emotions, which change moment to moment according to contextual interactions, are continually adjusting the body's internal functioning and thereby the way a person feels and the qualities of their communication with the environment. In Pert's (2002) research, the neuropeptides and the receptors are the two major components supporting the information system within the body as well as the communication of the body with the mind, which together form "a single integrated entity, a 'bodymind'" (p. 30). According to Pert et al. (1998),

> This psychosomatic network, extending to every molecular corner of the body, functions as a living processor of information -- a means to transmit meaningful messages across organs, tissues, cells, and DNA. Moreover, the 70 to 80 neuropeptides identified to date can be viewed as the biochemical substrates of emotion. (p. 30)

This line of research allows to investigate how phenomena occurring at the cellular or molecular level transcribe into feelings (Pert et al., 1998). It follows that "endocrinology and neuroscience are two aspects of the same process" (Pert, 2002, p. 33); the hormonal system is not separate from the nervous system, and immunology is a third actor in this process. A theory of "informational substances," such as neuropeptides, steroid hormones, neurotransmitters, growth factors, and so forth, was first proposed by molecular biologist Francis O. Schmitt, who discussed "the existence of a parasynaptic (parallel) system in which these information-bearing substances circulate throughout extracellular fluids to reach specific target-cell receptors" (Pert et al., 1998, p. 32). Neuropeptide receptors were also identified on immune cells, lymphocytes and monocytes, showing a neuroimmune interaction and evidencing the impact of an individual's mental and emotional states on their immune system. The process explains "gut feelings," for instance (p. 33). Additionally, immunocytes themselves can generate neuropeptides, whereas nerve cells can generate immune molecular structures. Constant feedback loops among these systems assure self-regulation: emotions and stress affect neuroimmune responses, and reciprocally, immune conditions affect psychophysical states. Thus, emotions have immunological correlates. Fear, anger, anxiety, joy, or bliss, for instance, "provide a way to prioritize the competing information to which the bodymind must pay attention. … It is this interplay of our conscious as well as our unconscious emotions that lies at the border between health and disease" (p. 34).

Findings from interventions promoting emotional expression and emotional processing infer that positive emotions and the resolution of repressed emotions strengthen the psychoneuroendocrinoimmunological healing system (Fawzy et al., 1993; Leserman et al., 1996; Spiegel et al., 1989). Similarly, stress and emotions impact gene expression, which in turn alters cellular functioning (Glaser et al., 1993). Pert et al. (1998) envisioned the bodymind as a dynamical unity, taken care of by an internal system geared toward preservation and health through emotional expression carried by electrochemical substrates, "vibrating with intelligence and purpose" (p. 31). Concurrently, research on cell regulation and developmental biology is showing the quasisystemic prevalence of the electric field—and therefore magnetic field— in living organisms (Levin, 2023; Liboff, 2004); disturbances in a living system produce electrical changes at the cellular level (Liboff, 2004), and in turn, endogenous as well as exogenous electrical signals with a set goal can generate new adaptations, altogether (Levin, 2023), allocating bioelectricity with capacities overriding molecular biology and biochemistry.

All combined, the studies showed that awareness and conscious strategies, or intentions, can intervene in the process and restore health in autonomic or unconscious processes. Conversely, sociopsychological processes might deteriorate the body's homeostasis and contribute to generating illness. Pert et al. (1998) suggested "the integration of energy-based models with neuropeptide-receptor-based models under the rubric of an informational paradigm" (p. 40), proposing that emotional expression might be "the best available marker for a psychospiritual vitalization of the life force" (p. 40). Information, then, appears to be the "immaterial substrate" (p. 39) called mind. Whereas proteins, coded by the DNA pairs, explain the "physical substrate of life" (Pert, 2002, p. 34), the peptides "account for the physiological manifestation of emotions" (p. 35), that is, the flow of energy. Emotions being an integral part of the body and emotions being regulated by neuropeptides, Pert (2002) concluded that "neuropeptides bring us to states of consciousness and to alterations in those states" (p. 32). Those include feeling states and behavioral states. Overall, Pert speculated that the physiological basis of emotion lays in the neuropeptides, the biochemical mediators of emotions, and each neuropeptide has its own mood state, or own state of consciousness signature. Candace Pert's findings suggest that the neural correlates of the mind may extend throughout the body, including the heart, which, according to Pert et al. (1998), has all the neuropeptides and receptors available to the brain.

The Interpersonal Neurobiology of the Heart

Among the first studies to measure cardiac informational exchange between individuals was the 42-year follow-up to the 1952 Harvard Mastery of Stress Study, conducted by Russek and Schwartz (1994). During the initial study, 126 Harvard students had evaluated their perception of the parental care they received. For the 42-year follow-up, the authors examined whether the electric energy emitted by the heart of one person can be detected and measured in nearby individuals, and whether participants who rated high parental caring would register higher degrees of cardiac energy from the emitter.

All 126 initial subjects were male college students, at least 18 years of age at the time of the study and now 60 to 66 years of age (Russek & Schwartz, 1994). Twenty of these former students participated in this 42-year follow-up, 11 of whom had rated both their mother's and father's parental love high, and 9 had rated it low. Russek and Schwartz used ECG to measure cardiac electrical activity and EEG for brain electrical activity. A resting and eye-closed baseline EEG and ECG were initially recorded for 2 minutes from both, the participants and the interviewer, who were seated facing each other at 3 feet distance, without touching. This baseline was followed by a formal interview with the same settings and recordings. The baseline ECG recording was used to verify whether the cardiac energy emitted by the interviewer during the interview was registered in the participants' brain by comparing synchronized averages with their baseline

EEG. Analysis of variance suggested that subjects with high parental caring had stronger and faster registration of the interviewer's cardiac signals.

Given the findings, Russek and Schwartz (1994) stated that the cardiac pattern of one subject can be detected in the EEG of another subject located nearby, and that perception of high parental caring increases interpersonal connectedness. Subjects who registered the greatest heart–brain synchronization with the experimenter were the same ones who had rated parental caring as high when they were students. The researchers determined that the findings were supportive of a system theory approach to cardiac energy, adapted from von Bertalanffy's (1950) general system theory, hypothesizing that

> (1) The heart is a dynamic energy generating system; (2) Energy from the heart may regulate organs and cells throughout the body interactively; (3) The heart generates patterns of energy. The cardiac energy pattern includes electrical, magnetic, sound, pressure, and thermal energies; (4) Cardiac energy patterns may have interactive effects interpersonally and environmentally as well as intrapersonally; and (5) Levels of consciousness may modulate cardiac energy patterns in health and illness, and conversely, cardiac energy patterns may modulate levels of consciousness. (Russek & Schwartz, 1994, p. 197)

The researchers' theory, based on the findings, thus corroborated the heart as a producer, coordinator, and integrator of bodily energy. This framework of "energy cardiology" (p. 196) engages equally the intrapersonal (between cells, organs, and functions—the subject's own internal energy), interpersonal (from one individual to another—in this case, from the interviewer to the subject), and environmental (geomagnetic—from the environment to the subject) cardiac energy registrations. The authors inferred that such a theory could advance energy medicine and healing, shedding light on interpersonal communications such as mother–child, humans–pets, healer–recipient, distant healing, and so forth.

Despite these findings, Russek and Schwartz's (1994) follow-up study had a number of limitations. For example, the original participants were all males, and the longitudinal sample was small. Even if adequate for longitudinal data on mid-life health, this context could have limited or biased the inferential statistics related to cardiac pattern detection (cumulatively due to the sample's gender, mean age, educational level, and therefore, likely its income level, and ethnicity). The software used to calculate averaged ECG and EEG waveforms was customized, without further specifications. Nonetheless, the study was not only among the first to measure and confirm the exchange of cardiac energy between individuals but also, within the context of a longitudinal study, confirmed that perception of positive emotions increases interpersonal connectedness, which has potential implications on subjective and intersubjective emotional experience.

Russek and Schwartz's (1994) findings were given further support by a study conducted independently by McCraty et al. (1998) that emphasized the impact of positive emotions, such as compassion or gratitude, on the ability to achieve a state of heart coherence, which in turn increases the magnitude of electromagnetic communication between individuals. These findings were confirmed later by Mandel (2007). McCraty et al. (1998) found that both magnetic and electric fields generated by the heart are larger than those generated by the brain (about 100 times and 60 times, respectively), and showed, similarly, that the magnetic field can be detected three feet away from the body. The authors inferred that the heart's electromagnetic interaction is an ability that can intensify awareness and facilitate empathy and sensitivity to others. The degree of physiological coherence appeared to determine the degree of transmission/reception. Thus, the ongoing studies led by HMI support that heart coherence can be learned and nurtured and is reinforced through positive emotions. As seen previously, the heart, as a center of coordination and emitter/receiver of electromagnetic fields, effects emotional states such as anger, fear, or appreciation, in the form of HRV waveforms (McCraty, 2017). When achieved, heart coherence can entrain other systems with which the heart is coupled into higher synchronization and cohesion. Moreover, heart coherence can be extended to social coherence and stimulate cooperation, compassion, trust, and emotional bonds, as well as to global coherence to embrace the earth and beyond (Kemp & Quintana, 2013). It should be noted again, however, that the term coherence, as used in the HMI context, tends to conflate interpersonal physiological synchrony, behavioral synchrony, and shared affect, revealing an aggregation of several constructs, including coherence, resonance, and synchronization, into too broad a generalization (Reed, 2022).

A new scientific discipline discussed the emergence of *biofield physiology,* which studies the interactions between geomagnetic influences and the emitting/receiving body (Hammerschlag et al., 2015, p. 39). The authors suggested that biofields (biologically generated fields such as electrical fields, magnetic fields, and biophotons) are biological signaling systems (p. 36) and that the measurement of these fields' emissions are clinically relevant indicators for overall health. Among the examples given was the “heart-brain interaction, where several types of cardiac initiated signals appear to exert sequential effects on brain activity” (p. 39). Hammerschlag and colleagues stipulated that these “physiological regulatory systems in humans and animals are also affected by and even synchronized to environmentally generated fields, e.g., of geomagnetic and solar origin” (p. 35). A growing number of studies support this assertion (Alabdulgader et al., 2018; Caswell et al., 2016; Wahbeh, Radin, et al., 2021). Although the biofield physiology research is often speculative, it is collecting growing data with promising applications, in which the heart and its neural system may have a significant function yet to be understood.

A novel study by Yount et al. (2021) measured heart to heart interpersonal physiological synchrony between the hearts of two individuals as reflected in HRV activity. The study defined coherence interpersonally, that is, the degree to which heartbeat intervals in two individuals synchronize—as contrasted with the intrapersonal definition of coherence used by HMI. The study aimed to determine the measurability of purported subtle energies exchanges between healer and healee, the person they intend to heal, as claimed by energy medicine, as well as the way in which subtle energies can be passed from one person to another (Wahbeh, Niebauer, et al., 2021), or from one person to inanimate matter such as water (Radin et al., 2021). To do so, Yount et al.’s (2021) study used ECG as the main instrument, examining changes in HRV. Healer (n = 17) and healee (n = 184), suffering from carpal tunnel pain, were seated less than 10 inches apart in an electromagnetically shielded room, wired to the same ECG device to avoid frequency noise. Each healing session lasted 30 minutes, and the ECG recorded during the first six and last six minutes of the session, during which the healer and healee remained sitting still, was analyzed. The healers used various modalities; 10 of them used light touch in their practice. Healees additionally completed a series of questionnaires and tests (related to their level of pain, well-being, sleep quality, beliefs about energy medicine, personality, etc.) before and after the session, and again three weeks after the session.

In most cases, healees felt decreased pain immediately after this single healing session (a 2-point drop on average on a scale of 1–10; Yount et al., 2021, p. 16) and persistent reduction three weeks later (a 1.3-point drop in average, $p < 0.000005$; p. 16). They also reported improved happiness, quality of sleep, and decreased negative emotion, which in turn improved work productivity, quality of relationships, and life enjoyment (p. 17). Contrary to the authors' expectations, the results showed "no significant differences between the first and last six minutes in ECG synchrony variables" (p. 18) nor significant differences in the coherence (p.17). The authors cautioned against possible interference from the setup constraints, inhibiting the practitioner's usual way of proceeding. However, significant differences were found in six HRV measurements, indicating parasympathetic activation. For instance, the mean heart rate and the minimum heart rate decreased, whereas the mean RR interval (i.e., the time between two ventricular depolarizations) increased. Comparably, time-varying synchrony (how the synchrony changed over time in a similar way between the healer and the healee during the first six minutes) showed a significant coherence increase in the high-frequency band, which is not only associated with parasympathetic activation but also corresponds to the exhalation phase of breathing rates. This finding led researchers to suggest that the healer and healee began spontaneously breathing in synchrony at the start of the first six-minute phase—when they first met—until they felt relaxed enough to resume their own breathing rhythm. In other words, hearts have the capacity to be interconnected, corroborating metaphors such as "heart to heart connection." Beliefs and expectancy related to energy medicine did not seem to interfere with the outcomes. High HRV has been associated with enhanced health outcomes by improving "regulatory capacity of the body to adaptively respond to challenges like exercise or stressors" (Yount et al., 2021, p. 20). The authors concluded that energy medicine can be studied even in a laboratory setting and has potential impact. Provided that the various practices used by the healers did not matter in the results suggests that a singular mechanism—not yet understood—might be at work. This was the first experiment to apply signal processing software to heart signals with the goal of understanding how synchronicity between hearts influences connection between people.

Together, Russek and Schwartz (1994), Hammerschlag et al. (2015), and Yount et al. (2021) have suggested that the heart's electromagnetic energy, or the purported subtle energies transmitted by or through the heart, can help expand the individual's ability to connect and communicate inter- and transpersonally. The state of a person's heart influences other people around them, revealing a cardiac energetic interconnection. Such empirical and theoretical data are in line with the phenomenological basis of the current investigation's inquiry, stating that states of consciousness—or awareness—develop through interactions and connections between entities and result in specific subjective experiences (Abram, 1988; Fuchs, 2017, 2018; Gendlin, 1992; Merleau-Ponty, 1968). Expressed differently, adopting a specific bodily focused attentional posture leads to particular states of consciousness, which modify the relational experience (Fetterman et al., 2020; Hartelius, 2007, 2021; Marolt-Sender, 2014).

Heart and the Sense of Self

Neural monitoring of internal organs determines a foundational sense of selfhood, and the default mode network, which is speculated to be the main cerebral center of selfhood, was shown to react to the heartbeats. Babo-Rebelo et al. (2016) hypothesized that two seemingly unrelated functions attributed to the default network, physiological autonomic regulation and processing of selfhood, are in fact connected such that self-processing occurs through the neural monitoring of internal organs. The purpose of the study was to investigate whether cardiac monitoring and self-related cognition were interrelated functions. Participants, 16 paid volunteers, (8 F, mean age 24.1 ± 0.6 years), were seated in front of a screen and instructed to focus on a point, letting their mind wander. This fixation phase lasted between 13.5 s and 30 s. A visual stimulus would then show on the screen for 200 ms, interrupting their free mind-wandering at irregular intervals. The participants evaluated the intensity of their self-relatedness at the moment of the interruption.

Babo-Rebelo et al. (2016) used magnetoencephalography to measure heartbeat-evoked responses (HERs) and examined covariance between the amplitude of HERs and self-relatedness, as well as the relationship between the neural responses evoked by heartbeats and the default network (DN). Four scales were proposed for the participants' ratings: (a) the "I" scale, referring to the perceiving or acting subject; (b) the "Me" scale, relating to the matter of their thought (i.e., themselves or someone/something else); (c) the "Time" scale to locate the moment in time (past, present, or future) they had wandered to; and (d) the "Valence" scale to evaluate the pleasantness of their thought. A cursor was used to move left or right on the scales. High ratings for self-relatedness referred to oneself, low ratings referred to someone or something else (p. 7830).

The behavioral findings reported by Babo-Rebelo et al. (2016) showed the "I" scale was leaning toward high self-relatedness ($p = 0.015$), the "Me" scale was less tendentious ($p = 0.17$), the "Time" scale was prominent on the present ($p = 0.94$), and the "Valence" scale was leaning toward pleasantness ($p = 0.012$; p. 7833). Since parametric coding of selfhood was revealed by neuronal responses to heartbeats in the vPC (the left ventral precuneus) and the vmPFC (the left ventromedial prefrontal cortex) regions of the DN, correlating respectively to the "I" and the "Me" properties of the self, the authors concluded that the findings validate theories that anchor selfhood in the neural tracking of visceral organs, among which the heart may be instrumental. More precisely, "neural responses to heartbeats in the DN encode cognitively refined information about the self. This implies that physiological and cognitive functions should be considered jointly in the DN" (pp. 7838–7839). Thus, the study assessed the involvement of the heartbeats in cognitive awareness, showing a correlation between the sense of self and the heart. Although the study presented meticulous details describing the procedures, it can be criticized that the sample was small. The authors, however, presented a strong argument opening toward innovative future research and encouraging replications.

A follow-up study was conducted by Babo-Rebelo et al. (2019), recording heartbeat-evoked responses using magnetoencephalography during a task where participants ($N = 23$) had to imagine either themselves or a friend in a number of situations. The specificity of the task was to be a solely internal process (imagination). The amplitude of the neuronal recorded responses showed a difference between the imagination of self and the imagination of other in the precuneus and posterior cingulate (p. 10). The researchers concluded that heartbeats seem to function as an internal signal to distinguish self from other during imagination.

Heartbeats correlating with self-processing might similarly underwrite the individual's personality, as seen in the issues encountered by heart transplant recipients (Kaba et al., 2005; Liester, 2020; Pearsall et al., 1999; Poole et al., 2009). Pearsall et al. (1999) were among the first to examine the reasons why heart transplant survivors—as compared to other organ transplants— often experience personality changes that match the donor's traits. The authors suggested that cellular memory (systemic memory) could be a cause. Liester (2020) examined different types of memory, taste, and habit changes in the personality of heart transplant recipients and speculated that the transplants modify the recipients' electromagnetic field. However, this research is in the early stage and no conclusion can be drawn.

Emotional issues whose cause is not inferred by medication, such as distress related to identity disorder, raise "questions about how patients incorporate a transplanted heart into their sense of self and how this impacts their identity" (Mauthner et al., 2015, p. 578). Mauthner and colleagues' study was based on the theoretical assumption that "any change to the body is ultimately a change to one's self" (p. 587), asserting the embodiment of the phenomenological self. A large majority of participants (92%) reported feeling as if they were not themselves, experiencing affective changes and transformation in their sense of identity (p. 586). The changes were categorized as *identity disruption* by the researchers, revealing that not only the organ replaced a body part (the heart) but also that visceral substance impacts enaction in the social fields and interpersonal relations, thus transforming the sense of self physically, emotionally, and psychologically. Three main themes stood out from Mauthner et al.'s (2015) qualitative study with 25 medically stable heart transplant recipients (70% male, 17 Caucasian, mean age 53 years ± 13.8, mean time since transplant 4.1 years ± 2.4) in this order: (a) identity and bodily integrity disruption, (b) interconnectedness with the donor, and (c) speculations of how the donor was (p. 585).

Mauthner et al.'s (2015) study design used visual methodology, a phenomenological research approach grounded on Merleau-Ponty's contributions for which embodiment incorporates both, matter and mind. This methodology considers language and body demeanor—verbal and physical expressions—equally essential and informative; affective and verbal expressions are forms of knowledge that relate to one another, and their concurrent examination augments the information communicated. Furthermore, embodiment is intersubjective, as in Merleau-Ponty's (1945/2012) example of the intricacy of touching/being touched; ambiguity is inherent in human experience. This intersubjectivity of the body is at the core of individual experience and might express itself keenly in the experience of heart transplant recipients. Interconnectedness with the donor was particularly acute, reported by 60% of the participants as the feeling of an alien or spirit identity to be integrated into their sense of self (Mauthner et al., 2015, p. 587). Psychologically, the death of a person is conditional to the survival of the heart transplant recipient. Simultaneously, what is transplanted is a living organ, which will continue to live. The question of the donor's survival arose among survivors in a context where the body is a machine whose parts are replaceable, a Western paradigm that does not seem to keep its promises in the face of experience. The research proposed to move beyond the conventional considerations of the existence of a free-standing core self and instead opened the way to more ambiguous situations, dilemmas, and uncertainties, exposing that "the phenomenological self is inseparable from and only exists in virtue of those who are others" (Mauthner et al., 2015, p. 38). The interconnections are not just abstract but intracorporeal, weaving bodies together in a literal way.

In the same vein, a qualitative study conducted by Poole et al. (2014) found that 88% of heart transplant recipients felt distressed (p. S222).

Posttransplant recipients expressed concerns not only about the death of the donor but also about their "old" heart, and felt profound bereavement, with the loss of their autonomous self. Clinically, the authors suggested encouraging the heart recipients to consider that the transplant will be a shared intercorporeal relationship with the donor. Because each transplant, by nature, holds DNA of the donor that will remain, an attitude of accepted integration might allow for new perceptions of subjectivity, other, and self, while avoiding depression, distress, grief, and rejection—an ethical approach considering the recipient as a host receiving a guest (Poole et al., 2009). This shift in approach might point to unescapable reconsiderations of the nature of self, identity, interconnection, and consciousness. And, again, what makes a heart transplant so disruptive compared to other organ transplants?

Relationship Between Psychosomatic Network and Felt Space of the Body

The relationship between the body's psychosomatic network and the felt space of the body has not yet been clearly articulated. However, this question seems worthy of examination in light of the reviewed literature on self-location within body-relative space (Hartelius et al., 2022), combined with evidence showing that the whole body is an integrated network of physiologic systems in continuous interaction (Bartsch et al., 2015; Ivanov, 2021) and evidence that numerous physiological systems function as elements of a psychosomatic information processing network that encompasses psyche and soma (Pert et al., 1998).

Emotion, together with motivation, has played an essential role in the evolutionary development of humans as well as of other animals, a fact reflected in recent reassessment of how wellbeing is related to its affective correlates (Dukes et al., 2021). Accordingly, affective processes such as emotions, feelings, motivations, and moods have been attracting increasing attention in psychology since the 1980s; this development challenges the limits of the behavioral and cognitive sciences, which traditionally considered these processes to be irrational and nonmeasurable, according to Dukes and colleagues. Although the various terms associated with affective processes do not yet have consensual definitions, the scientific valuation of affective processes has contributed to a multidisciplinary impulse to better understand how affect impacts knowledge of others, the environment, and concepts, as well as the mechanisms by which affective values are allocated to information, since "emotions do not just shape how we interpret the world, but also shape which aspects of the world need our attention and which can safely be ignored: emotions are not just about what is, but also about what matters" (Dukes et al., 2021, p. 816). Affective phenomena have been found to play a role in central cognitive mechanisms as well as in emotional intelligence and social interaction, suggesting that affect is robustly connected with cognition and behavior (e.g., the effect of fear, anger, or affection on behavior, of empathy or depression on social interaction, of passion or loneliness on decision-making, etc.).

Accordingly, the felt space of the body (Hartelius, 2007, 2015, 2021; Hartelius et al., 2022) might be generated by one or more homunculi in the brain

(Carvalho & Damasio, 2021; Damasio, 1999, 2003; Damasio & Carvalho, 2013; Damasio et al., 1991). However, the brain is also intimately interconnected through multiple physiological interactions with the entirety of the psychosomatic network (Pert et al., 1998). Therefore, the felt space of the body likely is not simply an abstract representation but may be richly informed by aspects of the psychosomatic network beyond the brain. For instance, Damasio and colleagues have demonstrated a specific way that decision-related processes can occur outside the brain (Damasio & Carvalho, 2013; Damasio et al., 1991). Along these lines, and coming from the standpoint of embodied cognition theory, Lee and Cecutti (2022) reviewed experimental studies that showed causal bodily effects on mental processes and proposed a process model of the mind–body influence involving the psychological mechanics of feelings, concepts, and procedures. The authors determined that cognitive processes are not restricted to cerebral phenomena, but that cognitive processes operate in dynamic perpetually changing contexts perceived and acted upon by the body's sensorimotor abilities, where "the constantly changing perceptual inputs and motor outputs are inseparable from and inherent to cognitive functioning" (p. 552). Whereas it is not yet possible to delineate a clear correlation between the phenomenal heart and the biological heart, it is reasonable to suggest that such connections may exist. The phenomenal heart is traditionally identified as the location of emotion, soul, caring, bonding, and so forth, and it is reasonable to suggest that information from the biological heart as well as information from areas of the brain associated with emotion, compassion, connection, and so forth may inform the experience of the phenomenal heart (Adam et al., 2015; Fetterman & Robinson, 2013; Hanley et al., 2021; Hartelius et al., 2022). As such, the phenomenal heart may be a rich representation or matrix within which biological, emotional, psychological, and relational dimensions of the psyche are reflected in affective and/or symbolic form.

Discussion

As noted, science has traditionally located the self and emotions in the brain (Gazzaniga, 2005; Lazarus, 1991) and does not distinguish between neuro-correlates and the felt experience of location. Relative to felt experience of self-location, several recent studies have shown that self-location can be situated in other parts of the body in some individuals, but most of these studies identified a single self-location (Bertossa et al., 2008; Starmans & Bloom, 2012) and did not consider the possibility of multiple self-locations, nor the possibility that self-location might be subject to movement within an individual. More recent research has taken into account these considerations (Adam et al., 2015; Fetterman & Robinson, 2013; Hanley et al., 2021; Hartelius et al., 2022), on which the current investigation extends.

Fetterman and Robinson's (2013) research demonstrated that the experienced location of the self impacts emotion, temperament, and relationship in particular ways. Traditional body metaphors respectively associated with head and heart were assessed as referents. Head-locators were found to be rational, logical, interpersonally cold, and to achieve higher intellectual performance; heart-locators were found to be emotional, feminine, interpersonally warm, experiential, and having more negative emotional reactivity to stressors, showing that head versus heart locations followed the traditional body metaphors respectively associated with each, highlighting individual differences in emotion, reasoning, and enactment. These traits had an impact on moral decision-making and interpersonal relationships. The interpersonal relationship measurement—a part of Fetterman and Robinson's study—however, rested on a narrow, trait-like approach to relational quality based on the Big Five (Goldberg, 1999; Lang et al., 2011) and the theory of social connection developed by Aron et al. (2003), mostly restraining connection to close relationships, sustained by motivations, and conditional to the benefits a relationship provides.

Adam et al. (2015), using independent and interdependent self-construal as a measure for their study, found that, when primed, self-construal influences self-location: independently primed men, and Americans, favored head-location, whereas interdependently primed women, and Indians, favored heart-location. Priming the self-location showed its impact on judgement and decision-making. However, the metapersonal self-construal (DeCicco & Stroink, 2007), a recent extension of self-construal, measuring to which extent a person construes themselves as a more expansive self beyond the personal and close relationships, was not accounted for, and may have impacted the results of Adam et al.'s (2015) study's analysis, had it been included.

Hanley et al.'s (2021) study showed—as did most studies so far—that most respondents located their embodied sense of self primarily either in their head or in their chest. However, 70% of the participants reported a multiregion location relative to the size and shape of the self-embodiment (p. 5). A disseminated distribution in the torso correlated with psychological wellbeing, whereas such distribution of sense of self in the head did not show wellbeing enhancement. The findings suggested that although self-location can take place in any part of the body, when located in the torso it might have therapeutic value.

Finally, Hartelius et al. (2022) demonstrated that the seat of attention, or self-location, can be deliberately moved within the body, shifting self-location from one body part to another including switching between focused and diffused modes. EEG measurements of particular attentional stances were found to correlate with specific emotional states and neural arousal. This suggests that attentional stances, as variations in self-location, appear to control access to cognitive and emotional resources and impact a person's global state, self-construal, and social and moral attitudes.

In terms of relationality—or interactionality of self/other/world—and from a phenomenological perspective, the body is intertwined with the world (Merleau-Ponty 1968; Varela, 1996; Varela et al., 1993). The body has an intelligence that includes a sense of the whole of the situation at any given moment, which goes beyond analytical thinking (Abram, 1988; Fuchs, 2018; Gendlin, 1992, 2003; Johnson, 2000). This direct bodily knowledge is consciousness embodied. It is a process engaged in interactional and creative activity based on connectedness with others, events, and the environment. Methodologies stemming from phenomenology, therefore, seem appropriate for investigating whether the heart plays a role in the intertwining of body and world and in body-consciousness.

Furthermore, the transpersonal psychology framework may reveal a fertile ground for such future developments since, as Hartelius et al. (2013) stated, "transpersonal psychology typically assumes that there is an intimacy between the individual and the larger world, an interconnectedness that, when directly experienced, can be transformative" (p. 14). In this context, the heart might be a location where an intertwining between the inner bodily sensations and the outer world can be felt and appreciated. A heart-located attentional stance may expand one's felt sense of connection with other than self.

Despite the presence of important early research in the area of the impact of self-location, existing research has focused on how the difference between head-location and heart-location affects the characteristics of qualities of the individual. An aspect that is lacking is research into how self-location impacts qualities of relationship, and therefore interactionality. The current study may be a first step in addressing this gap.

CHAPTER 3: METHOD

This quantitative comparison study gathered self-report data related to the body-located sense of self, the conceptual extension of self in space and time, self-construal, and qualities of phenomenological experience associated with emotional connection to self, others, and world in participants who self-reported having experienced a strong emotional connection. The purpose of this study was to investigate how self-location relates to specific aspects of identity and phenomenal qualities of emotional relationship to others, with a focus on the lived experience of emotional connection associated with self-location in the heart.

A survey questionnaire used questions based on existing research to identify the primary self-location; standardized scales were selected to measure self-concept, self-construal, and the phenomenal qualities of experience associated with emotional connection to others; and somatic phenomenology—a graphical method for assessing body-located sensations—was used to measure self-location as well as the body-relative location of phenomenal qualities associated with emotional connection. As with any quantitative research, these choices of measures came with assumptions, advantages, and disadvantages. The notion of objectivity, on which Western science rests, is originally based on subjective experience, since direct knowledge only emerges from personal experience, and measures such as those selected simply aggregate such experiences in a structured way from a particular population (Christensen et al., 2014; Creswell & Creswell, 2018). This investigation was originally planned as mixed methods but the study was paused after the quantitative phase due to robust data and temporal restrictions inherent in PhD dissertation research. Interviews were conducted—and archived—with 18 heart self-located participants, and the qualitative part of the investigation is planned for analysis after graduation.

Research Question and Hypotheses

The research question of the study was as follows: How does an individual with a heart-located self-location differ from an individual with a head-located self-location with respect to self-concept, self-construal, attentional stance, dimensions of connectedness, and qualities of experience associated with emotional connection to others? Heart versus head self-location was determined by the Self-Location Assessment (SLA); self-concept was measured with the Self-Expansiveness Level Form (SELF; Friedman, 1983); self-construct was measured with the Metapersonal Self (MPS; DeCicco & Stroink, 2007) scale and the Independent and Interdependent Self-Construal Scale (SCS; Singelis, 1994); attentional stance was measured with the Somatic Phenomenology (SP) Body Maps (Hartelius, 2021); dimensions of connectedness was measured with the Watts Connectedness Scale (WCS; Watts et al., 2022) and with the Inclusion of Other in the Self (IOS; Aron et al., 1992) scale; and qualities of the experience of connection was measured with the Qualities of Connection Measure (QCM).

The main hypothesis was as follows: Individuals with self-location at the heart will score differently than those identified as having a head-located self-location on the Transpersonal and Personal subscales of the Self-Expansiveness Level Form (SELF; Appendix A), the Metapersonal Self (MPS; Appendix B) scale, the Independent and Interdependent Self-Construal Scale (SCS; Appendix

C), the Somatic Phenomenology Body Maps (SP Body Maps; Appendix D) of felt location of self, the Watts Connectedness Scale (WCS; Appendix E), the Inclusion of Other in the Self (IOS; Appendix F) scale, and the Qualities of Connection Measure (QCM; Appendix G), and these differences will be statistically significant.

Subhypotheses were as follows:

1. Individuals identified as having a heart-located self-location by the Self-Location Assessment (SLA) will have a statistically significant at the $p < .05$ level higher mean score on the Transpersonal subscale of the SELF than individuals identified as having a head-located self-location. (The rationale for using probability value as statistical inference is discussed below, in the next section.)
2. Individuals identified as having a heart-located self-location by the SLA will have a statistically significant at the $p < .05$ level higher mean score on the Personal subscale of the SELF than individuals identified as having a head-located self-location.
3. Individuals identified as having a heart-located self-location by the SLA will have a statistically significant at the $p < .05$ level higher mean score on the MPS scale than individuals identified as having a head-located self-location.
4. Individuals identified as having a heart-located self-location by the SLA will have a statistically significant at the $p < .05$ level lower mean

score on the Independent Self subscale of the SCS than individuals identified as having a head-located self-location.

5. Individuals identified as having a heart-located self-location by the SLA will have a statistically significant at the $p < .05$ level higher mean score on the Interdependent Self subscale of the SCS than individuals identified as having a head-located self-location.
6. Individuals identified as having a heart-located self-location by the SLA will report statistically significant at the $p < .05$ level body-located self-sensations in the central chest area on the body charts of the Somatic Phenomenology (SP) body mapping more frequently than individuals identified as having a head-located self-location.
7. Individuals identified as having a heart-located self-location by the SLA will score statistically significant at the $p < .05$ level higher on the WCS as compared to individuals identified as having a head-located self-location.
8. Individuals identified as having a heart-located self-location by the SLA will score statistically significant at the $p < .05$ level higher on the IOS than individuals identified as having a head-located self-location.
9. Individuals identified as having a heart-located self-location by the SLA will score statistically significant at the $p < .05$ level higher on the QCM for warmth and heartfelt than individuals identified as having a head-located self-location.

a. Individuals identified as having a heart-located self-location, as measured by the SLA, will rate higher on the QCM for all four qualities (respect, appreciation, warmth, and heartfelt) than individuals identified as having a head-located self-location, as measured by the SLA.
b. The difference in the score on the QCM for warmth and heartfelt between individuals identified as having a heart-located self-location and individuals identified as having a head-located self-location, as measured by the SLA, will be statistically significant at the $p < .05$ level.
c. The difference in the score on the QCM for respect and appreciation between individuals identified as having a heart-located self-location and individuals identified as having a head-located self-location, as measured by the SLA, will not be statistically significant at the $p < .05$ level.

Participants

The participants were a purposive selection of individuals who reported having experienced an intense felt sense of connection to other than self. A power analysis with a medium effect size of $d = 0.5$ highlighted and confirmed that two groups of 100 people each should show an effect (Christensen et al., 2014). Christensen and colleagues defined *power* as “the probability of rejecting a false-null hypothesis” (p. 255) and *effect size* as “the magnitude of the relationship between two variables in a population” (p. 255), thus determining the probability value (*p* value). Lakens (2021) suggested that the probability value is a valuable statistical tool when used correctly, that is, in the context of "the Neyman-Pearson approach to hypothesis testing [that] allows researchers to limit the frequency or erroneous claims in the long run by choosing the α level and designing a study with a desired statistical power for a specified effect size" (p. 641). Thus, as determined above, the power analysis allowed the use of *p* value in hypothesis testing. The primary sample would consist of at least 100 individuals who would identify as heart-located on the SLA. A comparison group would consist of a group of at least 100 individuals, matched for gender, age, and level of education and identified as head-located on the SLA. Recruitment efforts aimed to achieve gender balance within and across both groups, understanding that females may be more often heart-centered (Adam et al., 2015; Fetterman & Robinson, 2013) and might otherwise be oversampled in the groups.

The inclusion criteria were as follows: Participant had, or recurrently had experienced a strong emotional connection with other people (or a pet) over the past year (the topic of the research); was fluent in spoken and written conversational English (able to express subtle feelings); was age 25 to 65 years old (to provide legal informed consent and be able to perceive the sense of self, which increases with age; 25 should be a mature enough age to ensure a stable sense of self); resided in the United States (geographic homogeneity); and was able to commit approximately 30 minutes to fill out questionnaires (ensure time commitment). People of any sex, race, educational level, and religious or spiritual traditions were eligible (these factors were not known to affect the phenomena under study).

The exclusion criteria included: diagnosis with psychiatric and/or neurological serious disorders, such as psychosis (only mentally healthy individuals qualified); intense connection with others experienced while under drugs, whether recreational or medical (this study only considered experiences occurring under "normal," that is, sober, states of consciousness); and use of substances or drugs, whether recreational or medical, during the tests (this study was only testing experiences occurring under "normal," that is, sober, states of consciousness). The exclusion criteria aimed to bar candidates at risk for emotional reactions to memories. Such risk was still possible with the included participants due to the affective character of many relationships, inevitably.

Recruitment

Qualtrics, a data management company, served as survey platform, and recruitment was conducted both via Qualtrics and via social media such as Facebook or Twitter, initiated by friends and colleagues on their own networks (see Call for Participation, Appendix H). The candidates completed the Demographics Questionnaire (see Appendix I), the Inclusion/Exclusion Criteria (Appendix J), and the Self-Location Assessment (SLA; see Appendix K). The selection process was performed online and took about 10 minutes. An initial general sample of at least 200 individuals who completed the Demographics Questionnaire and met participant criteria were selected according to their score on the SLA. Heart-located individuals were identified as scoring between +5 and

+14 on the SLA, and head-located individuals were those scoring between -5 and -14. Power analysis with a medium effect size determined the sample size.

Measures

Measures administered to participants included the SLA, the SELF, MPS, SCS, SP body maps, WCS, IOS, and QCM assessments (see Appendices K, A, B, C, D, E, F, and G, respectively).

Self-Location Assessment (SLA)

This survey questionnaire was constructed in part based on the results of Fetterman and Robinson (2013) and Adam et al. (2015) regarding self-reported head-located and heart-located individuals, and in part on questions formulated to assess somatic self-location. The questionnaire included 14 items. Each multiple-choice question asked respondents to select one of two, three, or four possible responses, one of which represented the response expected from a heart-located individual, one of which represented the response expected from a head-located individual; other response options, when present, represented answers not expected to correlate with either heart-located or head-located individuals. Heart-related responses scored +1 points, head-related responses scored –1 points, and other responses scored 0. For example, Item 10, a question with four possible answers, asked: "When you feel close to someone, where in your body do you feel the closeness? Choose one among liver, heart, brain, somewhere else or don't know," for which the score was 0, +1, -1, and 0, respectively. And Item 5, a question with two possible answers, asked: "Which of the following maxims do you consider carrying more importance in life: (a) Follow your heart or (b) Use your head," which scored +1 and -1, respectively. The maximum score for both positive and negative was 14. Participants scoring less than a plus 5 or minus 5 were excluded. Individuals with a positive overall score were assessed as heart-located, and individuals with a negative overall score were assessed as head-located.

Self-Concept: The Self-Expansiveness Level Form (SELF)

The SELF (Friedman, 1983) measured the degree to which self-concept extends to others and the environment in present, past, and future time. The scale held 18 items, each measuring a specific postural identification on a 5-point Likert-type scale, within three distinct levels of self-expansiveness: the personal level (behavior, body, feelings, in the present), the middle level (social, ecological, in past and future), and the transpersonal level (atoms, ancestors, descendants, cosmos, beyond time). Participants rated how willing or unwilling they were to use a statement describing their sense of self or identity, such as "My emotions and feelings as experienced in the present" or "Experiences of all life forms of which I am one." Construct validation was assessed by showing evidence of convergent validity ($p < .005$) and discriminant validity ($p < .05$). Adequate reliability was demonstrated by Spearman-Brown reliability coefficients of .81 for the Personal Scale and estimated correlation with the "true" score of .91, and .66 for the Transpersonal Scale with an estimated correlation with the "true" score of .81 (Friedman, 1983, p. 44); test–retest reliability for the Personal Scale was .83, and for the Transpersonal Scale was .80 (p. 45).

Self-Construal (a): The Independent and Interdependent Self-Construal Scale (SCS)

The SCS (Kitayama et al., 2014; Singelis, 1994) was concerned with the psychological concept of self-construal, that is, the definition of self and whether an individual refers to themselves as independent or interdependent. The SCS comprised two subscales: (a) the Independent Self-Construal scale, with 15 items measuring the self-image of separateness and uniqueness underlined in Western culture, for instance Item 22, "I enjoy being unique and different from others in many respects," to be rated on a 7-point Likert scale. and (b) the Interdependent Self-Construal scale, with 15 items measuring the self-image of interpersonal connectedness underlined in Eastern or indigenous cultures, for instance Item 9, "It is important to me to respect the decisions made by the group," to be rated on a 7-point Likert scale. Both subscales have shown satisfactorily reliable and valid, with an alpha reliability of .70 and .74, respectively, a high face validity, and a construct validity of $p < .05$ (Singelis, 1994).

Self-Construal (b): The Metapersonal Self (MPS) scale

The MPS (DeCicco & Stroink, 2007) was equally concerned with the psychological concept of self-construal, that is, the definition of self, appending a third measure to the Independent and Interdependent self-construals proposed by the SCS, the metapersonal self-construal measuring to which extent a person refers to themselves as metapersonal, or as a transcendent self, expanded, beyond the personal and close relationships, connected to the universal, and embedded in life. The MPS scale comprised 10 items to be rated on a 7-point Likert scale as well. An example of metapersonal self-construct statement was Item 9, “I am aware of a connection between myself and all living things.” The MPS scale has been deemed valid, with the alpha reliability of .82 and low social desirability (DeCicco & Stroink, 2007).

The Self-Construal Questionnaire (SCQ)

The SCQ was the 40-item self-report measure composed of the combination of the SCS and MPS administered to the participants as a single questionnaire testing the psychological concept of self-construal.

Attentional Stance: Somatic Phenomenology Body Maps (SP Body Maps)

Somatic phenomenology (SP; Hartelius, 2021) was a research method for reporting body-located qualitative experience in a form that can be quantified. SP associates phenomenological dynamics with attentional and emotional processes resulting from information emanating from somatic markers. It permitted the empirical measurement of felt experience within its bodily location, mappable on a body chart. For analysis, all body charts were overlaid with a transparent grid divided into cells, and the marked location was transcribed on this grid. When reporting results, the more often a cell was penciled, the darker its shade was. These findings could then be compared with data from other lines of evidence. For this study, and to comply with the interactive features available on the digital interface at hand, the body chart was divided into seven body zones (head, chest, right arm, left arm, abdomen, pelvis, and legs). Participants were asked to click in one of these areas to place a dot where they felt their self was located and this dot was then recorded.

Dimensions of Connectedness (a): The Watts Connectedness Scale (WCS)

The WCS (Watts et al., 2022) measured the extent of felt connectedness by evaluating three dimensions of connectedness (connection to self, others, and world) as a three faceted dimension of a singular foundational construct, and operational definition. Nineteen items were scored on a scale spanning from 0 (not at all) to 100 (entirely), using a slider. Questions covering the span of self, other, and world ranged from “My mind has felt connected to my heart/emotion” to “I have felt unwelcome amongst others” to “I have felt that everything is interconnected.” The construct validity of the WCS, evaluated by comparing it to existing validated scales, showed high convergent validity, which “implies a broad, multidimensionality to the WCS” (p. 10). Internal consistency of the three first-order (subscales for self, others, world) and one second-order (total WCS) latent variables was evaluated using Cronbach’s alpha coefficient and showed high and excellent reliability at > 0.8 and > 0.9, respectively (p. 8). Criterion validity measured against a baseline was significant at $p < 0.0001$. The WCS total score had a high composite reliability of 0.86 (Watts et al., 2022, p. 10). The three separable subscales were considered to establish a continuum—one type of connectedness usually entraining the two others.

Dimensions of Connectedness (b): The Inclusion of Other in the Self (IOS) Scale

The IOS (Aron et al., 1992) was a single-item pictorial scale intended to measure the degree of inclusion of other in self. A set of seven Venn-like diagrams each showing two circles representing self and the other and going linearly from juxtaposition to increasing overlap were rated from 1 (juxtaposed) to 7 (highest overlap). The participants designated the diagram that best described their sense of interconnectedness with others in three contexts: interconnectedness with an intimate partner, with close family, and with friends. The chosen diagram for each context represented their score. The IOS has proven to be highly reliable for measuring interpersonal connectedness, showing alternate-form reliability of .93 and test-retest reliability of .83 overall (Aron et al., 1992, p. 600), concurrent validity with former closeness scales, predictive validity for couples to be still together three months later (r = .46, p = .001; p. 601), significant convergent and discriminant validity overall with a number of other scales, and low social desirability (p. 610).

The Qualities of Connection Measure (QCM)

The Qualities of Connection Measure was a single question using a 5-point Likert scale, ranging from 1 (not at all) to 5 (completely), to investigate how the notions of respect, appreciation, warmth, and heartfelt rated the quality of subjective experience of connection with others. A priori labeling would be to categorize respect and appreciation as cognitive and rational tendencies, and warmth and heartfelt as somatic and interoceptive tendencies. The question asked: "When connecting with others, how much do you experience each of these qualities?

Research Procedure

All activities of the research were ethically approved by the Human Research Review Committee (HRRC), and the qualified respondents were directed to the Qualtrics platform, where they were invited to complete the study measures. First, applicants were provided with the Demographics Sheet, the Inclusion/Exclusion Criteria, and the SLA questionnaire to complete. Two hundred candidates, 100 female/100 male, were selected. The 100 candidates who scored a minimum of +5 constituted the primary group (heart-located), whereas the 100 candidates who scored a minimum of –5 constituted the comparison group (head-located). The recruitment process was repeated with incremental selections of 10 candidates until the primary and comparison groups were matched by gender, age, and level of education.

The selected candidates were informed of their selection on the Qualtrics platform (Appendix L) and provided with the written Informed Consent Form (see Appendix M), which gave them a description of the steps of the study, the tasks, the time involved, and the confidentiality procedures, and offered them to ask any questions they might have. They were given the Confidentiality Statement (see Appendix N) and the Participant Bill of Rights (Appendix O). All participants were asked to sign the Informed Consent Form. The nonselected candidates were thanked by an online prompt explaining that the quota of participants for the study had already been reached (Appendix P). No indication was given in the recruitment materials or during the survey process that the study was investigating self-location.

Treatment of Data

All responses and information during the process, from recruitment information to analysis feedback, were treated as confidential. Individual answers to survey questions were only reviewed by me, the primary researcher, and my dissertation members. True identities were protected by the attribution of a pseudonym to ensure anonymity. I altered any information that may have identified a participant in this study and will not use any identifying information in any public discussion or publication of the results from this study. All paperwork, including the copies of the signed Informed Consent Forms and other materials were kept in a personal safe on private property to which only I had access. All hardcopy and electronic data for the study will be preserved for three years after completion of this research project, in case access to anonymized data sets is requested by other researchers. The material will then be securely destroyed.

All participants were administered the SELF, SCQ, SP Body Maps, WCS, IOS, and QCM assessments. Participants selected answers online either by attributing a figure on a Likert scale or by clicking on boxes of choice and took about 30 minutes. The empirical data collected were quantified and rendered graphically to allow comparison between the primary group and the comparison group, as well as convergence of the results. Due to the forced response format of the questionnaires and scales, requiring respondents to answer all questions on a page before permitting progress to the next page, all response records were complete. No personal keys were collected (first name or last name, birthdate), but respondents were asked to enter their email address to participate in a planned follow-up qualitative study of individuals with a heart-located sense of self.

Data Analysis

The software used for data analyses was SPSS v.27. The SELF, MPS, SCS, WCS, IOS, and QCM assessments were subjected to Pearson correlations and one-way ANOVA (i.e., *t* test), which allowed to control for other variables (e.g., age, education, etc.) and to determine validity. The False Discovery Rate (FDR) was applied to adjust for multiple comparisons, thus testing for Type I errors. The SP Body Map was analyzed by performing a chi-square test. Basic descriptive data were also computed for demographic and scale variables. The independent variable was the self-location type (head or heart). The dependent variables were self-expansiveness, dimensions of connectedness, self-construal, attentional stance, and qualities of experience associated with emotional connection to others, corresponding to the SELF, SCQ, SP Body Maps, WCS, IOS, and QCM assessments, respectively.

Establishing Reliability

The instruments were chosen for their internal consistency with Cronbach's alpha values equivalent or higher than 0.7. When a reliability coefficient was not available, as for the SP Body Map, the instrument was expected to show congruence and agreement with the SLA scores, as an equivalent-forms reliability. This design allowed consistent data to be collected "*using the same or parallel variables, constructs, or concepts*" (Creswell & Creswell, 2018, p. 300; emphasis in the original).

Establishing Validity

The matched comparison group controlled for internal validity, showing that the independent and dependent variables were related (Christensen et al., 2014). It was expected that known group validity evidence and construct validity would be obtained. Validity was also addressed by implementing reflexivity, that is, “thinking critically about one’s interpretations and biases” (Christensen et al., 2014, p. 346) to counter researcher bias.

Challenges to Validity

Several threats to internal validity needed to be considered. For instance, although a felt sense of connection can be achieved in any circumstance and instantly, it remained difficult to control for the authenticity of the experience. The participant’s experience of connection was reported from memory, which might have compromised the accuracy of the responses to questions about the experience. A second threat to internal validity concerned the ability of the participants to accurately decipher their interoceptive awareness and to report their adequate attentional stance. Finally, the sample size, although determined by power analysis, might not have been sufficient to show significant or predictable findings.

CHAPTER 4: RESULTS

A purposive sample of individuals having experienced an expansive felt sense of connection with others was asked to answer questionnaires and scales related to self-expansiveness, self-construal, body location of self, connectedness, and qualities of connection. The study found statistically significant differences between head- and heart-located self on the Metapersonal Self, the SP Body Map, the Watts Connectedness Scale, and the Qualities of Connection Measure, indicating that self-location appeared to impact these variables.

Participants

During March and April 2023, 208 participants self-reporting having had an experience of a strong connection with another or others were recruited through Qualtrics, and 10 participants through social networks. Despite the fact that no indication was given in the recruitment materials that the heart-located self was the primary focus of the study, the recruitment of the heart-related subsample was accomplished much more quickly than for the head-located subsample, possibly because the subject may have been of greater interest to those with a heart-located self than to those with a head-located self. Participants who completed the survey in less than 15 minutes or who showed repetitive answer patterns were eliminated as likely using criteria other than personal experience to complete the questionnaires; multiple submissions from the same IP address were also eliminated. Head-located females, aged 55–65, were the demographic category most difficult to fill.

The combination of the two datasets (Qualtrics and personal social networks) for SPSS analysis caused some slight disparities that have added minor errors in this study, however not at any statistically significant level: (a) there was some uncertainty as to the identities of seven participants, some of whom may be different in Qualtrics data and in SPSS data, and (b) there was a discrepancy on the Body Maps where some data showed 102 participants instead of 103 participants in the Head group, due to a single dot placement in the leg region, within the Head group, which was excluded as an outlier in the analyses using SPSS.

Demographics

A total of 218 participants completed the study measures, with the sample skewed toward heart locators, toward the higher age brackets, and slightly toward males. Of the total sample, 103 were identified as likely self-located in the head, and 115 as likely self-located in the heart. All participants resided in the United States, and head- and heart-located groups were matched by gender, age, and level of education, and achieved the required minimum 40% of each gender in each of the above categories. The 10 respondents from social networks were all identified as having a heart-located egocenter (Heart 2 group) and were combined with the 105 respondents identified as heart-located that were provided by Qualtrics (Heart 1 group) to constitute the final Heart group (N = 115). Table 1 shows the demographic characteristics of the final dataset by groups, Head and Heart.

Table 1

Demographic Characteristics of Participants

Characteristic	Head group		Heart group		Full sample	
	n	%	*n*	%	*n*	%
Gender						
Female	51	49.51	56	48.7	107	49.09
Male	51	49.51	59	51.3	110	50.45
Other	1	.98			1	.46
Total	103	100	115	100	218	100
Age						
25–34						
Female	18	17.47	12	10.44	30	13.76
Male	9	8.74	20	17.39	29	13.30
Total	27	26.21	32	27.83	59	27.06
35–54						
Female	9	8.74	22	19.13	31	14.22
Intersex	1	0.97			1	0.46
Male	26	25.24	15	13.04	41	18.81
Total	36	34.95	37	32.17	73	33.49
55–65						
Female	24	23.3	22	19.13	46	21.10
Male	16	15.54	24	20.87	40	18.35
Total	40	38.84	46	40	86	39.45
Total *N*	103	100	115	100	218	100
Educational level						
High School or GED	46	44.66	49	42.61	95	43.58
Associates or Technical	21	20.39	19	16.52	40	18.35
BA Degree	20	19.41	28	24.35	48	22.02
MA Degree	15	14.56	17	14.78	32	14.68
Doctoral Degree	1	0.98	1	.87	2	.91
Other Degree			1	.87	1	.46
Total *N*	103	100	115	100	218	100
Income						
Lower						
less than $50k	52	50.48	56	48.7	108	49.54
Middle						
$50k–$99,999	32	31.07	41	35.65	73	33.49
Higher	19	18.45	18	15.65	37	16.97

Characteristic	Head group		Heart group		Full sample	
	n	%	*n*	%	*n*	%
$100k and up						
Total *N*	103	100	115	100	218	100

Note. None of these demographics were different across groups. Gender: $X^2(2) = .37$, $p = 0.848$; Age: $X^2(2) = .196$, $p = 0.907$; Race: $X^2(2) = 7.606$, $p = 0.179$; Education: $X^2(2) = 1.999$, $p = 0.849$; Income: $X^2(2) = .626$, $p = 0.731$.

Results by Gender

The final sample was evenly matched between males and females in the Head group, with the addition of one intersex participant; the Heart group had three more male participants than female participants. The tendency to find more females than males in the heart group was not confirmed by this study, which instead found slightly more male heart locators than females and substantially more females in the head group's 35–54 age category.

Results by Age

The age categories, defined by Qualtrics, were as follows: (a) 25–34, (b) 35–54, and (c) 55–65 and assigned quotas of 30%, 32%, and 38% respectively. As a result, the participants were skewed toward the 25–34 and 55–65 groups compared to the U.S. population reported by the 2022 United States Census Bureau (U.S. Census Bureau, 2022, Table S0101). The mean age was 47.74 years old in the Head group ($n = 103$), 46.10 years old in and Heart 1 group ($n = 105$), and 47.90 in the Heart 2 group ($n = 10$), showing close similarity between groups.

Results by Educational Levels

The quotas were 65%, for the category "No college degree" and 35% for the category "4-year degree or higher," corresponding to the educational levels in the general U.S. population, as reported by the 2022 U.S. Census Bureau (2022, Table S1501). The data from the sample showed that 43.6% of the participants had some high school educational level, 18.3% earned an associate or technical degree, and 38% had a 4-year degree or more (22% bachelor's degree, and 16% master's degree, professional degree or doctoral degree). In conclusion, head-locators tended to have a high school educational level more often than heart locators, and/or to have earned a technical degree more often than heart locators. Heart locators tended to have earned more bachelor's degrees than head locators. Higher level education was shared equally by both groups.

Results by Income Levels

Half of the participants (49.5%) earned less than $50k/year, and a minority (17%) earned more than 100k/year. Heart locators were more numerous in the middle-income level (56.2%) than head locators (43.8%).

Race was not a matching feature in the study design (rationale: the felt sense of connection is not a racial reaction); therefore, the sample cannot indicate any data in this direction. White or Caucasians (not including Hispanic and Latino Americans) were over-represented (about 75%). For a similar rationale, religious belief was not a focal consideration in the study (the felt sense of connection is not intrinsically a religious reaction). Most participants identified as having been raised Christian, with a minor tendency to orient themselves toward *spiritual but not religious* at the time of the survey.

Self-Report Measures Results

The following tables present the results by variable as inventoried in the hypotheses, successively self-expansiveness, self-construal, body self-location, connectedness, inclusion of other in self, and qualities of connection.

Self-Expansiveness

Table 2 summarizes the Self-Expansiveness levels by groups (Head and Heart).

Table 2

Means, Standard Deviations, and ANOVA Statistics for SELF

SELF	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Transpersonal	3.78	0.88	4.01	0.85	0.055	3.725	1	.017
Middle	4.07	0.81	4.27	0.58	0.043	4.155	1	.019
Personal	4.40	0.67	4.54	0.47	0.069	3.333	1	.015
SELF total	73.54	12.52	76.94	10.02	0.027	4.956	1	.022

Note. The Self-Expansiveness Level form (SELF), a scale developed by Friedman (1983), had three subscales (Transpersonal, Middle, and Personal).

ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the False Discovery Rate (FDR; Benjamini & Hochberg, 1995).

Whereas some of the *p*-values were below 0.05, they did not survive multiple comparison corrections. Subhypotheses 1 and 2 were not confirmed when using the FDR.

Self-Construal

Table 3 summarizes the results for the three subscales of the Self-Construal Questionnaire (Independent, Interdependent, and Metapersonal) by groups (Head and Heart).

Table 3

Means, Standard Deviations, and ANOVA Statistics for SCQ

Self construals	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Independent	5.29	0.77	5.22	0.76	0.496	0.465	1	.002
Interdependent	4.69	0.91	4.93	0.84	0.046	4.040	1	.018
Metapersonal	4.95	1.03	5.48	0.88	<.00005^	16.893	1	.073

Note. The Self-Construal Questionnaire (SCQ) was composed of the Self-Construal Scale (SCS; Singelis, 1994) and the Metapersonal Self (MPS) scale (DeCicco & Stroink, 2007), with three subscales (Independent, Interdependent, and Metapersonal).

ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the FDR.

^ Significant after multiple comparison corrections (FDR).

The analysis of variance was corrected for multiple comparisons using the FDR and values with ^ were still significant. The Metapersonal Self remained significant at the q <.05 level after multiple comparison corrections (q = 0.00015), confirming Subhypothesis 3 and indicating a medium effect. The Independent self-construal subscale showed no significant difference at the p < .05 level though the descriptive trend was in the anticipated direction according to Subhypothesis 4, that is, that heart-locators would score lower than head-locators. Noticeably, the Independent self-construal subscale was the only variable in the study results having a higher mean in the Head group than in the Heart group. The Interdependent self-construal did not remain significant, and Subhypothesis 5 was not confirmed when corrected for multiple comparisons.

Body Map

Table 4 summarizes the empirical measurement of felt experience of self within its bodily location by groups (Head and Heart) mapped on body charts.

Table 4

Means, Standard Deviations, and ANOVA Statistics for the Somatic Phenomenology Body Map

Body map	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Body map	0.12	0.32	0.94	0.24	<.00005	456.986	1	.68

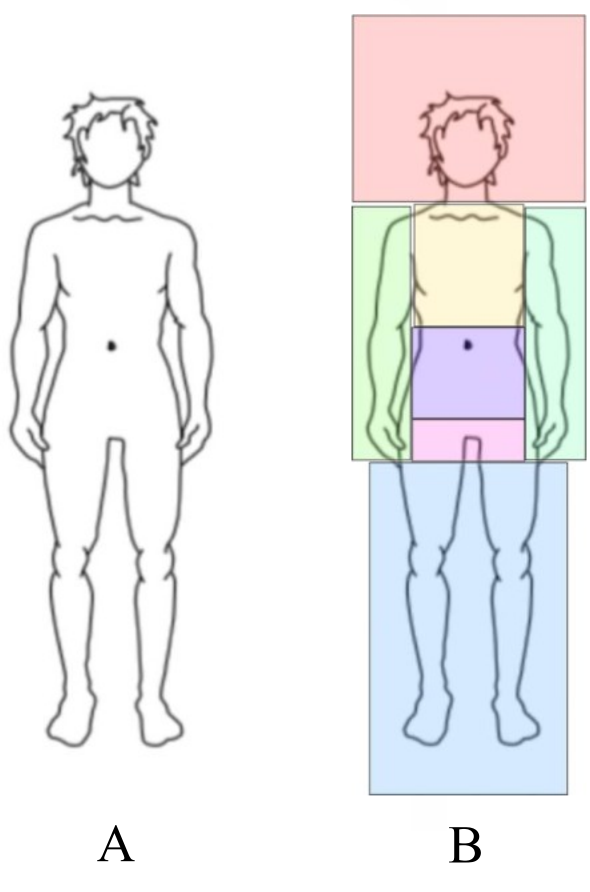
Note. Somatic Phenomenology Body Map (SP) is a research method for reporting body-located qualitative experience in a form that can be quantified (Hartelius, 2021). Participants reported the bodily location of their felt sense of self on the silhouette of a body.

ANOVA = analysis of variance, statistics between groups; $N = 217$ (the single dot placement in the leg region, within the Head group, was excluded as an outlier, and the small number of lower torso responses were combined with upper torso responses).

For the SP Body Map, identification of self-location in the heart was scored as +1, and self-location in the head was scored as zero. Results were significant at the level of $p < .00005$ and indicated a large effect, confirming Subhypothesis 6. This outcome demonstrates a robust agreement between identification of self-location by means of the SLA and by means of the SP Body Map. The placement of a point on a body map is an empirical figurative location parameter. Although the entire body silhouette was uniformly accessible (see Figure 1) to locate their sense of self, participants rarely placed dots in other body areas than head and upper torso (see Figures 2, 3, and 4). These findings can then be compared with data from other lines of evidence.

Figure 1

Somatic Phenomenology Body Map as Seen by Participants (A) and as Set by Zones for Digital Recording (B)



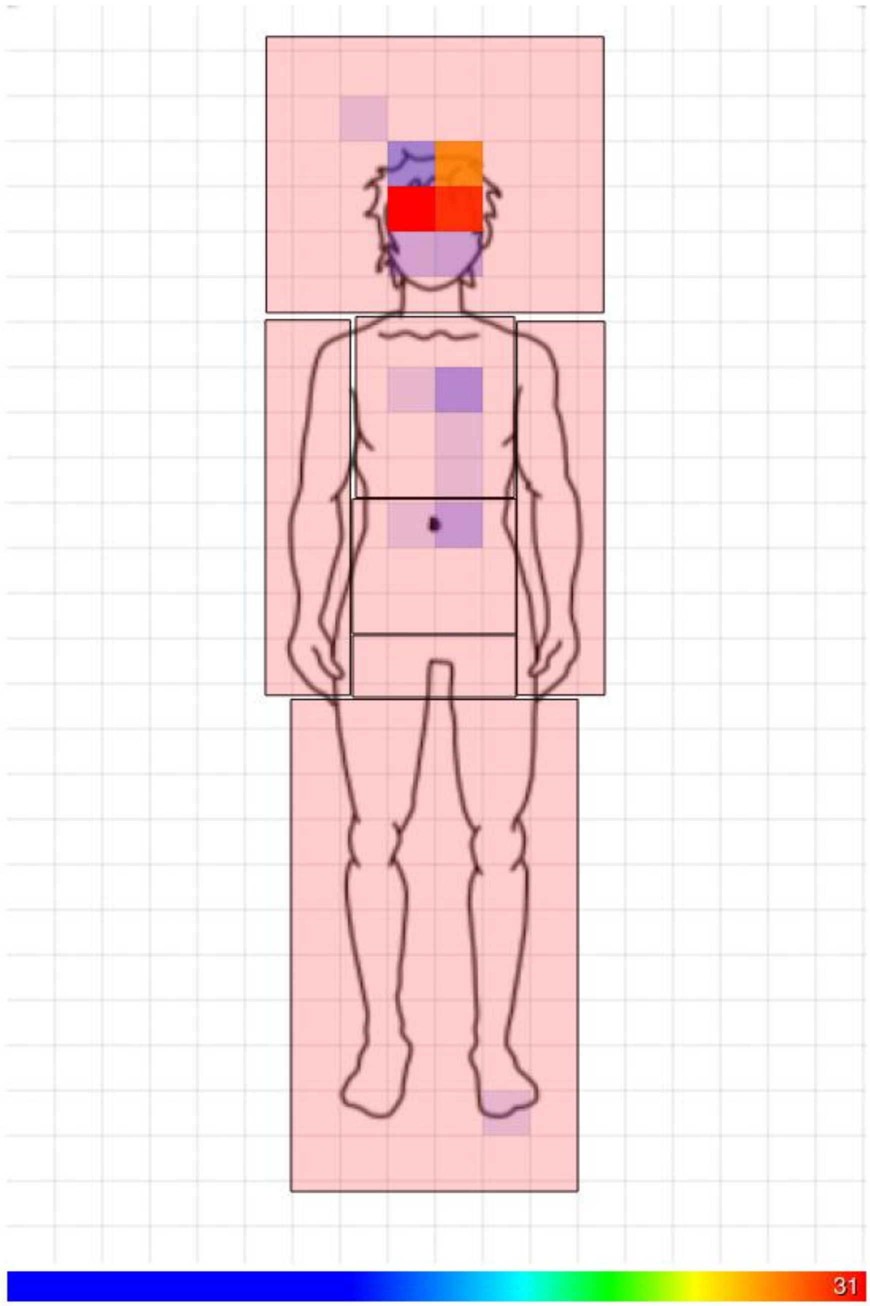
Note. Original Body Chart from "Somatic Phenomenology: Maps of Body-Felt Experience," by G. Hartelius, in J. F. Tantia (Ed.), *The Art and Science of Embodied Research Design* (Figure 8.1, p. 94), 2021, Routledge (https://doi.org/10.4324/9780429429941-8). Copyright 2021 by Routledge. Reprinted with permission.

A = SP Body map as seen by participants; B = SP Body Map as set by zones for digital recording.

During the survey, dots placement was registered digitally and reported on a grid (see Figures 2, 3, 4). Denser areas were marked accordingly to the recurrence of the placements, showing from purple/blue (lowest density) to red (highest density). It was not possible to introduce the coordinates (x, y) of the participants' interactive body maps from private social networks (Heart 2 group, $n = 10$) into the data managed by Qualtrics (Heart 1 group, $n = 105$) and combine the results into a single graphical map because Qualtrics operated solely from its own recruiting panels; private participants could not be imported into the enterprise dataset. Therefore, the visual representations of the Heart group's self-locations are shown on two separate maps. The numerical results from the two Heart groups were, however, easily combinable, thus providing all statistical results as a single Heart group. These statistics and tables are shown later, in Figures 5, 6, 7, and 8.

Figure 1

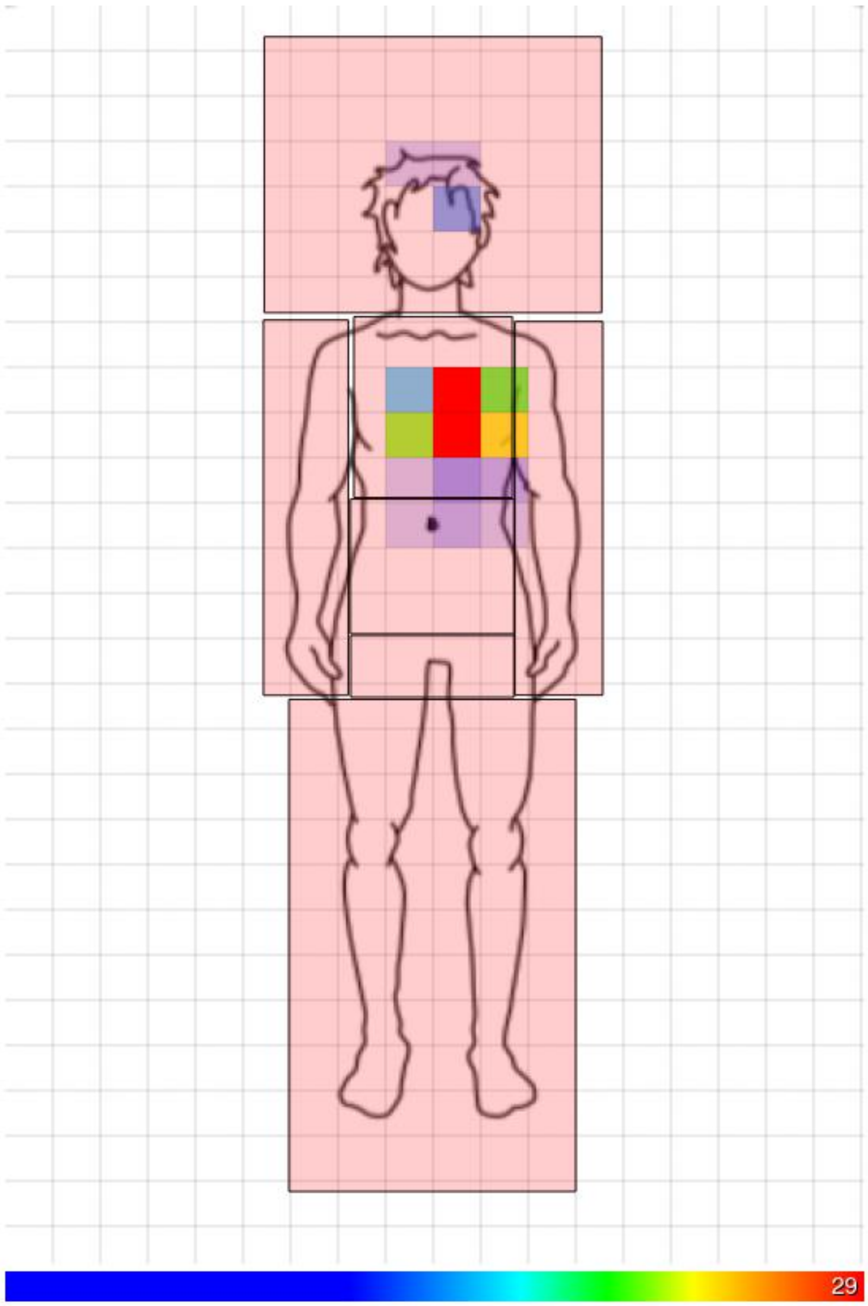
Dots Placement on Somatic Phenomenology Body Map in the Head Group



Note. *N* = 103. Original Body Chart from "Somatic Phenomenology: Maps of Body-Felt Experience," by G. Hartelius, in J. F. Tantia (Ed.), *The Art and Science of Embodied Research Design* (Figure 8.1, p. 94), 2021, Routledge (https://doi.org/10.4324/9780429429941-8). Copyright 2021 by Routledge. Reprinted with permission.

Figure 2

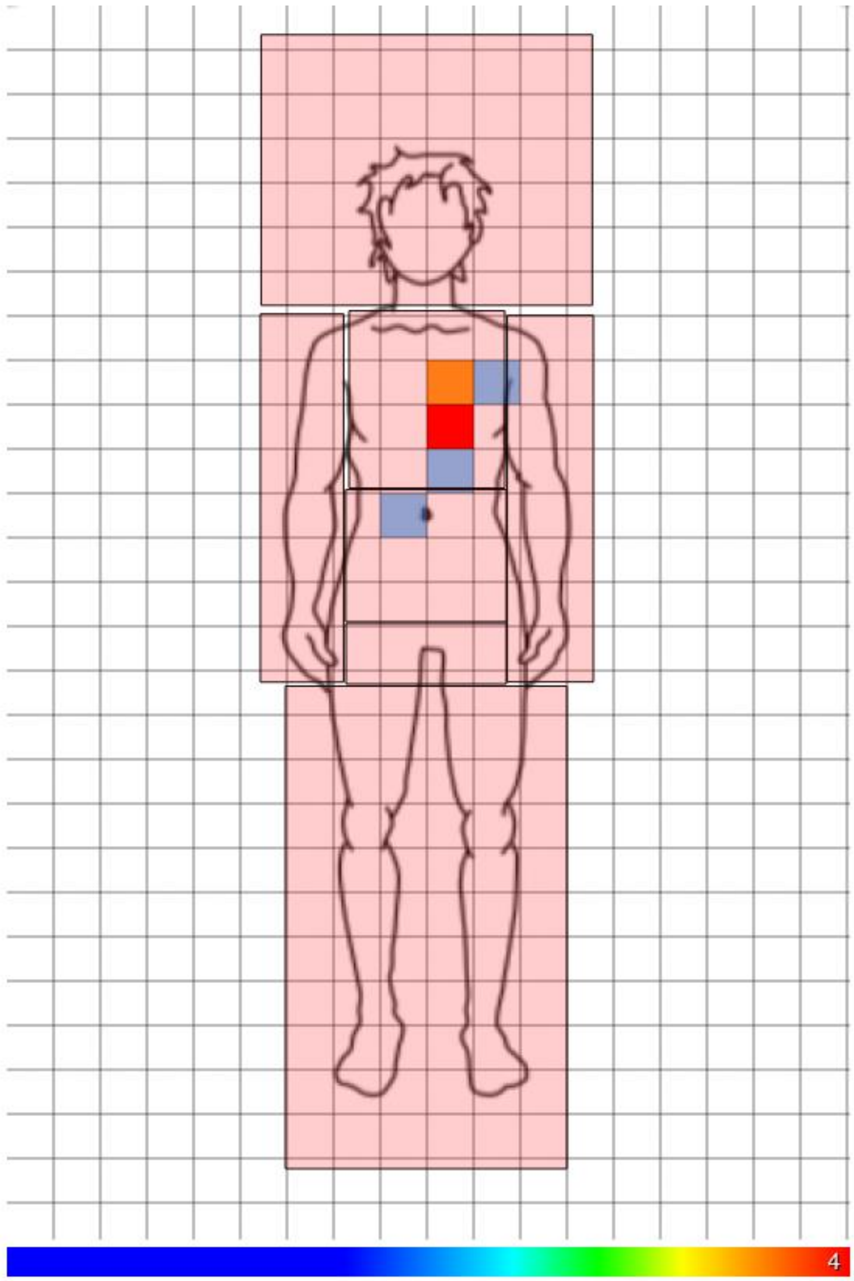
Dots Placement on Somatic Phenomenology Body Map in the Heart 1 Group



Note. n = 105. Original Body Chart from "Somatic Phenomenology: Maps of Body-Felt Experience," by G. Hartelius, in J. F. Tantia (Ed.), *The Art and Science of Embodied Research Design* (Figure 8.1, p. 94), 2021, Routledge (https://doi.org/10.4324/9780429429941-8). Copyright 2021 by Routledge. Reprinted with permission.

Figure 3

Dots Placement on Somatic Phenomenology Body Map in the Heart 2 Group



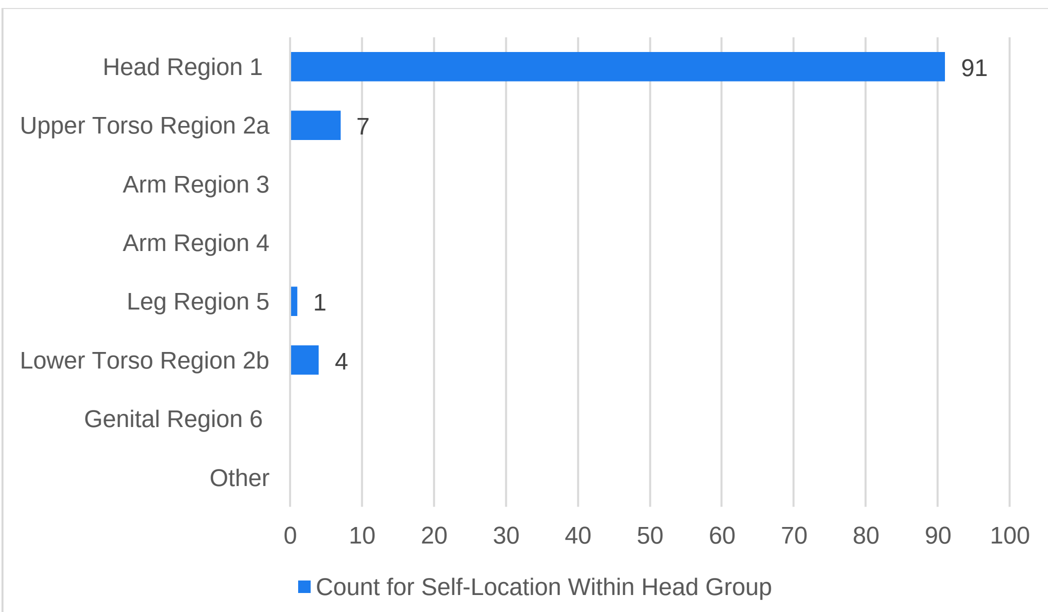
Note. $n = 10$. Original Body Chart from "Somatic Phenomenology: Maps of Body-Felt Experience," by G. Hartelius, in J. F. Tantia (Ed.), *The Art and Science of Embodied Research Design* (Figure 8.1, p. 94), 2021, Routledge (https://doi.org/10.4324/9780429429941-8). Copyright 2021 by Routledge. Reprinted with permission.

Body Map Locations Within-Group That Differed From Self-Location as Scored by the SLA

A few answers to the location of self on the body maps differed from the answers provided by the SLA scoring. Following is an examination of the differences found in the SP Body Maps per group and illustrated in Figures 5, 6, 7, and 8. In the Head group (Figure 5), 7 participants (6.80%) located their self in the heart (upper torso), 4 participants (3.88%) located their self in the lower torso, and 1 in the legs (0.97%).

Figure 4

Self-Location Within Head Group on the SP Body Map



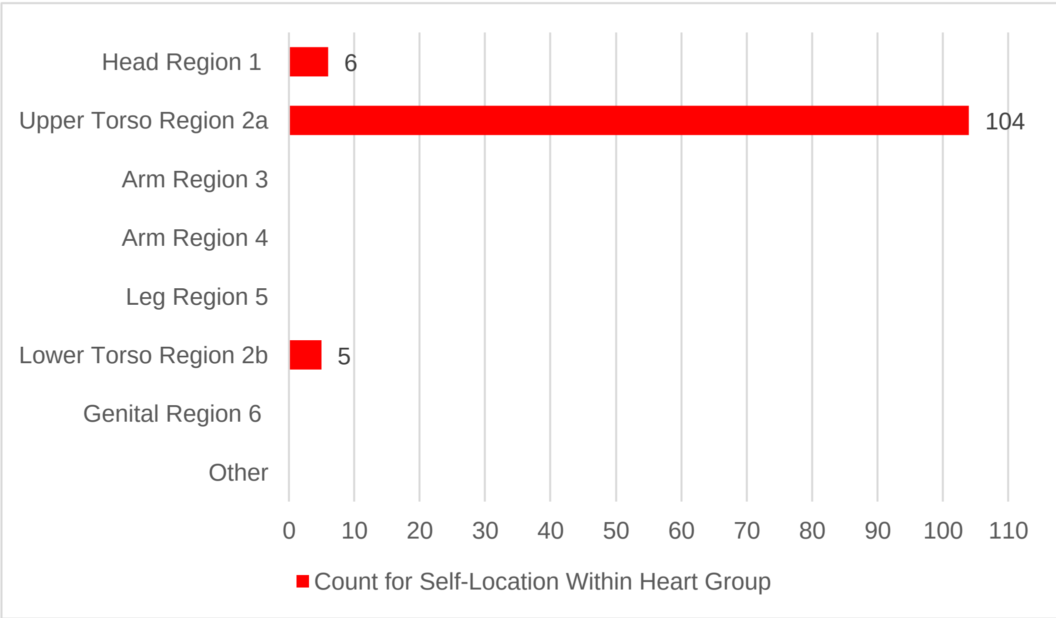
Note. Author's figure; number of individuals identified by the Self-Location Assessment as having a head location selecting head location, heart location (upper torso), lower torso location, and leg location on the Body Map, respectively.

Maximum raw score = 100*; n* = 103.

In the Heart group, 6 participants (5.22%) located their self in the head, and 5 participants (4.35%) located their self in the lower torso.

Figure 5

Self-Location Within Heart Group on the SP Body Map



Note. Author's figure; number of individuals identified by the Self-Location Assessment as having a heart location selecting head location, heart location (upper torso), and lower torso location on the Body Map, respectively.

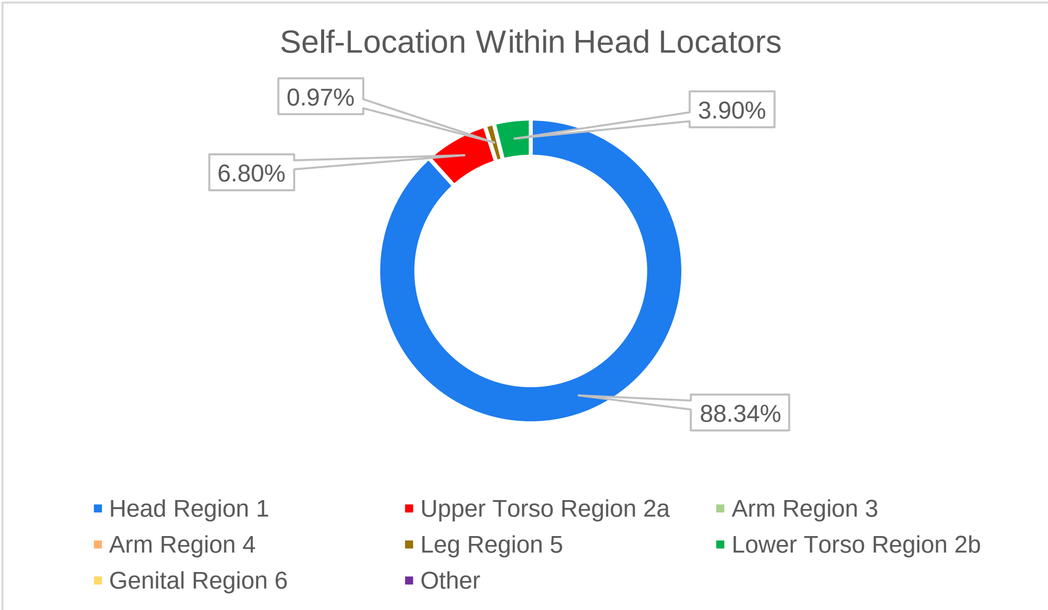
Maximum raw score = 100; Heart group = Head 1 group and Head 2 group combined, *n* = 115.

Thus, approximately 10% of Body Map locations within-group (11.65% in Head group and 9.57% in Heart group combined) differed from self-location as scored by the SLA.

Figure 7 (further below) shows an 88.35% correlation between the test assessment (SLA) and the Body Map assessment for the Head group.

Figure 6

Percentages of Self-Location Within Head Group

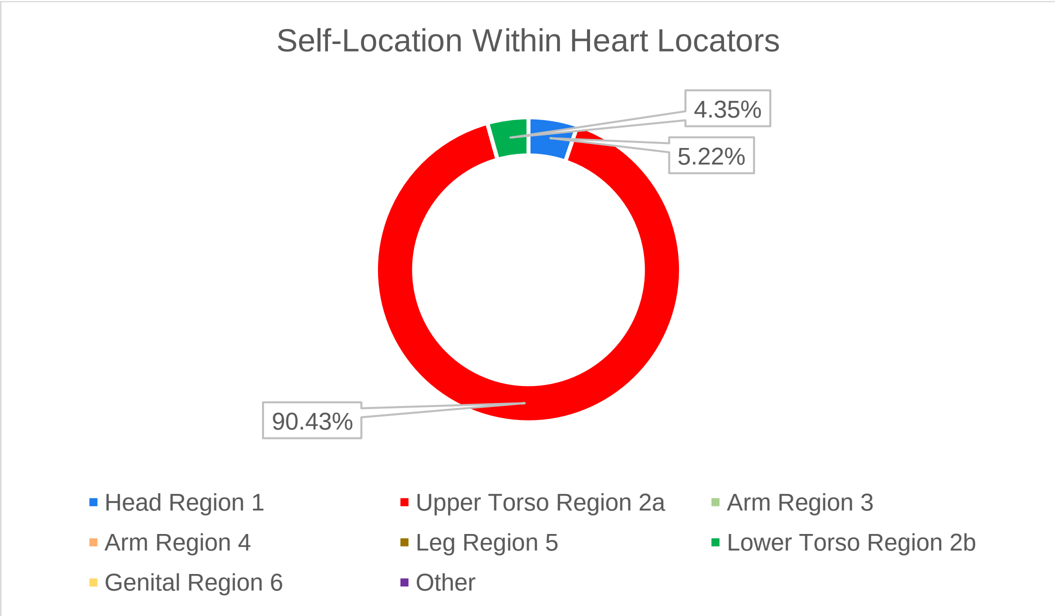


Note. Author's figure.

Figure 8 (further below) shows a 90.43% correlation between the test assessment (SLA) and the Body Map assessment for the Heart group. Together, Figures 7 and 8 show the strong correlation between the Self-Location Assessment and the Body Maps assessment: about 90% of the individuals identified as head self-located by SLA scoring placed their sense of self in the head region. An equally strong correlation was found relative to the Heart group.

Figure 7

Percentages of Self-Location Within Heart Group



Note. Author's figure.

Age, gender, and educational level did not significantly impact the self-location within groups; the age, gender, and educational level means were similar in the Head and Heart groups. Only when considering the Heart 2 group (n = 10) did gender and educational level show significantly different results, with more females (60%) and higher levels of education (90% of master's degree). Thus, whereas the Heart 2 group was demographically different from the Heart 1 group, though with only 10 participants, it was not statistically significant.

Differences Related to Whom Participants Connected With

Table 5 reports with whom, or with what, participants connected and the differences between Head and Heart groups.

Table 5

Number of Connections to Family, Lover, Friend, Stranger, Pet, Nature, and Other per Group (Head and Heart)

Variables	Head group		Heart group	
	n	%	*n*	%
Close family	77	74.76	84	73.04
Lover	33	32.04	47	40.87
Friend	37	35.92	45	39.13
Stranger			6	5.22
Pet	51	49.51	56	48.70
Nature	22	21.36	35	30.43
Other	3	2.91	6	5.22

Note. Lover corresponded to Intimate Partner in the Inclusion of Other in Self subscale.

Head group = 103 participants, Heart group = 115 participants.

A large majority of the participants in both groups experienced a strong interpersonal connection daily. Crosstabulation between body maps by group and the SLA answers related to with whom connection was experienced indicated differences, not so much between groups but in the targets of connection. Close family yielded the highest number of connections with over 70% (74.76% in the Head group). Lovers only collected 32.04%, (Head group) and 40.87% (Heart group), and friends gathered 35.92% (Head group) and 39.13% (Heart group). Pets generated more connections than lovers and friends, with 49.51% (Head group) and 48.70% (Heart group). Nature had the lowest connection, especially in the Head group (21.36%). When examining the Heart 2 group separately—in which all participants were heart self-located (no head-locator) with strong differences in educational levels (90% master's and 10% bachelor's)—connection in that group was established almost equally with close family (70%), lovers (60%), friends (60%), pets (60%), and nature (70%), indicating that the level of education was a mediator in determining with whom connection was established. However, with only 10 participants, the Heart 2 group was not statistically significant, and the educational level could be a moderator to examine in future research.

Connectedness

Table 6 summarizes the results shown by the Watts Connectedness Scale's three subscales (Self, Others, and World) by groups (Head and Heart).

Table 6

Means, Standard Deviations, and ANOVA Statistics for the Watts Connectedness Scale (WCS)

Connectedness	Head group		Heart group		*p* value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Self	74.23	19.08	81.58	15.49	0.002^	9.828	1	.044
Others	54.72	21.21	56.57	22.30	0.532	0.392	1	.002
World	60.50	22.54	76.15	18.88	0.000^	31.046	1	.126
WCS total	73.54	12.52	76.94	10.02		4.95	1	.022

Note. The *Watts Connectedness Scale (WCS) was* developed by Watts et al. (2022) using three dimensions of connection: to self, others, and the world.

ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the FDR.

^ Significant after multiple comparison corrections (FDR).

The values with ^ were still significant after FDR corrections. The Others subscale showed no significant difference, whereas the Self and the World subscales were confirmed as statistically significant by the FDR at the $q = 0.003$ and $q < .000015$ levels, respectively, with small and large effects, thus partially confirming Subhypothesis 7. Overall, the WCS findings display a significant relationship between connectedness and heart location.

Inclusion of Other in the Self

Table 7 summarizes the measurement of the amount of overlap between other and self in three distinct contexts (interconnectedness with an intimate partner, with close family, and with friends) by groups (Head and Heart).

Table 7

Means, Standard Deviations, and ANOVA Statistics for the IOS

Inclusion	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Partner	4.50	2.14	5.15	2.08	0.026	5.032	1	.023
Family	4.50	1.84	4.81	2.07	0.241	1.384	1	.006
Friends	3.71	1.68	3.99	1.93	0.253	1.312	1	.006

Note. The Inclusion of Other in the Self (IOS) scale, developed by Aron et al. (1992) was examined in three different contexts: with intimate partner, with close family, and with friends.

ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the FDR.

^ Significant after multiple comparison corrections (FDR).

Whereas the *p*-value of the Intimate Partner subscale was below 0.05, it did not survive multiple comparison corrections. Subhypothesis 8 was not confirmed.

Qualities of Connection

Table 8 summarizes the scores of the four subscales of the Qualities of Connection Measure (respect, appreciation, warmth, and heartfelt) by groups (Head and Heart).

Table 8

Means, Standard Deviations, and ANOVA Statistics for the Qualities of Connection Measure (QCM)

Qualities	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Respect	3.91	0.78	4.01	0.84	0.362	0.836	1	.004
Appreciation	3.82	0.80	3.98	0.87	0.172	1.877	1	.009
Warmth	3.67	0.97	3.99	0.79	0.008^	7.226	1	.032
Heartfelt	3.57	1.11	4.02	0.87	0.001^	10.882	1	.048
R&A mean	3.86	0.72	4.00	0.98	0.214	1.551	1	.007
W&H mean	3.62	0.98	4.00	0.78	0.002^	10.157	1	.045

Note. R&A mean = Respect and Appreciation mean score, that is, the mean score for Respect and Appreciation combined, qualities more associated with the Head group; W&H mean = Warmth and Heartfelt mean score, that is the mean score for Warmth and Heartfelt combined, qualities of connection more associated with the Heart group; ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the FDR.

^ Significant after multiple comparison corrections (FDR).

As hypothesized, there were no significant findings for the qualities of respect and appreciation. As hypothesized, there were significant findings at the $p < 0.5$ level for the qualities of warmth and heartfelt, and for their combination, and these remained significant after multiple comparison corrections ($q = 0.004$, $q = 0.016$, and $q = 0.017$, respectively), showing that heart self-location scored significantly higher on these qualities than head self-location, with small effects. Subhypothesis 9 was thus confirmed. As a result, warmth and heartfelt are two qualities to consider in an investigation of heart location and state of consciousness.

Correlations Between Self-Construal and Inclusion of Other in Self

Strong positive correlations were found between the Metapersonal Self scale and all three subscales (intimate partner, close family, friends) of the Inclusion of Other in Self scale, as illustrated in Table 9.

Table 9

Pearson Correlations Between MPS and IOS

Variable	MPS mean	IOS IP	IOS CF	IOS F
MPS mean	—			
IOS IP	.272**	—		
IOS CF	.334**	.342**	—	
IOS F	.341**	.334**	.557**	—

Note. The MPS was created by DeCicco and Stroink (2007) to examine how the concept of self-construal applies to the sense of self of a person as meta personal, that is, transcendent, expanded, and connected to the universal.

MPS mean = Self-Construal mean for the metapersonal subscale; IOS IP = Inclusion of Other in Self mean for Intimate Partner; IOS CF = Inclusion of Other in Self mean for Close Family; IOS F = Inclusion of Other in Self mean for Friends; $N = 218$.

** Correlation is significant at the 0.01 level (2-tailed).

The metapersonal self-construal correlated with all three IOS subscales, and the three IOS subscales (intimate partner, close family, and friends) were strongly interconnected. This finding follows the confirmation of Subhypothesis 3, according to which heart self-located individuals differ significantly from head self-located individuals on the criterion of the metapersonal self-construal. The correlations between the subscales of the Self-Construal Scale (independent, interdependent) and the Inclusion of Other in Self scale (intimate partner, close family, friends) showed some disparities when applied to the entire sample (Table 10), and thus was applied per group (Head and Heart) for further interpretations (Table 11).

Table 10

Pearson Correlations Between SCS and IOS for Entire Sample

Variable	C Ind	C Inter	IOS IP	IOS CF	IOS F
C Ind	—				
C Inter	.274**	—			
IOS IP	0.064	.236**	—		
IOS CF	.229**	.284**	.342**	—	
IOS F	0.100	.173*	.334**	.557**	—

Note. C Ind = Self-Construal mean for Independent subscale; C Inter = Self-Construal mean for Interdependent subscale; IOS IP = Inclusion of Other in Self mean for Intimate Partner; IOS CF = Inclusion of Other in Self mean for Close Family; IOS F = Inclusion of Other in Self mean for Friends; *N* = 218.

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Table 11

Pearson Correlations Between SCS and IOS per Group (Head and Heart)

Group	Variable	C Ind	C Inter	IOS IP	IOS CF	IOS F
Head	C Ind	—				
	C Inter	.363**	—			
	IOS IP	0.068	0.186	—		
	IOS CF	.244*	.238*	.395**	—	
	IOS F	0.022	0.086	.330**	.533**	—
Heart	C Ind	—				
	C Inter	.205*	—			
	IOS IP	0.076	.255**	—		
	IOS CF	.226*	.313**	.288**	—	
	IOS F	0.168	.234*	.327**	.569**	—

Note. Head group (*n* = 103). Heart group (*n* =115).

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Pearson correlations in the Heart group (*n* = 115) showed that the three subscales of the IOS were strongly interconnected. Similarly, the two subscales of the SCS (Independent and Interdependent) were correlated in the Heart group. The Heart group's Independent self-construal subscale only correlated with the Close Family subscale, whereas the Heart group's Interdependent self-construal subscale correlated with all three IOS subscales.

The correlation between SCS and IOS per subscales for the entire sample (*N* = 218) had a similar pattern. The Independent self-construal correlated only with close family inclusion in self. The Interdependent self-construal correlated with all three IOS subscales. The two subscales of the SCS were correlated and the three IOS subscales were strongly interconnected.

In summary, in the Heart group, the correlation was strongest between interdependent and close family, followed by interdependent and intimate partner, and finally, interdependent and friends, after which came independent and close family. In the Head group, a correlation was found with close family.

Self-Location Associated Qualities

Table 12 summarizes the scores by groups (Head and Heart), related to the bodily location of five qualities inquired in the Self-Location Assessment (SLA). The qualities under consideration were caring, authenticity, closeness, empathy, and strong connection.

Table 12

Means, Standard Deviations, and ANOVA Statistics for Five Qualities of Self-Location

SELF	Head group		Heart group		*p*-value	ANOVA between groups		
	M	*SD*	*M*	*SD*		*F* ratio	*df*	η^2
Caring	-0.66	.73	.95	.24	0.000	495.660	1	0.696
Authenticity	-0.78	.53	.84	.50	0.000	533.105	1	0.712
Closeness	-0.45	83	.96	.22	0.000	306.353	1	0.586
Empathy	-0.58	.78	.92	.37	0.000	334.707	1	0.608
Strong connection	-0.73	.59	.94	.30	0.000	709.868	1	0.767

Note. Scores by groups (Head and Heart) of five qualities (caring, authenticity, closeness, empathy, and strong connection) measured by the Self-Location Assessment (SLA). Mean scores correspond to the data collected in the Head group (n = 103; assigned a minus score) and the Heart group (n = 115; assigned a positive score).

ANOVA = analysis of variance, statistics between groups. These were corrected for multiple comparisons using the FDR.

All five qualities showed a significant difference at the p <.00005 level, confirmed with FDR, and very large effects. These heart-located qualities were contrasted by the equivalently strong statistical differences between the Head and Heart groups in four head-located qualities: decision-making, strong conviction, beauty, and knowing (see Table 13 for frequencies of all nine qualities combined).

Table 13

Frequencies for Self-Location Qualities by Location and Gender Identity for N = 218 Groups Combined

Quality	Head location		Elsewhere		Heart location		All locations	
	n	%	*n*	%	*n*	%	*n*	%
Caring								
Female	40	18.35	4	1.83	63	28.90	107	49.09
Male	44	20.18	2	0.92	64	29.36	110	50.45
Intersex	1	0.46					1	0.46
Total	85	38.99	6	2.75	127	58.26	218	100
Authenticity								
Female	40	18.35	11	5.04	56	25.69	107	49.09
Male	53	24.31	3	1.38	54	24.77	110	50.45
Intersex	1	0.46					1	0.46
Total	94	43.12	14	6.42	110	50.46	218	100
Closeness								
Female	30	13.76	10	4.58	67	30.74	107	49.09
Male	40	18.35	2	0.92	68	31.19	110	50.45
Intersex	1	0.46					1	0.46
Total	71	32.57	12	5.50	135	61.93	218	100
Decision making								
Female	85	38.99	2	0.92	20	9.17	107	49.09
Male	78	35.78	2	0.92	30	13.76	110	50.45
Intersex	1	0.46					1	0.46
Total	164	75.23	4	1.84	50	22.93	218	100
Empathy								
Female	34	15.59	5	2.29	68	31.19	107	49.09
Male	48	22.02	1	0.46	61	27.99	110	50.45
Intersex	1	0.46					1	0.46
Total	83	38.07	6	2.75	129	59.18	218	100
Strong conviction								
Female	54	24.77	11	5.04	42	19.27	107	49.09
Male	57	26.15	3	1.38	50	22.93	110	50.45

Quality	Head location		Elsewhere		Heart location		All locations	
	n	%	*n*	%	*n*	%	*n*	%
Intersex	1	0.46					1	0.46
Total	112	51.38	14	6.42	92	42.20	218	100
Beauty								
Female	52	23.85	12	5.50	43	19.73	107	49.09
Male	57	26.15	1	0.46	52	23.85	110	50.45
Intersex	1	0.46					1	0.46
Total	110	50.46	13	5.96	95	43.58	218	100
Knowing								
Female	67	30.74	4	1.84	36	16.51	107	49.09
Male	60	27.52	3	1.37	47	21.56	110	50.45
Intersex	1	0.46					1	0.46
Total	128	58.72	7	3.21	83	38.07	218	100
Strong connection								
Female	39	17.89	8	3.67	60	27.52	107	49.09
Male	46	21.10	6	2.75	58	26.61	110	50.45
Intersex	1	0.46					1	0.46
Total	86	39.45	14	6.42	118	54.13	218	100

Note. Frequencies of qualities measured in the Self-Location Assessment (SLA) for *N* = 218 by location and gender, groups combined.

Location in the head, groups combined, scored higher when it came to decision-making, strong conviction, beauty, and knowing, at 75.23%, 51.38%, 50.46%, and 58.72%, respectively. Location in the heart scored higher when it came to caring, authenticity, closeness, empathy, and strong connection, at 58.26%, 50.46%, 61.93%, 59.18%, and 54.13%, respectively. Elsewhere (i.e., other locations) yielded between 2% and 6% of the qualities.

Variations in frequencies within groups (see Table 14) revealed large disparities and variations in gender frequencies from quality to quality, with some tendencies deviating from the literature (or from the prejudices) as commonly reported to this day. For instance, the study gathered more females than males in the decision-making/head location and in the knowing/head location, and more males than females in the caring/head location, closeness/head location, and empathy/head location.

Table 14

Crosstabulation for Self-Location Qualities by Gender Identity Within Location

Quality	Head location		Elsewhere		Heart location		Full sample	
	n	%	*n*	%	*n*	%	*n*	%
Caring								
Female	40	47.06	4	66.66	63	49.61	107	49.09
Male	44	51.76	2	33.33	64	50.39	110	50.45
Intersex	1	1.18					1	.46
Total	85	100	6	100	127	100	218	100
Authenticity								
Female	40	42.56	11	78.57	56	50.91	107	49.09
Male	53	56.38	3	21.43	54	49.09	110	50.45
Intersex	1	1.06					1	.46
Total	94	100	14	100	110	100	218	100
Closeness								
Female	30	42.25	10	83.33	67	49.63	107	49.09
Male	40	56.34	2	16.66	68	50.37	110	50.45
Intersex	1	1.41					1	.46
Total	71	100	12	100	135	100	218	100
Decision making								
Female	85	51.83	2	50	20	40.00	107	49.09
Male	78	47.56	2	50	30	60.00	110	50.45
Intersex	1	0.61					1	.46
Total	164	100	4	100	50	100	218	100
Empathy								
Female	34	40.97	5	83.33	68	52.71	107	49.09
Male	48	57.83	1	16.66	61	47.29	110	50.45
Intersex	1	1.20					1	.46
Total	83	100	6	100	129	100	218	100
Strong conviction								
Female	54	48.22	11	78.57	42	45.65	107	49.09
Male	57	50.89	3	21.43	50	54.35	110	50.45
Intersex	1	0.89					1	.46
Total	112	100	14	100	92	100	218	100
Beauty								

Quality	Head location		Elsewhere		Heart location		Full sample	
	n	%	*n*	%	*n*	%	*n*	%
Female	52	47.27	12	92.31	43	45.26	107	49.09
Male	57	51.82	1	7.69	52	54.74	110	50.45
Intersex	1	0.91					1	.46
Total	110	100	13	100	95	100	218	100
Knowing								
Female	67	52.34	4	57.14	36	43.37	107	49.09
Male	60	46.88	3	42.86	47	56.63	110	50.45
Intersex	1	0.78					1	.46
Total	128	100	7	100	83	100	218	100
Strong connection								
Female	39	45.35	8	57.14	60	50.85	107	49.09
Male	46	53.49	6	42.86	58	49.15	110	50.45
Intersex	1	1.16					1	.46
Total	86	100	14	100	118	100	218	100

Note. Female *n* = 107, Male *n* = 110, Intersex *n* = 1, Total *N* = 218.

The table shows males and females relative to where they locate a quality (in the head, the heart, or elsewhere), that is, the frequencies of the nine qualities measured in the Self-Location Assessment (SLA) per gender within location (head, heart, and elsewhere).

The scores within groups were exactly the opposite: nine out of the nine qualities scored brain in the Head group and eight out of nine qualities scored heart in the Heart group (decision-making scoring counter to this trend in the Heart group; see Table 15). This showed the high rate of congruence between the Self-Location Assessment and the ascribed location of these qualities.

Self-Location Assessment Scores by Group

Correlations between the test assessment and Body Maps showed 90% congruence for both Head and Heart groups. Following is an analysis of the frequency in identifying head self-locators and heart self-locators for each of the 14 questions constituting the SLA (Table 15).

Table 15

Frequencies for SLA Questions by Group for N = 218

Questions	Head group		Heart group		Full sample	
	n	%	*n*	%	*n*	%
Functioning						
Rational/logical	92	89.32	49	42.61	141	64.68
Emotional	11	10.68	66	57.39	77	35.32
Interpersonal style						
Cold	31	30.10	7	6.09	38	17.43
Warm	72	69.90	108	93.91	180	82.57
Decision factors						
Rational factors	90	87.38	55	47.83	145	66.51
Emotional factors	13	12.62	60	52.17	73	33.49
Self-location						
Liver						
Brain	93	90.29	5	4.35	98	44.96
Heart	8	7.77	107	93.04	115	52.75
Intestines	2	1.94	3	2.61	5	2.29
Important maxim						
Use your head	87	84.47	13	11.30	100	45.87
Follow heart	16	15.53	102	88.70	118	54.13
Caring						
Liver						
Brain	84	81.56	2	1.74	86	39.45
Heart	16	15.53	111	96.52	127	58.26
Somewhere else	3	2.91	2	1.74	5	2.29
Authenticity						
Liver						
Brain	87	84.47	6	5.22	93	42.66
Heart	6	5.82	106	92.17	112	51.38
Somewhere else	10	9.71	3	2.61	13	5.96
Closeness						
Liver						
Brain	70	67.96	1	0.87	71	32.57

Questions	Head group		Heart group		Full sample	
	n	%	*n*	%	*n*	%
Heart	23	22.33	113	98.26	136	62.39
Somewhere else	10	9.71	1	0.87	11	5.04
Decision making						
Liver						
Brain	103	100	60	52.17	163	74.77
Heart			52	45.22	52	23.85
Somewhere else			3	2.61	3	1.38
Empathy						
Liver						
Brain	78	75.73	4	3.48	82	37.62
Heart	20	19.42	111	96.52	131	60.09
Somewhere else	5	4.85			5	2.29
Strong conviction						
Liver						
Brain	95	92.24	18	15.65	113	51.84
Heart	3	2.91	89	77.39	92	42.20
Somewhere else	5	4.85	8	6.96	13	5.96
Beauty						
Liver						
Brain	90	87.38	20	17.39	110	50.46
Heart	5	4.85	91	79.13	96	44.04
Somewhere else	8	7.77	4	3.48	12	5.50
Knowing						
Liver						
Brain	100	97.09	30	26.09	130	59.63
Heart	2	1.94	80	69.56	82	37.62
Somewhere else	1	0.97	5	4.35	6	2.75
Strong connection						
Liver						
Brain	84	81.55	2	1.74	86	39.45
Heart	8	7.77	111	96.52	119	54.59
Somewhere else	11	10.68	2	1.74	13	5.96

Note. Frequencies of the questions measured in the Self-Location Assessment (SLA) by group (Head, n = 103; Heart, n = 115).

Twelve out of 14 questions showed strong accuracy in identifying head versus heart self-locators. Whereas these 12 questions yielded a high percentage within each of the groups, two other questions showed reverse scores: Interpersonal style scored 69.9% in heart location (choosing interpersonally warm) in the Head group, and as seen earlier in the SLA associated qualities results, decision-making scored 52.17% in head location (choosing brain,) in the Heart group.

Contradictory Self-Locations

An analysis associating the SLA scores, initially differentiating head versus heart locators (see Table 15), and the changes in location observed in the Body Maps Assessment completed later during the survey (see Figures 5 and 6) indicated that the selection threshold is determinant. When examined through the lens of the scoring rates relative to the changes of self-location that occurred between the SLA and the Body Maps Assessment, correspondence could be established with the scores of the responses. Table 16 shows the changes per group.

Table 16

Number of Self-Location Changes Relative to Scores for Head and Heart Groups

Score	Head group		Heart group		Full sample
	Changes	Changed to	Changes	Changed to	Changes
±14	1	LT	2	1LT +1H	3
±12	1	Legs			1
±10	1	LT	2	H	3
±8	2	Ht	5	4LT + 1H	7
±6	4	1LT + 3Ht	1	H	5
±5	3	1LT + 2 Ht	1	LT	4
All	12	4 LT + 6HT	11	6 LT + 4H	23

Note. LT = lower torso; H = head; Ht = heart.

Most of the changes (70%) occurred between scores ±5 and ±8. When these low-scoring individuals changed location, it was equally toward lower torso (7) or heart (7), and less so toward head (2). When high-scoring individuals (above ±8) changed location, it was equally toward lower torso (3) or toward head (3). More self-location changes occurred in the Head group (12 changes; n = 103) than in the Heart group (11 changes; n = 115). The Head sub-group changed more often toward the heart region than toward the lower torso region, whereas the Heart sub-group changed more often toward the lower torso than it did toward the head.

More females than males changed their self-location (14 versus 9). Females were 6.4% of the full sample (N = 218) to change their self-location, whereas males were 4.1%. The Head group (n = 103) had a 50% female-to-male ratio (and 1 intersex), a proportion that is exactly reflected in the Head group self-location-change demographics, with 5.9% female-change and 5.9% male-change. The Heart group (n = 115) had 48.7% females and 51.3% males: the tendency was inversed in the Heart group self-location-change demographics, with 7% female-change versus 2.6% male-change. Overall, females were the population that changed their self-location most often in the full sample, and more so in the Heart group.

The mean age was 47.74 years old in the Head group (n = 103), which was quite similar to the mean age of the individuals who changed their self-location in the Head group (47.83 years old). The mean age was 46.10 years old in the Heart 1 group (n = 105, representing 91.3% of the Heart Total group), and 47.90 in the

Heart 2 group (n = 10, representing 8.7% of the Heart Total group); the mean age of the individuals who changed their self-location in Heart group was lower (43.27 years old). Finally, 78.26% of the individuals who changed their self-location were White/Caucasian, which is similar to the full sample demographics data. However, their educational level was lower compared to the full sample, as was their income level. In conclusion, setting the SLA threshold up from ±5 to ±9 would improve the SLA's congruence with the Body Map from 90% to 96.8% according to this study. However, this would produce more uninclusive responses.

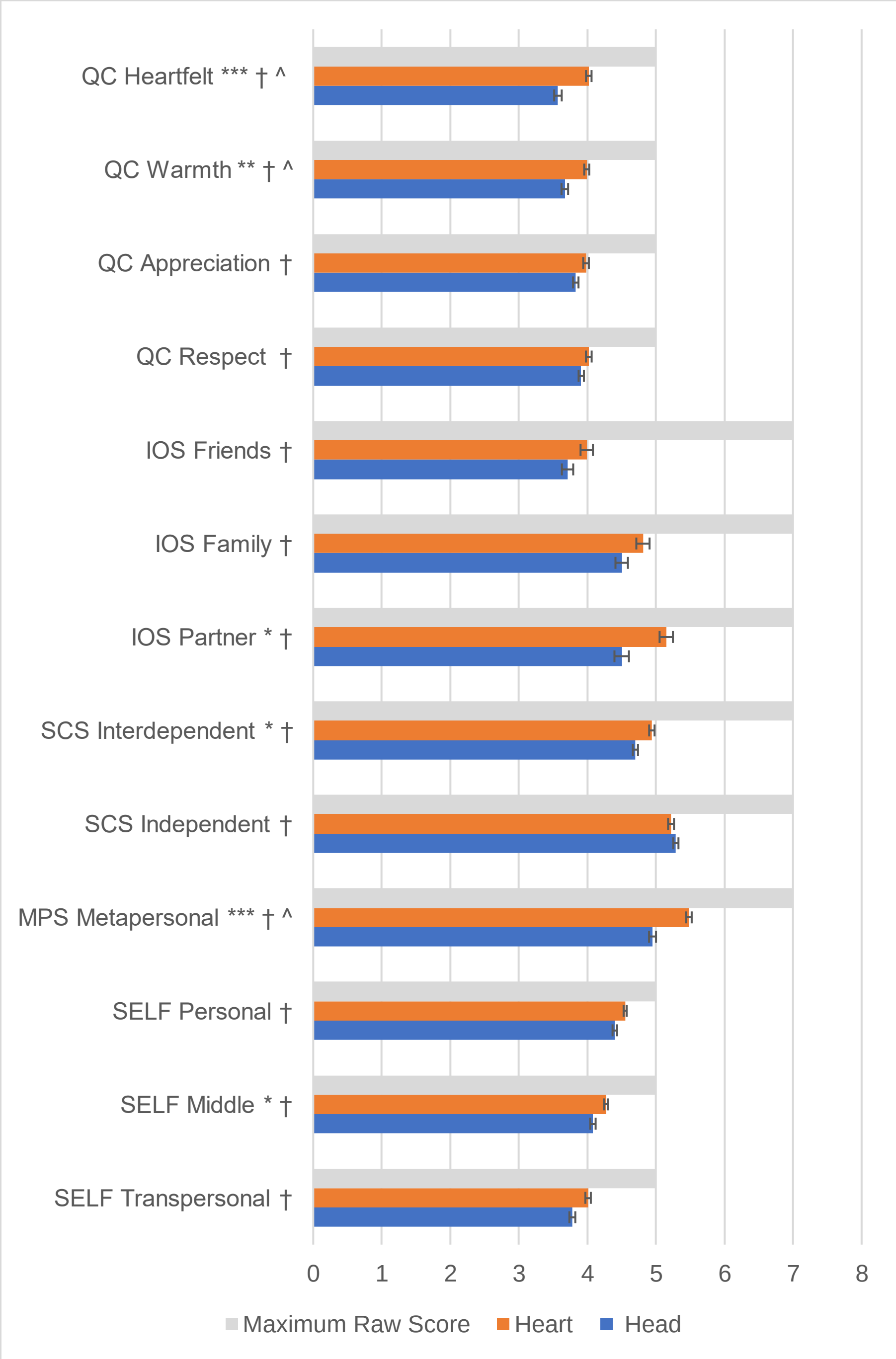
Summary of Statistical Means

Figure 9 shows the difference in means per scale and per group, providing an overview of the results relative to the hypotheses. Overall, the nine hypotheses were either confirmed, marginally confirmed, or confirmed the trend in the anticipated direction.

As shown in figures 9, 10, and 11, the Heart group had a higher mean on all scales, except on the self-construal independent, whose trend was reversed, as hypothesized. The largest differences in means between groups were found for the Watts connectedness world and self subscales, the inclusion of other in self intimate partner subscale, the metapersonal self-construal, the heartfelt quality of connectedness, and the body maps.

Figure 8

Bar Graph With Means per Scale (SELF, SCQ, IOS, QCM) and per Group



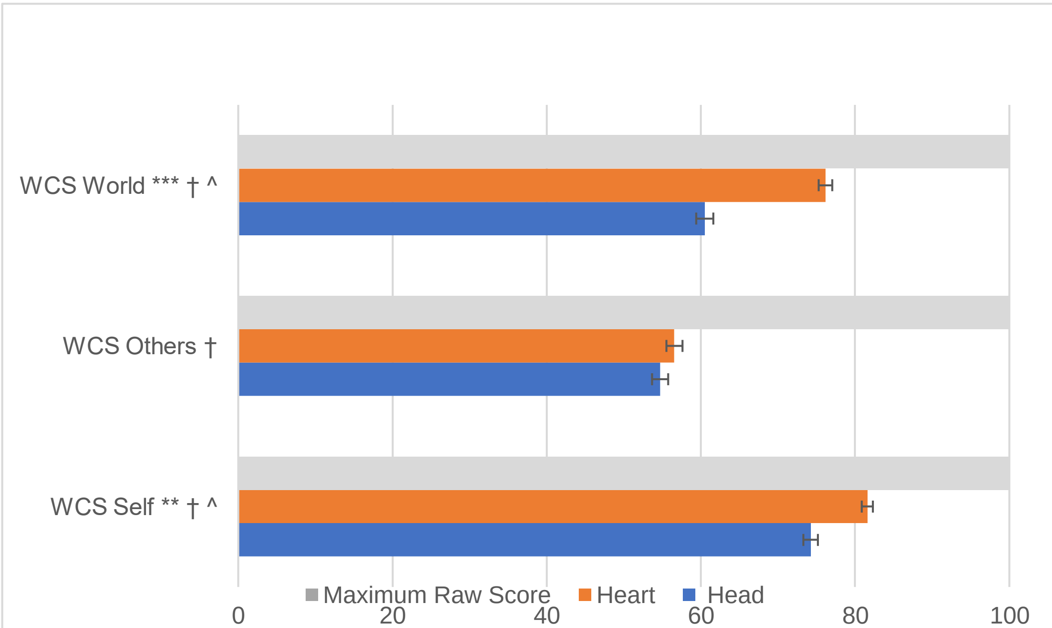
Note. Author's figure; scoring differential between individuals assessed as having head self-location (blue line) or heart self-location (red line) as determined by the Self-Location Assessment.

* Significant at the $p < .05$ level. ** Significant at the $p < .01$ level. *** Significant at the $p < .001$ level. † Direction of results consistent with hypothesis.

^ Significant after multiple comparison corrections (FDR)

Figure 9

Bar Graph With Means for the Watts Connectedness Scale



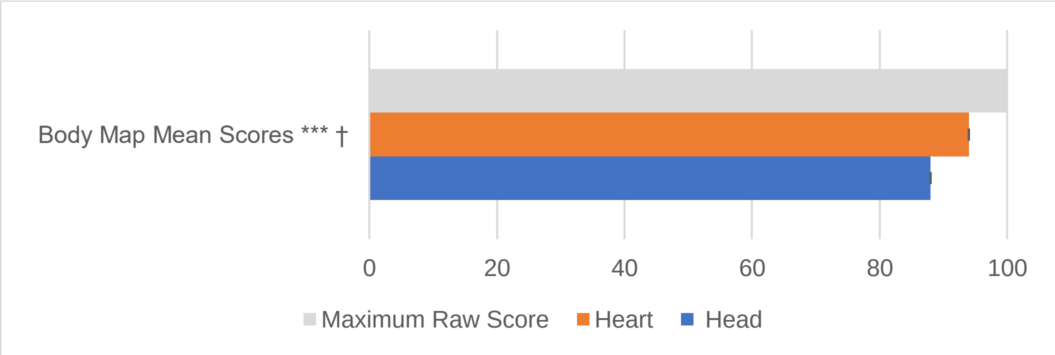
Note. Author's figure; scoring differential on the Watts Connectedness Scale between individuals assessed as having head self-location (blue line) or heart self-location (red line) as determined by the Self-Location Assessment.

* Significant at the $p < .05$ level. ** Significant at the $p < .01$ level. *** Significant at the $p < .001$ level. † Direction of results consistent with hypothesis.

^ Significant after multiple comparison corrections (FDR).

Figure 10

Bar Graph With Means Reporting the Mean Score in Each Group (Head and Heart) on the SP Body Map



Note. Author's figure; Body Map mean scores for the individuals identified by the Self-Location Assessment as self-head locators (blue line) and individuals identified by the Self-Location Assessment as self-heart locators (red line).

*** Significant at the $p < .001$ level. † Direction of results consistent with hypothesis.

Conclusion

By design, the two groups (Head and Heart) constituting the purposive sample were matched by gender, age, and educational level. The recruitment process seemed to indicate that the sample criterion of having had strong bonding experiences with others may have biased the sample toward heart locators, and due to the sampling quotas used by the recruitment company, the participants were skewed toward the 25–34 and the 55–65 age. The 55–65 age category collected the largest number of respondents. The mean age was roughly similar in both groups (about 47 years old). The Head group had an equal number of males and females, with disparities within the age categories (more males than females in the 34–45 age category, and vice versa in the two other categories). The Head group earned more high school or associate/technical degrees and more often had lower or higher incomes than heart locators. The Heart group found more males than females, totalizing more males in the 25–34 and the 55–65 age categories. They earned more bachelor's degrees than the head locators and were more numerous in the middle-income level.

Despite the biases that may have occurred during recruitment, the findings show that heart locators scored higher on all scales associated with connection, even where the differences were not statistically significant. In the Self-Expansiveness Level Form (SELF), both the personal subscale alone and the transpersonal subscale alone were only marginally significant. Although the SELF Total was significant at the $p < .05$ level ($p = 0.027$), indicating that heart locators tend to extend their sense of self to others and the environment more often than head locators, it did not survive the multiple comparison corrections, and therefore Subhypotheses 1 and 2 were not confirmed. The Metapersonal Self scale (MPS) scored significantly different with $p < .00005$ and remained significant after multiple comparison correction, indicating that heart locators more often have a sense of self as transcendent, expanded beyond the personal and close relationships, connected to the universal, and embedded in life, thus confirming Subhypothesis 3. The independent self-construal subscale of the Self-Construal Scale (SCS) showed no significant difference at the $p < .05$ level, but confirmed the descriptive trend anticipated in Subhypothesis 4, denoting that heart-locators are less inclined to refer to themselves as separate and unique entities than head locators. The Interdependent subscale of the SCS showed that heart locators are more interpersonally connected than head locators with a significant difference at $p = .0046$, however not significant after multiple comparison correction, and thus not confirming Subhypothesis 5. The Somatic Phenomenology Body Map (SP Body Map) quantified the felt subjective experience of self-location by mapping it on a body chart, probing the relationship between qualitative body sensations and phenomenal experiences, with heart-locators reporting more often a body-located self-sensation in the chest area than head-locators at the $p < .00005$ level, confirming Subhypothesis 6. The Watts Connectedness Scale (WCS) evaluated three dimensions of connectedness (connection to self, others, and world). Of the three subscales, the connection to self and the connection to the world showed that heart locators connected to self and to the world more often than head locators ($p = .002$ and $p = < .00005$, respectively), and remaining significant after multiple comparison corrections, whereas the connection to others subscale did not show a significant difference, although the trend was in the anticipated direction. Thus, Subhypothesis 7 tended to be confirmed overall. The Inclusion of Other in the Self (IOS) measured the degree of inclusion of other in the self in regard to intimate partners, close family members, and friends. The significant difference found for the interconnectedness with intimate partners, for which heart locators scored higher than head locators with $p = .026$, was not confirmed after multiple comparison correction. The interconnectedness with close family and with friends did not yield a significant difference, even though the anticipated trend was confirmed, leaving Subhypothesis 8 not validated. Finally, the Qualities of Connection Measure (QCM), measuring how the notions of respect, appreciation, warmth, and heartfelt rate the quality of subjective experience of connection, showed that all qualities scored higher among heart-locators than head-locators, with warmth and heartfelt showing a significant difference (p = 0.008 and p = 0.001, respectively, and p = 0.002 when combined), which remained significant after multiple comparison corrections, confirming all three sub-hypotheses of Subhypothesis 8.

A post-hoc analysis comparing self-construal and interconnectedness of other in the self (SCQ/IOS) showed a significant correlation between the metapersonal self-construal and all three interconnections (intimate partner, close family, and friend). Similarly, the interdependent self-construal correlated with all three IOS subscales. No correlation was found between the independent self-construal and intimate partner or friend inclusions in self, but there was a correlation between independent self-construal and close family inclusion in self. There were disparities when correlations between independent, interdependent, and IOS were applied per group (Head and Heart): the Heart group's independent self-construal subscale did not correlate with the intimate partner and with the friend inclusion in self subscales, mimicking the behavior of the independent self-construal found in the Head group. Another post-hoc analysis applied to nine qualities investigated by the Self-Location Statement (SLA) showed significant differences at the $p < .00005$ level—all confirmed after multiple comparison corrections—for the qualities of caring, authenticity, closeness, empathy, and strong connection toward heart-location, whereas decision-making, strong conviction, beauty, and knowing scored toward head-location. Finally, the Heart group had a higher mean score on all scales, except on the self-construal independent subscale, whose trend was reversed, as hypothesized.

CHAPTER 5: DISCUSSION

This study extends existing research on the impact of self-location, demonstrating differences in quantity and quality of connection between those who self-locate in the head versus those who self-locate in the heart. This suggests that self-location may substantively impact connectedness, such that head-located and heart-located individuals may differ in their understanding of what connectedness entails.

The results showed that on the Watts Connectedness Scale (WCS), participants who self-located in the heart reported greater connectedness with themselves and with the world than those who self-located in the head—differences that were robust and statistically significant. As compared with head-located participants, those who were heart-located reported a significantly greater inclination to characterize the connectedness of self in expansive ways, both inwardly and outwardly, to include intrapersonal and transpersonal aspects. In the literature, two processes have been proposed to explain such shifts in dimensions of self-interconnectedness: alteration of self-boundaries and dissolution of self-boundaries. That is, increased connectivity might result from a sense that the self expands to encompass all things or that the separated self merges into all things (Lindahl & Britton, 2019). These two dynamics may not be either mutually exclusive or exhaustive, and both might contribute to fluctuations in the extent of connectedness.

Self-location also impacted perceived qualities of connection: As compared with head-located participants, those who were heart-located gave significantly higher ratings to the terms *warmth* and *heartfelt* on the Qualities of Connection Measure (QCM). A post hoc analysis applied to the Self-Location Assessment found a significantly greater association with self-location in the heart for the qualities of caring, authenticity, closeness, empathy, and strong connection.

In addition, self-location appears to have an effect on the type of self that has connection. Previous research has found that self-location in the brain is more strongly associated with an independent self-construal—that is, belief in an autonomous self who exerts influence on one's environment—than self-location in the heart (Adam et al., 2015). These researchers found that a heart-located self was also more often associated with independent self-construal, but more likely than a brain-located self to be associated with an interdependent self-construal—an understanding of self as one who makes adjustments to maintain harmonious relationships as part of a group.

The results replicated and extended the findings of Adam et al. (2015) by testing for associations with three types of self-construal: independent, interdependent, and metapersonal. In the current study head-located participants scored higher on independent self-construal and those with self-location in the heart scored higher on interdependent self-construal, demonstrating a clearer association between self-location and self-construal than in the earlier study; however, after multiple comparisons corrections, neither of these results achieved statistical significance. Where self-location had stronger impact was with the metapersonal self-construal, on which heart-located participants scored substantially higher; this difference was robust and remained significant after multiple comparison corrections. Closer consideration of the interdependent and metapersonal self-construals shows that both are more relational than the less- and differently-connected independent self-construal. From a developmental perspective, the metapersonal self-construal appears to be a more individuated version of an interdependent self-construal: one that holds greater agency than the interdependent self but maintains a stance of interconnectedness with others and the world rather than seeing itself as an agent minimally impacted by relationship.

Taken together, these significant differences in dimensions of connectedness, quality of connection, and self-construal illustrate how self-location appears to impact the constructed interface between self and other. Self-location in the head is associated with less sense of connectedness with self, others, and the world, and less emotional warmth, which logically results in constructing a self delimited by robust boundaries. By contrast, the greater emotional warmth and sense of connectedness with self, others, and the world associated with self-location in the heart appears to result in the development of a more relational self. From these results, it seems possible to infer that self-location impacts both the degree of experienced connectedness and the qualities of experienced connectedness. The felt sense of connection appears to hold a different priority and have different meanings for individuals self-located in the head than for those self-located in the heart, indicating that these two self-locations use different conceptualizations of self and of relationality.

Self-Location Assessment

As the construct of self-location develops, it will be important to develop reliable tools for assessment. The 14-item survey instrument developed for this study, the Self-Location Assessment, was developed based on evidence from prior studies regarding multiple characteristics and their association with self-location in head or heart; this was considered likely to be more reliable than assessing self-location by graphical assessment on an outline of the body. Results of the Self-Location Assessment were found to have 90% congruence with graphical assessment of self-location on a body map, suggesting good reliability. Post-hoc analysis of results provides several suggestions that may improve the test's sensitivity. For example, the answer choices in Items 1 and 3, which ask, "Which of the following do you consider a better characterization of how you function in the world" and "Which factors are more important in moral decision-making processes," respectively, could be modified by replacing "emotional" with "intuitive and feeling," to mitigate possible negative associations with emotionality, a substitution justified by the fact that intuition has been empirically associated with emotion (Dunn et al., 2010). Similarly, replacing "interpersonally cold" with "interpersonally reserved" in Item 2, which asks, "Which of the following do you think would be a more accurate reflection of how others might characterize your interpersonal style," may avoid potential negative implications associated with emotional coldness. The association of both emotional and intuitive discernment with increased interoceptive accuracy (Parrinello et al., 2022; Sugawara et al., 2020) also drives the suggestion to replace the answer choice “liver” in Items 4 and 8 through 14 with the more familiar term “gut,” as a representation of access to interoception, and to score both the “heart” and “gut” answers as +1; “intestines” in Item 4 should then be replaced with “somewhere else or don’t know.” The Item 9 phrasing, “When you are making decisions, where in your body do you feel that a decision comes from?” should be replaced with “Which aspect of you carries the strongest influence in making important decisions?” for better comprehensibility. Similarly, the Item 12 phrasing should be changed from “When you feel empathy for someone, where in your body do you feel the empathy?” to “Which aspect of you carries the strongest influence in experiencing beauty?” These changes are integrated in Appendix Q, a proposed revised SLA suggested for future use.

Limitations and Delimitations

The study was intentionally delimited to exclude individuals who had not experienced a strong sense of connection with other persons or with animals in order to ensure that participants were qualified to provide data regarding the topic of the study.

Study limitations include the fact that purposive sampling may have skewed results, despite application of U.S. general population quotas intended to minimize recruitment biases. In addition, the requirement that participants have had a strong experience of connection with others might have skewed toward individuals more oriented toward relationality, even among the subsample of individuals self-located in the head. Additionally, the wording or presentation of questionnaires and scales may have limited or may have conditioned the answers.

For example, the scales investigating connection or connectedness reflected underlying conceptions, and the understanding of specific terms associated with these conceptions might be conditioned in some measure by the culture in which an individual lives or was raised. Although experiential states are to some extent conditioned by the culture in which an individual is raised and by their expectations, rigorous studies have nevertheless shown that emotions are distinctly biological patterns of physiological activation and interoceptive sensation and are only moderately cultural (Huang et al., 2017; Nummenmaa et al., 2014; Nummenmaa et al., 2018; Volynets et al., 2020). The word "heart," when referring to lived experience, seems not simply to be a symbol used to designate some abstract idea but appears—for some individuals—strongly associated with a physical sensation in relation to self, located in the upper torso. Yet, as noted in the literature, the felt location of bodily sensations may not intrinsically correspond to spatial coordinates of the associated biological activity (Bermúdez, 2005; Hartelius et al., 2022). They operate in the psychological space (Welwood, 1977), pointing to the organ and representing it, but are not of the same nature, and the link between the pointer or representation and the organ has not been evidenced by science yet. The physical organ of the heart appears to have capacities to respond and participate in these experiences (Babo-Rebelo et al., 2016; Babo-Rebelo et al., 2019; Mauthner et al., 2015; Yount et al., 2021), but no study has demonstrated a clear link.

Future Research

As noted in the literature, the fields of cardiology, neurology, and physiology contribute a compelling body of evidence for the heart and its neural networks as a primary center of bodily coordination, regulation, and synchronization (Armour, 2008; Dal Lin et al., 2021), as an emitter and receiver of electromagnetic energy that can be exchanged with others and the environment (Liboff, 2004; Russek & Schwartz, 1994; Wahbeh, Niebauer, et al., 2021) and as a moderator of selfhood (Babo-Rebelo et al., 2019; Dambrun et al., 2019), making it plausible that the physical organ of the heart may participate in perception and influence emotion, information processing, decision-making, and meaning-making (Damasio & Carvalho, 2013; Pert et al., 1998).

Among those attributes, a crucial contribution of the heart as an organ is its neural afferent feedback, as evidenced by Lacey and Lacey (1978) and Armour (2007), which led to a reconsideration of the heart–brain connectivity. Another crucial contribution of the heart as an organ is its interoceptive feedback; it has been shown that the heart, in conjunction with the lungs, exerts possibly the strongest visceral input within the body and that this core interoception can modulate various facets of the lived experience (Babo-Rebelo et al., 2019; Monti et al., 2021). Given evidence that the whole body is an integrated network of physiologic systems in continuous interaction that encompasses psyche and soma (Pert et al., 1998), and given evidence that affect is robustly connected with cognition and behavior (Dukes et al., 2021), it appears reasonable to investigate the relationship between the psychosomatic network and the felt space of the body.

Together, the heart's rate, electromagnetism, endocrine secretions, chemical impulses, and neuronal afferent inputs, which monitor bodily homeostasis and emotional states in relational activity with other beings and the environment (Dal Lin et al., 2018; Mather & Thayer, 2018; Wahbeh, Niebauer, et al., 2021; Yount et al, 2021), as well as the experience of heart transplant recipients, many of whom have changed personalities after receiving heart implants (Kaba et al., 2005; Liester, 2020; Poole et al., 2009; Poole et al., 2014), could be taken into account for further investigations. These tantalizing pieces of evidence may contribute to asserting the embodiment of the phenomenological self and the intersubjectivity of the body, which are at the core of individual experience (Mauthner et al., 2015).

Future studies on connectedness and self-location should conduct research with a variety of different cultures and communities, and expand the qualities tested for the impact of various self-locations. Purposive sampling studies should be supplemented with studies designed to test general population samples. Such studies would be aided by validation of a future version of the Self-Location Assessment, which would offer improved reliability in identifying differences between the two self-locations that have been identified to date. As the construct of self-location becomes more grounded in evidence, measurements of brain activity and cardiac activity could supplement self-report measures with more objective data.

REFERENCES

Abram, D. (1988). Merleau-Ponty and the voice of the earth. *Environmental Ethics*, *10*(2), 101–120. https://doi.org/10.5840/enviroethics19881027

Abram, D. (1996). *The spell of the sensuous: Perception and language in a more-than-human world*. Vintage Books.

Adam, H., Obodaru, O., & Galinsky, A. D. (2015). Who you are is where you are: Antecedents and consequences of locating the self in the brain or the heart. *Organizational Behavior and Human Decision Processes*, *128*, 74–83. https://doi.org/10.1016/j.obhdp.2015.03.004

Alabdulgader, A., McCraty, R., Atkinson, M., Dobyns, Y., Vainoras, A., Ragulskis, M., & Stolc, V. (2018). Long-term study of heart rate variability responses to changes in the solar and geomagnetic environment. *Scientific Reports*, *8*(1), 1–14. https://doi.org/10.1038/s41598-018-20932-x

Alshami, A. M. (2019). Pain: Is it all in the brain or the heart? *Current Pain and Headache Reports*, *23*(88), 1–4. https://doi.org/10.1007/s11916-019-0827-4

Alsmith, A. J., & Longo, M. R. (2014). Where exactly am I? Self-location judgements distribute between head and torso. *Consciousness and Cognition*, *24*, 70–74. https://doi.org/10.1016/j.concog.2013.12.005

Anglin, S. M. (2014). I think, therefore I am? Examining conceptions of the self, soul, and mind. *Consciousness and Cognition*, *29*, 105–116. https://doi.org/10.1016/j.concog.2014.08.014

Armour, J. A. (1991). Intrinsic cardiac neurons. *Journal of Cardiovascular Electrophysiology*, *2*(4), 331–341. https://doi.org/10.1111/j.1540-8167.1991.tb01330.x

Armour, J. A. (2007). The little brain on the heart. *Cleveland Clinic Journal of Medicine, (74)*1, 848–851. https://doi.org/10.3949/ccjm.74.Suppl_1.S48

Armour, J. A. (2008). Potential clinical relevance of the "little brain" on the mammalian heart. *Experimental Physiology*, *93*(2), 165–176. https://doi.org/10.1113/expphysiol.2007.041178

Aron, A., & Aron, E. N. (1986). *Love and the expansion of self: Understanding attraction and satisfaction*. Hemisphere.

Aron, A., & Aron, E. N. (1996). Self and self-expansion in relationships. In G. J. O. Fletcher & J. Fitness (Eds.), *Knowledge structures in close relationships: A social psychological approach* (pp. 325–344). Erlbaum. https://tinyurl.com/4bb93np5

Aron, A., Aron, E. N., & Norman, C. (2003). Self-expansion model of motivation and cognition in close relationships and beyond. In G. J. O. Fletcher & J. Fitness (Eds.), *Blackwell handbook of social psychology: Interpersonal processes* (pp. 478–501). Blackwell. https://doi.org/10.1002/9780470998557.ch19

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, *63*(4), 596–612. https://doi.org/10.1037/0022-3514.63.4.596

Ataria, Y., Dor-Ziderman, Y., & Berkovich-Ohana, A. (2015). How does it feel to lack a sense of boundaries? A case study of a long-term mindfulness meditator. *Consciousness and Cognition*, *37*, 133–147. https://doi.org/10.1016/J.CONCOG.2015.09.002

Azzalini, D., Rebollo, I., & Tallon-Baudry, C. (2019). Visceral signals shape brain dynamics and cognition. *Trends in Cognitive Sciences*, *23*(6), 488–509. https://doi.org/10.1016/j.tics.2019.03.007

Baier, k. (1964). The place of a pain. *The Philosophical Quarterly*, *14*(55), 138–150. https://doi.org/10.2307/2955550

Babo-Rebelo, M., Buot, A., & Tallon-Baudry, C. (2019). Neural responses to heartbeats distinguish self from other during imagination. *NeuroImage*, *191*, 10–20. https://doi.org/10.1016/j.neuroimage.2019.02.012

Babo-Rebelo, M., Richter, C. G., & Tallon-Baudry, C. (2016). Neural responses to heartbeats in the default network encode the self in spontaneous thoughts. *Journal of Neuroscience*, *36*(30), 7829–7840. https://doi.org/10.1523/JNEUROSCI.0262-16.2016mau

Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology*, *59*, 617–645. https://doi.org/10.1146/annurev.psych.59.103006.093639

Bartsch, R. P., Liu, K. K. L., Bashan, A., & Ivanov, P. C. (2015). Network physiology: How organ systems dynamically interact. *PloS One*, *10*(11), Article e0142143. https://doi.org/10.1371/journal.pone.0142143

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, *57*(1), 289–300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

Berkovich-Ohana, A., & Glicksohn, J. (2014). The consciousness state space (CSS)—A unifying model for consciousness and self. *Frontiers in Psychology*, *5*, Article 341. https://doi.org/10.3389/fpsyg.2014.00341

Bermúdez, J. L. (2005) The phenomenology of bodily awareness. In D. W. Smith & A. L. Thomasson (Eds.), *Phenomenology and philosophy of mind* (pp. 295–316). Clarendon Press. https://doi.org/10.1093/acprof:oso/9780199272457.003.0015

Bertossa, F., Besa, M., Ferrari, R., & Ferri, F. (2008). Point zero: A phenomenological inquiry into the seat of consciousness. *Perceptual and Motor Skills*, *107*(2), 323–335. https://doi.org/10.2466/pms.107.2.323-335

Bestetti, R. B., Restini, C. B. A., & Couto, L. B. (2014). Development of anatomophysiologic knowledge regarding the cardiovascular system: From Egyptians to Harvey. *Arquivos Brasileiros de Cardiologia*, *103*(6), 538–545. https://www.scielo.br/scielo.php?pid=S0066-782X2014002400013&script=sci_arttext

Blanke, O., Faivre, N., & Dieguez, S. (2016). Leaving body and life behind: Out-of-body and near-death experience. In S. Laureys, O. Gosseries, & G. Tononi (Eds.), *The neurology of consciousness* (pp. 323–347). Elsevier. https://doi.org/10.1016/B978-0-12-800948-2.00020-0

Boisaubin, E. V. (1988). Cardiology in ancient Egypt. *Texas Heart Institute Journal*, *15*(2), 80–85. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC324796/

Bowen, B. (2008). *The heart in somatic psychotherapy* [Unpublished practicum]. Somatics Program, John F. Kennedy University.

Bowman, I. A. (1987). The symbolism of the heart: A review [Review of the book *The heart: Its history, its symbolism, its iconography and its diseases*, by N. Boyadjian]. *Texas Heart Institute Journal*, *14*(4), 337–340. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC324754/

Boyadjian, N. (1980). *The heart: Its history, its symbolism, its iconography and its diseases*. Esco Books.

Braun, N., Debener, S., Spychala, N., Bongartz, E., Sörös, P., Müller, H. H., & Philipsen, A. (2018). The senses of agency and ownership: A review. *Frontiers in Psychology, 9,* Article 535. https://doi.org/10.3389/fpsyg.2018.00535

Brown, C. L., Van Doren, N., Ford, B. Q., Mauss, I. B., Sze, J. W., & Levenson, R. W. (2020). Coherence between subjective experience and physiology in emotion: Individual differences and implications for well-being. *Emotion, 20*(5), 818–829. https://doi.org/10.1037/emo0000579

Budge, E. A. W. (1967). *The book of the dead: The papyrus of Ani in the British museum*. Courier Corporation. https://jeremypfrost.tripod.com/sitebuildercontent/sitebuilderfiles/Egyptianbookofthedead.pdf

Buzsáki, G. (2019). *The brain from inside out*. Oxford University Press. https://doi.org/10.1093/oso/9780190905385.001.0001

Carvalho, G. B., & Damasio, A. (2021). Interoception and the origin of feelings: A new synthesis. *BioEssays*, *43*(6), Article 2000261. https://doi.org/10.1002/bies.202000261

Caswell, J. M., Singh, M., & Persinger, M. A. (2016). Simulated sudden increase in geomagnetic activity and its effect on heart rate variability: Experimental verification of correlation studies. *Life Sciences in Space Research*, *10*, 47–52. https://doi.org/10.1016/j. lssr.2016.08.001

Childre, D., & McCraty, R. (2001). Psychophysiological correlates of spiritual experience. *Biofeedback*, *29*(4), 13–17. https://www.heartmath.org/research/research-library/basic/psychophysiologicalcorrelates-of-spiritual-experience/

Chödrön, P. (2010). *The wisdom of no escape: And the path of loving-kindness*. Shambhala.

Christensen, L. B., Johnson, R. B., & Turner, L. A. (2014). *Research methods, design, and analysis* (12th ed.). Pearson.

Christoff, K., Cosmelli, D., Legrand, D., & Thompson, E. (2011) Specifying the self for cognitive neuroscience. *Trends in Cognitive Sciences*, *15*(3), 104–112. https://doi.org/10.1016/j.tics.2011.01.001

Ciaunica, A., Shmeleva, E. V., and Levin, M. (2023), The brain is not mental! Coupling neuronal and immune cellular processing in human organisms. *Frontiers in Integrative Neuroscience, 17,* Article 1057622. https://doi.org/10.3389/fnint.2023.1057622

Clark, A., & Chalmers, D. (1998). The extended mind. *Analysis*, *58*(1), 7–19. https://doi.org/10.1093/analys/58.1.7

Coakley, S. (1997). *Religion and the body*. Cambridge University Press.

Cogan, J. (2015). The phenomenological reduction. *Internet Encyclopedia of Philosophy*. https://tinyurl.com/mry9x5u9

Corbin, H. (1997). *Alone with the alone: Creative imagination in the Ṣūfism of Ibn ʿArabī* (Vol. 149). Princeton University Press.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.

Critchley, D., Mathias, C. D., & Dolan, R. J. (2002). Fear conditioning in humans: The influence of awareness and autonomic arousal on functional neuroanatomy. *Neuron*, *33*(4), 653–663. https://doi.org/10.1016/S0896-6273(02)00588-3

Dal Lin, C., Falanga, M., De Lauro, E., De Martino, S., & Vitiello, G. (2021). Biochemical and biophysical mechanisms underlying the heart and the brain dialog. *AIMS Biophysics*, *8*(1), 1–33. https://www.aimspress.com/article/10.3934/biophy.2021001

Dal Lin, C., Tona, F., & Osto, E. (2018). The heart as a psychoneuroendocrine and immunoregulatory organ. In P. Kerkhof & V. Miller (Eds.), *Sex-specific analysis of cardiovascular function* (pp. 225–239). Springer. https://doi.org/10.1007/978-3-319-77932-4_15

Damasio, A. R. (1998). Constructing the self. [Review of the book *The mind's past*, by M. Gazzaniga]. *Nature Neuroscience, 1*(5), 347–347. https://doi.org/10.1038/1555

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. Harcourt Brace.

Damasio, A. R. (2003). Mental self: The person within. *Nature*, *423*, 227. https://doi.org/10.1038/423227a

Damasio, A. R., & Carvalho, G. B. (2013). The nature of feelings: Evolutionary and neurobiological origins. *Nature Reviews Neuroscience*, *14*(2), 143–152. https://doi.org/10.1038/nrn3403

Damasio, A. R., Tranel, D., & Damasio, H. C. (1991). Somatic markers and the guidance of behavior: Theory and preliminary testing. In H. S. Levin, H. M. Eisenberg, & A. L. Benton (Eds.), *Frontal lobe function and dysfunction* (pp. 217–229). Oxford University Press. https://psycnet.apa.org/record/1992-97203-011

Dambrun, M., Berniard, A., Didelot, T., Chaulet, M., Droit-Volet, S., Corman, M., Juneau, C., & Martinon, L. M. (2019). Unified consciousness and the effect of body scan meditation on happiness: Alteration of inner-body experience and feeling of harmony as central processes. *Mindfulness*, *10*(8), 1530–1544. https://doi.org/10.1007/s12671-019-01104-y

Dannecker, M. E. (2005). *Myogenic transformation of emotions: A dialectical inquiry into Western psychotherapy and Buddhist psychology* (Publication No 3203159) [Doctoral dissertation, California Institute of Integral Studies]. ProQuest Dissertations and Theses Global.

DeCicco, T. L., & Stroink, M. L. (2007). A third model of self-construal: The metapersonal self. *International Journal of Transpersonal Studies*, *26,* 86–104. https://doi.org/10.1037/t58733-000

Deslauriers, D. (in press). Heart knowing, somatic dreaming, and transsubjectivity. *ReVision*.

Deutsch, F., & Madle, R. A. (1975). Empathy: Historic and current conceptualizations, measurement, and a cognitive theoretical perspective. *Human Development*, *18*(4), 267–287. https://doi.org/10.1159/000271488

Dor-Ziderman, Y., Ataria, Y., Fulder, S., Goldstein, A., & Berkovich-Ohana, A. (2016). Self-specific processing in the meditating brain: A MEG neurophenomenology study. *Neuroscience of Consciousness*, *2016*(1), Article niw019. https://doi.org/10.1093/nc/niw019

Dukes, D., Abrams, K., Adolphs, R., Ahmed, M. E., Beatty, A., Berridge, K. C., Broomhall, S., Brosch, T., Campos, J. J., & Clay, Z. (2021). The rise of affectivism. *Nature Human Behaviour*, 5(7), 816–820. https://doi.org/10.1038/s41562-021-01130-8

Dunn, B. D., Galton, H. C., Morgan, R., Evans, D., Oliver, C., Meyer, M., Cusack, R., Lawrence, A. D., & Dalgleish, T. (2010). Listening to your heart: How interoception shapes emotion experience and intuitive decision making. *Psychological Science*, *21*(12), 1835–1844. https://doi.org/10.1177/0956797610389191

Edwards, S. D. (2013). Intuition as a healing modality: Historical and contemporary perspectives. *Journal of Psychology in Africa*, *23*(4), 669–673. https://doi.org/10.1080/14330237.2013.10820686

Edwards, S. D. (2017). Radiating love: Reflections on the role of the heart in indigenous and global healing. *Indilinga African Journal of Indigenous Knowledge Systems, 16*(1), 31–43. https://tinyurl.com/mv45ar3v

Elbers, J., & McCraty, R. (2020). HeartMath approach to self-regulation and psychosocial well-being. *Journal of Psychology in Africa*, *30*(1), 69–79. https://doi.org/10.1080/14330237.2020.1712797

Espinosa, S. (2014). The therapeutic role of the practitioner's heart in classical Chinese medicine and modern medical science. A critical literature review. *The European Journal of Oriental Medicine*, *7*(5), 18–25. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=c2a3bc230eb0f24174fa8162571142e933bf6f42

Fawzy, F. I., Fawzy, N. W., Hyun, C. S., Elashoff, R., Guthrie, D., Fahey, J. L., & Morton, D. L. (1993). Malignant melanoma: Effects of an early structured psychiatric intervention, coping, and affective state on recurrence and survival 6 years later. *Archives of General Psychiatry, 50*(9), 681–689. https://doi.org/10.1001/archpsyc.1993.01820210015002

Ferrer, J. (2008). What does it mean to live a fully embodied spiritual life? *International Journal of Transpersonal Studies, 27*(1), 1–11. https://doi.org/10.24972/ijts.2008.27.1.1

Fetterman, A. K., Juhl, J., Meier, B. P., Abeyta, A., Routledge, C., & Robinson, M. D. (2020). The path to God is through the heart: Metaphoric self-location as a predictor of religiosity. *Self and Identity*, *19*(6), 650–672. https://doi.org/10.1080/15298868.2019.1651389

Fetterman, A. K., & Robinson, M. D. (2013, June 17). Do you use your head or follow your heart? Self-location predicts personality, emotion, decision making, and performance. *Journal of Personality and Social Psychology*, *105*(2), 316–334. https://doi.org/10.1037/a0033374

Feuerstein, G. (2001). *The yoga tradition: Its history, literature, philosophy and practice*. Hohm Press.

Field, T. M., Woodson, R., Greenberg, R., & Cohen, D. (1982). Discrimination and imitation of facial expression by neonates. *Science*, *218*(4568), 179–181. https://doi.org/10.1126/science.7123230

Flor, N., & Hutchins, E. (1991). Analyzing distributed cognition in software teams: A case study of team programming during perfective software maintenance. In J. Koenemann-Belliveau, T. G. Moher, & S. Robertson (Eds.), *Proceedings of the fourth annual workshop on empirical studies of programmers* (pp. 36–59). Ablex. https://tinyurl.com/mzyhzawd

Foletti, A., Grimaldi, S., Lisi, A., Ledda, M., & Liboff, A. R. (2013). Bioelectromagnetic medicine: The role of resonance signaling. *Electromagnetic Biology and Medicine*, *32*(4), 484–499. https://doi.org/10.3109/15368378.2012.743908

Friedman, H. L. (1983). The self-expansive level form: A conceptualization and measurement of a transpersonal construct. *The Journal of Transpersonal Psychology*, *15*(1), 37–50. https://psycnet.apa.org/record/1984-08404-001

Friedman, H. L. (2018). Transpersonal psychology as a heterodox approach to psychological science: Focus on the construct of self-expansiveness and its measure. *Archives of Scientific Psychology*, *6*(1), 230–242. https://doi.org/10.1037/arc0000057

Friston, K. J., Ramstead, M. J., Kiefer, A. B., Tschantz, A., Buckley, C. L., Albarracin, M., Pitliya, R. J., Heins, C., Klein, B., Millidge, B., Sakthivadivel, D. A. R., St Clere Smithe, T., Koudahl, M., Tremblay, S. E., Petersen, C., Fung, K., Fox, J. G., Swanson, S., Mapes, D., & René, G. (2022). Designing ecosystems of intelligence from first principles. *ArXiv*, Article 2212.01354I. https://doi.org/10.48550/arXiv.2212.01354

Fuchs, T. (2017). Intercorporeality and interaffectivity. *Phenomenology and Mind*, (11), 194–209. https://doi.org/10.13128/Phe_Mi-20119

Fuchs, T. (2018). *Ecology of the brain: The phenomenology and biology of the embodied mind*. Oxford University Press. https://doi.org/10.1093/med/9780199646883.001.0001

Fuchs, T., & De Jaegher, H. (2009). Enactive intersubjectivity: Participatory sense-making and mutual incorporation. *Phenomenology and the Cognitive Sciences*, *8*(4), 465–486. https://doi.org/10.1007/s11097-009-9136-4

Gallagher, S. (2000). Philosophical conceptions of the self: Implications for cognitive science. *Trends in Cognitive Sciences*, *4*(1), 14–21. https://doi.org/ 10.1016/S1364-6613(99)01417-5

Gallagher, S. (2003). Neurophenomenological research on embodied existence. In C-F. Cheung, I. Chvatik, I. Copoeru, L. Embree, J. Iribarne, & H. R. Sepp (Eds.), *Essays in celebration of the founding of the organization of phenomenological organizations* (pp. 1–34). WebPublished. https://www.researchgate.net/publication/242728627_Gallagher_S_2003_Neurophenomenological_Research_on_Embodied_Experience

Gallagher, S. (2018). Decentering the brain: Embodied cognition and the critique of neurocentrism and narrow-minded philosophy of mind. *Constructivist Foundations, 14*(1), 8–21. https://ro.uow.edu.au/lhapapers/3784

Gallagher, S., & Gazzaniga, M. (1998). The neuronal platonist: Michael Gazzaniga in conversation with Shaun Gallagher. *Journal of Consciousness Studies*, *5*(5–6), 706–717. https://www.researchgate.net/publication/284097541_Gazzaniga_M_and_Gallagher_S_1998_The_neuronal_platonist_Interview

Garfinkel, S. N., Minati, L., Gray, M. A., Seth, A. K., Dolan, R. J., & Critchley, H. D. (2014). Fear from the heart: Sensitivity to fear stimuli depends on individual heartbeats. *The Journal of Neuroscience*, *34*(19), 6573–6582. https://doi.org/10.1523/JNEUROSCI.3507-13.2014

Gazzaniga, M. S. (2005). Forty-five years of split-brain research and still going strong. *Nature Reviews Neuroscience*, *6*(8), 653–659. https://doi.org/10.1038/nrn1723

Gendlin, E. T. (1992). The primacy of the body, not the primacy of perception. *Man and World*, *25*(3–4), 341–353. https://doi.org/10.1007/BF01252424

Gendlin, E. (1999a). Implicit entry and focusing. *The Humanistic Psychologist*, *27*(1), 80–88. https://doi.org/10.1080/08873267.1999.9986899

Gendlin, E. T. (1999b). A new model. *Journal of Consciousness Studies*, *6*(2–3), 232–237. https://tinyurl.com/3a3sh567

Gendlin, E. T. (2000). When you feel the body from inside, there is a door. In J. K. Zeig (Ed.), *The evolution of psychotherapy: A meeting of the minds* (pp. 255–267). The Milton H. Erickson Foundation. http://www.focusing.org/gendlin /docs/gol_2232.html

Gendlin, E. T. (2003). *Focusing*. Random House.

Gendlin, E. T. (2018). *A process model*. Northwestern University. https://doi.org/10.2307/j.ctv47w48p

Gentile, D. A., Sweet, D. M., & He, L. (2020). Caring for others cares for the self: An experimental test of brief downward social comparison, loving-kindness, and interconnectedness contemplations. *Journal of Happiness Studies*, *21*(3), 765–778. https://doi.org/10.1007/s10902-019-00100-2

Glaser, R., Lafuse, W. P., Bonneau, R. H., Atkinson, C., & Kiecolt-Glaser, J. K. (1993). Stress-associated modulation of proto-oncogene expression in human peripheral blood leukocytes. *Behavioral Neuroscience*, *107*(3), 525–529. https://doi.org/10.1037/0735-7044.107.3.525

Glass, L. (2001). Synchronization and rhythmic processes in physiology. *Nature*, *410*(6825), 277–284. https://doi.org/10.1038/35065745

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower level facets of several five-factor models. In I. Mervielde, I. Dreary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe* (Vol. 7, pp. 7–28). Tilburg University Press. https://tinyurl.com/mpbrs7kj

Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., & Bouwsema, M. (1993). An emerging theory of human relatedness. *Image: The Journal of Nursing Scholarship*, *25*(4), 291–296. https://doi.org/10.1111/j.1547-5069.1993.tb00262.x

Hajar, R. (2018). The pulse in ancient medicine part 1. *Heart Views: The Official Journal of the Gulf Heart Association, 19(*1), 36–43. https://doi.org/10.4103/HEARTVIEWS.HEARTVIEWS_23_18

Hall, J. A., & Schwartz, R. (2022). Empathy, an important but problematic concept. *The Journal of Social Psychology*, *162*(1), 1–6. https://doi.org/10.1080/00224545.2021.2004670

Hammerschlag, R., Levin, M., McCraty, R., Bat, N., Ives, J. A., Lutgendorf, S. K., & Oschman, J. L. (2015). Biofield physiology: A framework for an emerging discipline. *Global Advances in Health and Medicine, 4*(Suppl), 35–41. https://doi.org/10.7453/gahmj.2015.015.suppl

Hanley, A., Lecy, N., & Hanley, R. (2021). Locating the embodied sense of self and examining its relationship with psychological well-being. *International Journal of Transpersonal Studies, 40* (1), 84–95. https://doi.org/10.24972/ijts.2021.40.1.84

Hartelius, G. (2007). Quantitative somatic phenomenology: Toward an epistemology of subjective experience. *Journal of Consciousness Studies, 14*(12), 24–56. https://tinyurl.com/bspfmh65

Hartelius, G. (2015). Body maps of attention: Phenomenal markers for two varieties of mindfulness. *Mindfulness*, *6*(6), 1271–1281. https://doi.org/10.1007/s12671-015-0391-x

Hartelius, G., (2021). Somatic phenomenology: Maps of body-felt experience. In J. F. Tantia (Ed.), *The art and science of embodied research design* (pp. 87–99). Routledge. https://doi.org/10.4324/9780429429941-8

Hartelius, G., & Goleman, J. (2016). Body felt imagery: Thoughts of the radically embodied mind. In L. Davenport (Ed.), *Transformative imagery: Cultivating the imagination for healing, change, and growth* (pp. 162–173). Jessica Kingsley. https://tinyurl.com/3u5yd7zf

Hartelius, G., Likova, L. T., & Tyler, C. W. (2022). Self-regulation of seat of attention into various attentional stances facilitates access to cognitive and emotional resources: An EEG study. *Frontiers in Psychology*, *13*, Article 810780. https://doi.org/10.3389/fpsyg.2022.810780

Hartelius, G., Rothe, G., & Roy, P. J. (2013). A brand from the burning: Defining transpersonal psychology. In H. L. Friedman & G. Hartelius (Eds.), *The Wiley-Blackwell handbook of transpersonal psychology* (pp. 3–22). Wiley-Blackwell. https://doi.org/10.1002/9781118591277.ch1

Helminski, K. (2000). *The knowing heart*. Shambhala. Herrero, N. L., Gallo, F. T., Gasca-Rolín, M., Gleiser, P. M., & Forcato, C. (2023). Spontaneous and induced out-of-body experiences during sleep paralysis: Emotions, "aura" recognition, and clinical implications. *Journal of Sleep Research*, *32*(1), Article 13703. https://doi.org.ciis.idm.oclc.org/10.1111/jsr.13703

Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review*, *31*(7), 1126–1132. https://doi.org/10.1016/j.cpr.2011.07.003

Holly, W. J. (1986). Tshe patial coordinates of pain. *The Philosophical Quarterly*, *36*(144), 343–356. https://doi.org/10.2307/2220189

Hu, X., Yu, J., Song, M., Yu, C., Wang, F., Sun, P., Wang, D., & Zhang, D. (2017). EEG correlates of ten positive emotions. *Frontiers in Human Neuroscience*, *11*, Article 26. https://doi.org/10.3389/fnhum.2017.00026

Huang, H. C., Lee, Y. T., Chen, W. Y., & Liang, C. (2017). The sense of 1PP-location contributes to shaping the perceived self-location together with the sense of body-location. *Frontiers in Psychology*, *8*, Article 370. https://doi.org/10.3389/fpsyg.2017.00370

Ivanov, P. C. (2021). The new field of network physiology: Building the human physiolome. *Frontiers in Network Physiology*, *1*, Article 711778. https://doi.org/10.3389/fnetp.2021.711778

Jain, S., Hammerschlag, R., Mills, P., Cohen, L., Krieger, R., Vieten, C., & Lutgendorf, S. (2015). Clinical studies of biofield therapies: Summary, methodological challenges, and recommendations. *Global Advances in Health and Medicine*, *4*(suppl), 58–66. https://doi.org/10.7453/gahmj.2015.034.suppl

James, W. (1890). *The principles of psychology*. Henry Holt. https://doi.org/10.1037/10538-000

Janashia, K., Tvildiani, L., Tsibadze, T., & Invia, N. (2022). Effects of the geomagnetic field time–varying components compensation as evidenced by heart rate variability of healthy males. *Life Sciences in Space Research*, *32*, 38–44. https://doi.org/10.1016/j.lssr.2021.10.003

Johnson, D. H. (2000). Body practices and consciousness: A neglected link. *Anthropology of Consciousness*, *11*(3–4), 40–53. https://doi.org/10.1525/ac.2000.11.3-4.40

Kaba, E., Thompson, D. R., Burnard, P., Edwards, D., & Theodosopoulou, E. (2005). Somebody else's heart inside me: A descriptive study of psychological problems after a heart transplantation. *Issues in Mental Health Nursing*, *26*(6), 611–625. https://doi.org/10.1080/01612840590959452

Kang, Y., Gray, J. R., & Dovidio, J. F. (2015). The head and the heart: Effects of understanding and experiencing lovingkindness on attitudes toward the self and others. *Mindfulness*, *6*(5), 1063–1070. https://doi.org/10.1007/s12671-014-0355-6

Kemp, A. H., & Quintana, D. S. (2013). The relationship between mental and physical health: Insights from the study of heart rate variability. *International Journal of Psychophysiology*, *89*(3), 288–296. https://doi.org/10.1016/j.ijpsycho.2013.06.018

Kitayama, S., King, A., Yoon, C., Tompson, S., Huff, S., & Liberzon, I. (2014). The dopamine D4 receptor gene (DRD4) moderates cultural difference in independent versus interdependent social orientation. *Psychological Science*, *25*(6), 1169–1177. https://doi.org/10.1177/0956797614528338

Kristeller, J. L., & Johnson, T. (2005). Cultivating loving kindness: A two-stage model of the effects of meditation on empathy, compassion, and altruism. *Zygon*, *40*(2), 391–408. https://doi.org/10.1111/j.1467-9744.2005.00671.x

Lacey, B. C., & Lacey, J. I. (1978). Two-way communication between the heart and the brain: Significance of time within the cardiac cycle. *American Psychologist*, *33*(2), 99–113. https://doi.org/10.1037/0003-066X.33.2.99

Lakens, D. (2021). The practical alternative to the p value is the correctly used p value. *Perspectives on Psychological Science*, *16*(3), 639–648. https://doi.org/10.1177/1745691620958012

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. University of Chicago Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to Western thought*. Basic Books.

Lang, F. R., John, D., Lüdtke, O., Schupp, J., & Wagner, G. G. (2011). Short assessment of the Big Five: Robust across survey methods except telephone interviewing. *Behavior Research Methods*, *43*(2), 548–567. https://doi.org/10.3758/s13428-011-0066-z

Laughlin, C. D., & Rock, A. J. (2013). Neurophenomenology: Enhancing the experimental and cross-cultural study of brain and experience. In H. L. Friedman & G. Hartelius (Eds.), *The Wiley-Blackwell handbook of transpersonal psychology* (pp. 261–280). John Wiley & Sons. https://doi.org/10.1002/9781118591277.ch14

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist*, *46*(8), 819–834. https://doi.org/10.1037/0003-066X.46.8.819

Lee, S. W., & Cecutti, L. (2022). Three mechanisms of mind–body influence: Feelings, concepts, and procedures. In L. R. Kahle, T. M. Lowrey, & J. Huber (Eds.), *APA handbook of consumer psychology* (pp. 551–580). American Psychological Association. https://doi.org/10.1037/0000262-024

Leppma, M. (2012). Loving-kindness meditation and counseling. *Journal of Mental Health Counseling*, *34*(3), 197–204. https://doi.org/10.17744/mehc.34.3.955g218326616282

Leserman, J., Drossman, D. A., Li, Z., Toomey, T. C., Nachman, G., & Glogau, L. (1996). Sexual and physical abuse history in gastroenterology practice: How types of abuse impact health status. *Psychosomatic Medicine*, *58*(1), 4–15. https://doi.org/10.1097/00006842-199601000-00002

Levin, M. (2019). The computational boundary of a “self”: Developmental bioelectricity drives multicellularity and scale-free cognition. *Frontiers in Psychology*, *10*, Article 2688. https://doi.org/10.3389/fpsyg.2019.02688

Levin, M. (2023), Bioelectric networks: The cognitive glue enabling evolutionary scaling from physiology to mind. *Animal Cognition*, 1–27. https://doi.org/10.1007/s10071-023-01780-3

Levinas, E. (1969). *Totality and infinity: An essay on exteriority* (A. Lingis, Trans.). Duquesne University Press.

Liboff, A. R. (2004). Toward an electromagnetic paradigm for biology and medicine. *The Journal of Alternative & Complementary Medicine*, *10*(1), 41–47. https://doi.org/10.1089/107555304322848940

Liester, M. B. (2020). Personality changes following heart transplantation: The role of cellular memory. *Medical Hypotheses, 135,* Article 109468. https://doi.org/10.1016/j.mehy.2019.109468

Likova, L. T. (2012). The spatiotopic “visual” cortex of the blind. *Human Vision and Electronic Imaging XVII, Proceedings of SPIE, 8291,* 147–167. https://doi.org/10.1117/12.912257

Limanowski, J., & Hecht, H. (2011). Where do we stand on locating the self. *Psychology, 2*(4), 312–317. https://doi.org/10.4236/psych.2011.24049

Lindahl, J. R., & Britton, W. B. (2019). “I have this feeling of not really being here”: Buddhist meditation and changes in sense of self. *Journal of Consciousness Studies, 26*(7–8), 157–183. https://tinyurl.com/2pvms2br

Lindahl, J. R., Fisher, N. E., Cooper, D. J., Rosen, R. K., & Britton, W. B. (2017). The varieties of contemplative experience: A mixed-methods study of meditation-related challenges in Western Buddhists. *PLOS One*, *12*(5), e0176239. https://doi.org/10.1371/journal.pone.0176239

Ma, K., Yang, L., & Hommel, B. (2023). The impact of interoceptive accuracy and stimulation type on the out-of-body experience. *Quarterly Journal of Experimental Psychology, 76*(8), 1940–1952. https://doi.org/10.1177/17470218221128285

Mandel, D. M. (2007). *Correlated heart rate measures in the study of nonlocal human connectedness* (Publication No 3251928) [Doctoral dissertation, Saybrook University]. ProQuest Dissertations and Theses Global.

Marolt-Sender, M. A. (2014). *A phenomenological inquiry into the attention postures of flow-like states* (Publication No. 3629329) [Doctoral dissertation, Sofia University]. ProQuest Dissertations & Theses Global.

Maslow, A. H. (1991). Critique of self-actualization theory. *The Journal of Humanistic Education and Development*, *29*(3), 103–108 (Original work published 1966). https://doi.org/10.1002/j.2164-4683.1991.tb00010.x

Mather, M., & Thayer, J. F. (2018). How heart rate variability affects emotion regulation brain networks. *Current Opinion in Behavioral Sciences*, *19,* 98–104. https://doi.org/10.1016/j.cobeha.2017.12.017

Mauthner, O. E., De Luca, E., Poole, J. M., Abbey, S. E., Shildrick, M., Gewarges, M., & Ross, H. J. (2015). Heart transplants: Identity disruption, bodily integrity and interconnectedness. *Health*, *19*(6), 578–594. https://doi.org/10.1177/1363459314560067

McCraty, R. (2004). The energetic heart: Bioelectromagnetic communication within and between people. In P. J. Rosch & M. S. Markov (Eds.), *Bioelectromagnetic medicine* (pp. 511–532). Marcel Dekker.

McCraty, R. (2011). Coherence: Bridging personal, social, and global health. *Activitas Nervosa Superior Rediviva, 53*(3), 85–102. http://www.rediviva.sav.sk/53i3/85.pdf

McCraty, R. (2017). New frontiers in heart rate variability and social coherence research: Techniques, technologies, and implications for improving group dynamics and outcomes. *Frontiers in Public Health, 5*, Article 267. https://doi.org/10.3389/fpubh.2017.00267

McCraty, R., Atkinson, M., & Tiller, W. A. (1993). New electrophysiological correlates associated with intentional heart focus. *Subtle Energies & Energy Medicine Journal Archives, 4*(3), 251–268. https://journals.sfu.ca/seemj/index.php/seemj/article/viewFile/173/138

McCraty, R., Atkinson, M., Tomasino, D., & Tiller, W. A. (1998). The electricity of touch: Detection and measurement of cardiac energy exchange between people. In K. H. Pribram (Ed.), *Brain and values: Is a biological science of values possible* (pp. 359–379). Lawrence Erlbaum. https://www.doi.org/10.4324/9780203763834-16

Merleau-Ponty, M. (1968). *The visible and the invisible* (A. Lingis, Trans.). Northwestern University Press.

Merleau-Ponty, M. (2012). *Phenomenology of perception* (D. A. Landes, Trans.). Routledge. (Original work published 1945)

Merriam-Webster. (n.d.). Core. In *Merriam-Webster.com dictionary*. https://www.merriam-webster.com/dictionary/core

Mesquita, B., & Barrett, L. F. (2017). Emotion [Editorial overview]. *Current Opinion in Psychology, 17*, iv–vi. https://doi.org/10.1016/j.copsyc.2017.07.030

Metzinger, T. (2010). The self-model theory of subjectivity: A brief summary with examples. *Humana Mente—Quarterly Journal of Philosophy, 14*, 25–53. https://tinyurl.com/yc3b875s

Mishara, A. L. (2005). Body self and its narrative representation in schizophrenia. In H. De Preester & V. Knockaert (Eds.), *Body image and body schema: Interdisciplinary perspectives on the body* (pp. 127–152). John Benjamins Amsterdam. https://doi.org/10.1075/aicr.62.09mis

Monti, A., Porciello, G., Panasiti, M. S., & Aglioti, S. M. (2021, May 28). The inside of me: Interoceptive constraints on the concept of self in neuroscience and clinical psychology. *Psychological Research*, 1–10. https://doi.org/10.1007/s00426-021-01477-7

Nave, O., Trautwein, F. M., Ataria, Y., Dor-Ziderman, Y., Schweitzer, Y., Fulder, S., & Berkovich-Ohana, A. (2021). Self-boundary dissolution in meditation: A phenomenological investigation. *Brain Sciences*, *11*(6), Article 819. https://doi.org/10.31234/osf.io/3jd7g

Newen, A., de Bruin, L. C., & Gallagher, S. (2018). 4E cognition: Historical roots, key concepts, and central issues. In A. Newen, L. C. de Bruin, & S. Gallagher (Eds.), *The Oxford handbook of 4E cognition* (pp. 3–15). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780198735410.001.0001

Nicotra, A., Critchley, H. D., Mathias, C. J., & Dolan, R. J. (2006). Emotional and autonomic consequences of spinal cord injury explored using functional brain imaging. *Brain*, *129*(3), 718–728. https://doi.org/10.1093/brain/awh699

Nummenmaa, L., Glerean, E., Hari, R., & Hietanen, J. K. (2014). Bodily maps of emotions. *Proceedings of the National Academy of Sciences*, *111*(2), 646–651. https://doi.org/10.1073/pnas.1321664111

Nummenmaa, L., Hari, R., Hietanen, J. K., & Glerean, E. (2018). Maps of subjective feelings. *Proceedings of the National Academy of Sciences, 115*(37), 9198–9203. https://doi.org/10.1073/pnas.1807390115

Oschman, J. L. (2015). *Energy medicine: The scientific basis* (2nd ed.). Elsevier Health Sciences. https://doi.org/10.1016/C2009-0-49551-5

Oyserman, D. (2001). Self-concept and identity. In A. Tesser & N. Schwarz, *The Blackwell handbook of social psychology: Intraindividual processes* (pp. 499–517). Blackwell. https://tinyurl.com/ypsa486n

Parrinello, N., Napieralski, J., Gerlach, A. L., & Pohl, A. (2022). Embodied feelings: A meta-analysis on the relation of emotion intensity perception and interoceptive accuracy. *Physiology & Behavior,* Article 113904. https://doi.org/10.1016/j.physbeh.2022.113904

Pearsall, P., Schwartz, G. E., & Russek, L. G. (1999). Changes in heart transplant recipients that parallel the personalities of their donors. *Integrative Medicine*, *2*(2–3), 65–72. https://doi.org/10.1016/S1096-2190(00)00013-5

Perloff, J. (2010). The metaphoric and morphologic heart: Symbol and substance. *The American Journal of Cardiology*, *105*(10), 1502–1503. https://doi.org/10.1016/j.amjcard.2010.02.001

Pert, C. (2002). The wisdom of the receptors: Neuropeptides, the emotions, and bodymind. *Advances in Mind Body Medicine*, *18*(1), 30–35. http://www.candacepert.com/wp-content/uploads/2017/07/Advances-v8-1988-Wisdom-of-the-Receptors1.pdf

Pert, C. B., Dreher, H. E., & Ruff, M. R. (1998). The psychosomatic network: Foundations of mind-body medicine. *Alternative Therapies in Health and Medicine*, *4*(4), 30–41. https://europepmc.org/article/med/9656499

Poole, J. M., Shildrick, M., McKeever, P., Abbey, S., & Ross, H. (2009). "You might not feel like yourself": On heart transplants, identity, and ethics. In S. J. Murray & D. Holmes (Eds.), *Critical interventions in the ethics of healthcare* (pp. 33–44). Routledge. https://doi.org/10.4324/9781315575025

Poole, J. M., Ward, J., De Luca, E., Shildrick, M., Abbey, S., Mauthner, O., Gewarges, M., & Ross, H. J. (2014). Getting ready and then keeping quiet? Exploring grief with pre and post-transplant patients. *The Journal of Heart and Lung Transplantation*, *33*(4), S222–S223. https://www.doi.org/10.1016/j.healun.2014.01.577

Przyrembel, M., Vrticka, P., Engert, V., & Singer, T. (2019). Loving-kindness meditation--A queen of hearts? A physio-phenomenological investigation on the variety of experience. *Journal of Consciousness Studies*, *26*(7–8), 95–129. https://www.ingentaconnect.com/content/imp/jcs/2019/00000026/f0020007/art00006

Qin, P., Wang, M., & Northoff, G. (2020). Linking bodily, environmental and mental states in the self—A three-level model based on a meta-analysis. *Neuroscience & Biobehavioral Reviews*, *115*, 77–95. https://doi.org/10.1016/j.neubiorev.2020.05.004

Radin, D., Yount, G., Delorme, A., Carpenter, L., & Wahbeh, H. (2021). Spectroscopic analysis of water treated by and in proximity to energy medicine practitioners: An exploratory study. *Explore*, *17*(1), 27–31. https://doi.org/10.1016/j.explore.2020.10.005

Ray, R. A. (2008). *Touching enlightenment: Finding realization in the body*. Sounds True.

Reed, D. A. (2022). *Interpersonal physiological synchrony as a biological marker of coregulation* (Publication No. 30243396) [Doctoral dissertation, California Institute of Integral Studies]. ProQuest Dissertations & Theses Global.

Roberts, W., Salandy, S., Mandal, G., Holda, M. K., Tomaszewksi, K. A., Gielecki, J., Tubbs, S., & Loukas, M. (2019). Across the centuries: Piecing together the anatomy of the heart. *Translational Research in Anatomy*, *17*, Article 100051. https://doi.org/10.1016/j.tria.2019.100051

Rubik, B., Muehsam, D., Hammerschlag, R., & Jain, S. (2015). Biofield science and healing: History, terminology, and concepts. *Global Advances in Health and Medicine*, *4*(Suppl), 8–14. https://doi.org/10.7453/gahmj.2015.038.suppl

Rumi, J. A. D. (2003). *The book of love: Poems of ecstasy and longing* (C. Barks, Trans.). Harper-Collins.

Russek, L. G., & Schwartz, G. E. (1994). Interpersonal heart-brain registration and the perception of parental love: A 42 year follow-up of the Harvard Mastery of Stress Study. *Subtle Energies & Energy Medicine Journal Archives, 5*(3), 195–208. http://journals.sfu.ca/seemj/index.php/seemj/article/view/185/150

Salzberg, S. (2011). Mindfulness and loving-kindness. *Contemporary Buddhism*, *12*(1), 177–182. https://doi.org/10.1080/14639947.2011.564837

Schievink, S. H., van Boxtel, M. P., Deckers, K., van Oostenbrugge, R. J., Verhey, F. R., & Köhler, S. (2017). Cognitive changes in prevalent and incident cardiovascular disease: A 12-year follow-up in the Maastricht Aging Study (MAAS). *European Heart Journal*, *0*, 1–8. https://doi.org/10.1093/eurheartj/ehx365

Schimmel, A. (1997). "I take off the dress of the body": Eros in Sufi literature and life. In S. Coakley (Ed.), *Religion and the body* (pp. 262–288). Cambridge University Press.

Schroter, F. A., & Jansen, P. (2022). Making peace with disliked others: The effects of a short loving-kindness meditation on implicit and explicit emotional evaluations. *BMC Psychology*, *10*, Article 110. https://doi.org/10.1186/s40359-022-00817-5

Seih, Y. T., & Lepicovsky, M. (2020). Head vs. heart: Which path do you take? Self-location shapes language use, indicating rational and experiential thinking styles. *Social Cognition*, *38*(4), 379–402. https://doi.org/10.1521/soco.2020.38.4.379

Seth, A. K. (2013). Interoceptive inference, emotion, and the embodied self. *Trends in Cognitive Sciences*, *17*(11), 565–573. https://doi.org/10.1016/j.tics.2013.09.007

Shaw, J., Gandy, S., & Stumbrys, T. (2023). Transformative effects of spontaneous out of body experiences in healthy individuals: An interpretative phenomenological analysis. *Psychology of Consciousness: Theory, Research, and Practice.* Advanced online publication. https://doi.org/10.1037/cns0000324

Shimono, K., Higashiyama, A., & Tam, W. J. (2001). Location of the egocenter in kinesthetic space. *Journal of Experimental Psychology: Human Perception and Performance*, *27*(4), 848–861. https://doi.org/10.1037/0096-1523.27.4.848

Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, *20*(5), 580–591. https://doi.org/10.1177/0146167294205014

Smith, C. M. (1997). *Jung and shamanism in dialogue: Retrieving the soul, retrieving the sacred*. Paulist Press.

Song, L. Z., Schwartz, G. E., & Russek, L. G. (1998, August 31). Heart-focused attention and heart-brain synchronization: Energetic and physiological mechanisms. *Alternative Therapies in Health and Medicine*, *4*(5), 44–52. https://europepmc.org/article/med/9737031

Spiegel, D., Kraemer, H., Bloom, J., & Gottheil, E. (1989). Effect of psychosocial treatment on survival of patients with metastatic breast cancer. *The Lancet*, *334*(8668), 888–891. https://doi.org/10.1016/S0140-6736(89)91551-1

Stapleton, M. (2011). *Proper embodiment: The role of the body in affect and cognition* (Publication No. U590923) [Doctoral dissertation, The University of Edinburgh, UK]. ProQuest Dissertations and Theses Global. https://doi.org/10.13140/2.1.3102.5600

Starmans, C., & Bloom, P. (2012). Windows to the soul: Children and adults see the eyes as the location of the self. *Cognition*, *123*(2), 313–318. https://doi.org/10.1016/j.cognition.2012.02.002

Sugawara, A., Terasawa, Y., Katsunuma, R., & Sekiguchi, A. (2020). Effects of interoceptive training on decision making, anxiety, and somatic symptoms. *BioPsychoSocial Medicine*, *14*, 1–8. https://doi.org/10.1186/s13030-020-00179-7

Sze, J. A., Gyurak, A., Yuan, J. W., & Levenson, R. W. (2010). Coherence between emotional experience and physiology: Does body awareness training have an impact? *Emotion*, *10*(6), 803–814. https://doi.org/10.1037/a0020146

Tallon-Baudry, C., Campana, F., Park, H. D., & Babo-Rebelo, M. (2018). The neural monitoring of visceral inputs, rather than attention, accounts for first-person perspective in conscious vision. *Cortex*, *102*, 139–149. https://doi.org/10.1016/j.cortex.2017.05.019

Tart, C. T. (1972). States of consciousness and state-specific sciences. *Science*, *176*(4040), 1203–1210. https://doi.org/10.1126/science.176.4040.1203

Tart, C. T. (2004). On the scientific foundations of transpersonal psychology: Contributions from parapsychology. *Journal of Transpersonal Psychology 36*(1), 66–90. https://tinyurl.com/aebvhub9

Thayer, J. F., Åhs, F., Fredrikson, M., Sollers III, J. J., & Wager, T. D. (2012). A meta-analysis of heart rate variability and neuroimaging studies: Implications for heart rate variability as a marker of stress and health. *Neuroscience & Biobehavioral Reviews*, *36*(2), 747–756. https://doi.org/10.1016/j.neubiorev.2011.11.009

Thayer, J. F., & Lane, R. D. (2009). Claude Bernard and the heart–brain connection: Further elaboration of a model of neurovisceral integration. *Neuroscience & Biobehavioral Reviews*, *33*(2), 81–88. https://doi.org/10.1016/j.neubiorev.2008.08.004

Townsend, K. C., & McWhirter, B. T. (2005). Connectedness: A review of the literature with implications for counseling, assessment, and research. *Journal of Counseling & Development*, *83*(2), 191–201. https://doi.org/10.1002/j.1556-6678.2005.tb00596.x

Trautwein, F. M., Naranjo, J. R., & Schmidt, S. (2016). Decentering the self? Reduced bias in self-vs. other-related processing in long-term practitioners of loving-kindness meditation. *Frontiers in Psychology*, *7*, Article 1785. https://doi.org/10.3389/fpsyg.2016.01785

Tsakiris, M., Schütz-Bosbach, S., & Gallagher, S. (2007). On agency and body-ownership: Phenomenological and neurocognitive reflections. *Consciousness and Cognition*, *16*(3), 645–660. https://doi.org/10.1016/j.concog.2007.05.012

Turk, D. J., Heatherton, T. F., Macrae, C. N., Kelley, W. M., & Gazzaniga, M. S. (2003). Out of contact, out of mind: The distributed nature of the self. *Annals of the New York Academy of Sciences*, *1001*(1), 65–78. https://doi.org/10.1196/annals.1279.005

Uddin, L. Q., Iacoboni, M., Lange, C., & Keenan, J. P. (2007). The self and social cognition: The role of cortical midline structures and mirror neurons. *Trends in Cognitive Sciences*, *11*(4), 153–157. https://doi.org/10.1016/j.tics.2007.01.001

U.S. Census Bureau (2022). *American community survey: S0101: Age and sex*. https://data.census.gov/table/ACSST1Y2022.S0101?q=United+States&t=Age+and+Sex

Valenza, G., Toschi, N., & Barbieri, R. (2016). Uncovering brain–heart information through advanced signal and image processing. *Philosophical Transactions of the Royal Society A*, *374*, 1–6. https://doi.org/10.1098/rsta.2016.0020

Van Bel, D. T., Smolders, K. C. H. J., IJsselsteijn, W. A., & de Kort, Y. (2009). Social connectedness: Concept and measurement. *Intelligent Environments*, *2*, 67–74. https://doi.org/10.3233/978-1-60750-034-6-67

Van der Veer, A. H., Longo, M. R., Alsmith, A. J., Wong, H. Y., & Mohler, B. J. (2019). Self and body part localization in virtual reality: Comparing a headset and a large-screen immersive display. *Frontiers in Robotics and AI*, *6*, Article 33. https://doi.org/10.3389/frobt.2019.00033

Varela, F. J. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies*, *3*(4), 330–349. https://www.ingentaconnect.com/content/imp/jcs/1996/00000003/00000004/718

Varela, F. J., Rosch, E., & Thompson, E. (1993). *The embodied mind: Cognitive science and human experience*. MIT Press.

Varela, F. J., & Shear, J. (1999). First-person methodologies: What, why, how? *Journal of Consciousness Studies*, *6*(2–3), 1–14. https://tinyurl.com/4xryruvw

Vesey, G. N. A. (1964) Bodily sensations. *Australasian Journal of Philosophy*, *42*(2), 232–247. https://doi.org/10.1080/00048406412341201

Volynets, S., Glerean, E., Hietanen, J. K., Hari, R., & Nummenmaa, L. (2020). Bodily maps of emotions are culturally universal. *Emotion*, *20*(7), 1127–1136. https://doi.org/10.1037/emo0000624 von Bertalanffy, L. (1950). An outline of general system theory. *British Journal for the Philosophy of Science*, *1*(2), 134–165. https://doi.org/10.1093/bjps/I.2.134

Von Mohr, M., Finotti, G., Villani, V., & Tsakiris, M. (2021). Taking the pulse of social cognition: Cardiac afferent activity and interoceptive accuracy modulate emotional egocentricity bias. *Cortex*, *145*, 327–340. https://doi.org/10.1016/j.cortex.2021.10.004

Wahbeh, H., Niebauer, E., Delorme, A., Carpenter, L., Radin, D., & Yount, G. (2021). A case study of extended human capacity perception during energy medicine treatments using mixed methods analysis. *Explore*, *17*(1), 70–78. https://doi.org/10.1016/j.explore.2020.10.006

Wahbeh, H., Radin, D., Yount, G., Delorme, A., & Carpenter, L. (2021). Effects of the local and geocosmic environment on the efficacy of energy medicine treatments: An exploratory study. *Explore*, *17*(1), 40–44. https://doi.org/10.1016/j.explore.2020.09.002

Wallis, C. D. (2013). *Tantra illuminated: The philosophy, history, and practice of a timeless tradition* (2nd ed.). Mattamayura Press.

Wang, C-A., Baird, T., Huang, J., Coutinho, J. D., Brien, D. C., & Munoz, D. P. (2018). Arousal effects on pupil size, heart rate, and skin conductance in an emotional face task. *Frontiers in Neurology*, *9*, Article 1029. https://doi.org/10.3389/fneur.2018.01029

Ward, D., & Stapleton, M. (2012). Es are good: Cognition as enacted, embodied, embedded, affective and extended. In F. Paglieri (Ed.), *Consciousness in interaction: The role of the natural and social environment in shaping consciousness* (pp. 89–104). John Benjamins. https://doi.org/10.1075/aicr.86

Ware, K. (1997). My helper and my enemy: The body in Greek Christianity. In S. Coakley (Ed.), *Religion and the body* (pp. 90–110). Cambridge University Press.

Watts, R., Kettner, H., Geerts, D., Gandy, S., Kartner, L., Mertens, L., Timmermann, C., Nour, M. M., Kaelen, M., Nutt, D., Carhart-Harris, R., & Roseman, L. (2022). The Watts Connectedness Scale: A new scale for measuring a sense of connectedness to self, others, and world. *Psychopharmacology*, 1–23. https://doi.org/10.1007/s00213-022-06187-5

Welwood, J. (1977). On psychological space. *The Journal of Transpersonal Psychology*, *9*(2), 97–118. https://www.atpweb.org/jtparchive/trps-09-77-02-097.pdf

Whitney, A. (2017). *Map of the heart: An East-West understanding of heart intelligence and its application in counseling psychology* (Publication No. AAI10284587) [Doctoral dissertation, California Institute of Integral Studies]. ProQuest Dissertations & Theses Global.

Williams, A. (1997). Zoroastrianism and the body. In S. Coakley (Ed.), *Religion and the body* (pp. 155–166). Cambridge University Press.

Yount, G., Delorme, A., Radin, D., Carpenter, L., Rachlin, K., Anastasia, J., Pierson, M., Steele, S., Mandell, H., Chagnon, A., & Wahbeh, H. (2021). Energy medicine treatments for hand and wrist pain: A pilot study. *Explore*, *17*, 11–21. https://doi.org/10.1016/j.explore.2020.10.015

Yu, N. (2007). Heart and cognition in ancient Chinese philosophy. *Journal of Cognition and Culture*, *7*(1–2), 27–47. https://doi.org/10.1163/156853707X171801

Yu, N. (2009). *The Chinese HEART in a cognitive perspective: Culture, body, and language*. Walter de Gruyter. https://doi.org/10.1515/9783110213348

Zahavi, D. (2003). Phenomenology of self. In T. Kircher & A. David (Eds.), *The self in neuroscience and psychiatry* (pp. 56–75). Cambridge University Press. https://doi.org/10.1017/CBO9780511543708.004

Ziskind, B., & Halioua, B. (2004). La conception du coeur dans l'Egypte ancienne. *M/S: Médecine Sciences*, *20*(3), 367–373. https://doi.org/10.1051/medsci/2004203367

APPENDIX A: SELF-EXPANSIVENESS LEVEL FORM

Sample from Friedman (1983, Figure 2, p. 42)

Each of us has a unique sense of who we are, our conception of self or identity. The following concepts could possibly describe a person's view of themselves. The purpose of this questionnaire is to explore the degree of willingness you have in using each of these concepts to describe yourself. Using the scale below, carefully consider each concept and choose the letter which best expresses your willingness to use that concept as an answer to the question, "WHO AM I?" Write that letter to the left of the concept in the space provided. There are no right or wrong answers, and you are requested to answer on the basis of your own experiences and beliefs, not just on the basis of logic. Take your time and feel free to go back and change your answers. If you have trouble deciding any of these, please make your best choice and do not leave any blank.

A Very willing to use to describe my sense of self or identity
B Somewhat willing
C Neither willing nor unwilling
D Somewhat unwilling
E Very unwilling to use to describe my sense of self or identity

1. My emotions and feelings as experienced in the present. (personal level)

2. Thoughts and feelings I experienced as a child. (middle level, past temporal)

3. The unique individual that I am in the present. (global-personal level)

4. The social relationships which I experience. (middle level, enlarged spatial)

5. The way I behaved in living my life as a child. (middle level, past temporal)

6. Experiences of all life forms of which I am one. (transpersonal level, enlarged spatial)

7. Sensations from parts of my body, such as my heart, that I experience. (middle level, contracted spatial)

8. The way I behave in living my life in the present. (personal level)

9. Future happenings which I will experience. (middle level, future temporal)

10. My thoughts and ideas as experienced in the present. (personal level)

11. The way I will behave in living my life in the future. (middle level, future temporal)

12. The individual atoms in my body. (transpersonal level, contracted spatial)

13. The physical surroundings which have an influence on my behavior. (middle level, enlarged spatial)

14. All that happened before my lifetime which has in some way influenced me. (transpersonal level, past temporal)

15. The behavior of parts of my body, such as my facial expressions. (middle level, contracted spatial)

16. My attitudes and values in the present. (personal level)

17. The entire universe beyond time which is me in an ultimate sense. (global-transpersonal level)

18. The beings who might descend from me in the distant future who may not have human form. (transpersonal level, future temporal)

Note. The level and dimensional direction of each item are added in parentheses. They were not part of the form as administered.

APPENDIX B: THE METAPERSONAL SELF (MPS) SCALE

Instructions

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement write the number that best matches your agreement or disagreement, using the scale below. Please respond to every statement.

Strongly Disagree	Disagree	Somewhat Disagree	Don’t Agree or Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. ____ My personal existence is very purposeful and meaningful.

2. ____ I believe that no matter where I am or what I’m doing, I am never separate from others.

3. ____ I feel a real sense of kinship with all living things.

4. ____ My sense of inner peace is one of the most important things to me.

5. ____ I take the time each day to be peaceful and quiet, to empty my mind of everyday thoughts.

6. ____ I believe that intuition comes from a higher part of myself and I never ignore it.

7. ____ I feel a sense of responsibility and belonging to the universe.

8. ____ My sense of identity is based on something that unites me with all other people.

9. ____ I am aware of a connection between myself and all living things.

10. ____ I see myself as being extended into everything else.

Note. DeCicco and Stroink (2007, p. 97)

APPENDIX C: SELF-CONSTRUAL SCALE

Sample from Singelis (1994)

Instructions:

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement write the number that best matches your agreement or disagreement. Please respond to every statement. Thank you.

1 = Strongly disagree
2 = Disagree
3 = Somewhat disagree
4 = Don't agree or disagree
5 = Agree somewhat
6 = Agree
7 = Strongly agree

____1. I enjoy being unique and different from others in many respects. (Sing1)

____2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am. (Sing2)

____3. Even when I strongly disagree with group members, I avoid an argument. (Sing3)

____4. I have respect for the authority figures with whom I interact. (Sing4)

____5. I do my own thing, regardless of what others think. (Sing5)

____6. I respect people who are modest about themselves. (Sing6)

____7. I feel it is important for me to act as an independent person. (Sing7)

____8. I will sacrifice my self interest for the benefit of the group I am in. (Sing8)

____9. I'd rather say "No" directly, than risk being misunderstood. (Sing9)

____10. Having a lively imagination is important to me. (Sing10)

____11. I should take into consideration my parents' advice when making education/career plans. (Sing11)

____12. I feel my fate is intertwined with the fate of those around me. (Sing12)

____13. I prefer to be direct and forthright when dealing with people I've just met. (Sing13)

____14. I feel good when I cooperate with others. (Sing14)

____15. I am comfortable with being singled out for praise or rewards. (Sing15)

____16. If my brother or sister fails, I feel responsible. (Sing16)

____17. I often have the feeling that my relationships with others are more important than my own accomplishments. (Sing17)

____18. Speaking up during a class (or a meeting) is not a problem for me. (Sing18)

____19. I would offer my seat in a bus to my professor (or my boss). (Sing19)

____20. I act the same way no matter who I am with. (Sing20)

____21. My happiness depends on the happiness of those around me. (Sing21)

____22. I value being in good health above everything. (Sing22)

____23. I will stay in a group if they need me, even when I am not happy with the group. (Sing23)

____24. I try to do what is best for me, regardless of how that might affect others. (Sing24)

____25. Being able to take care of myself is a primary concern for me. (Sing25)

____26. It is important to me to respect decisions made by the group. (Sing26)

____27. My personal identity, independent of others, is very important to me. (Sing27)

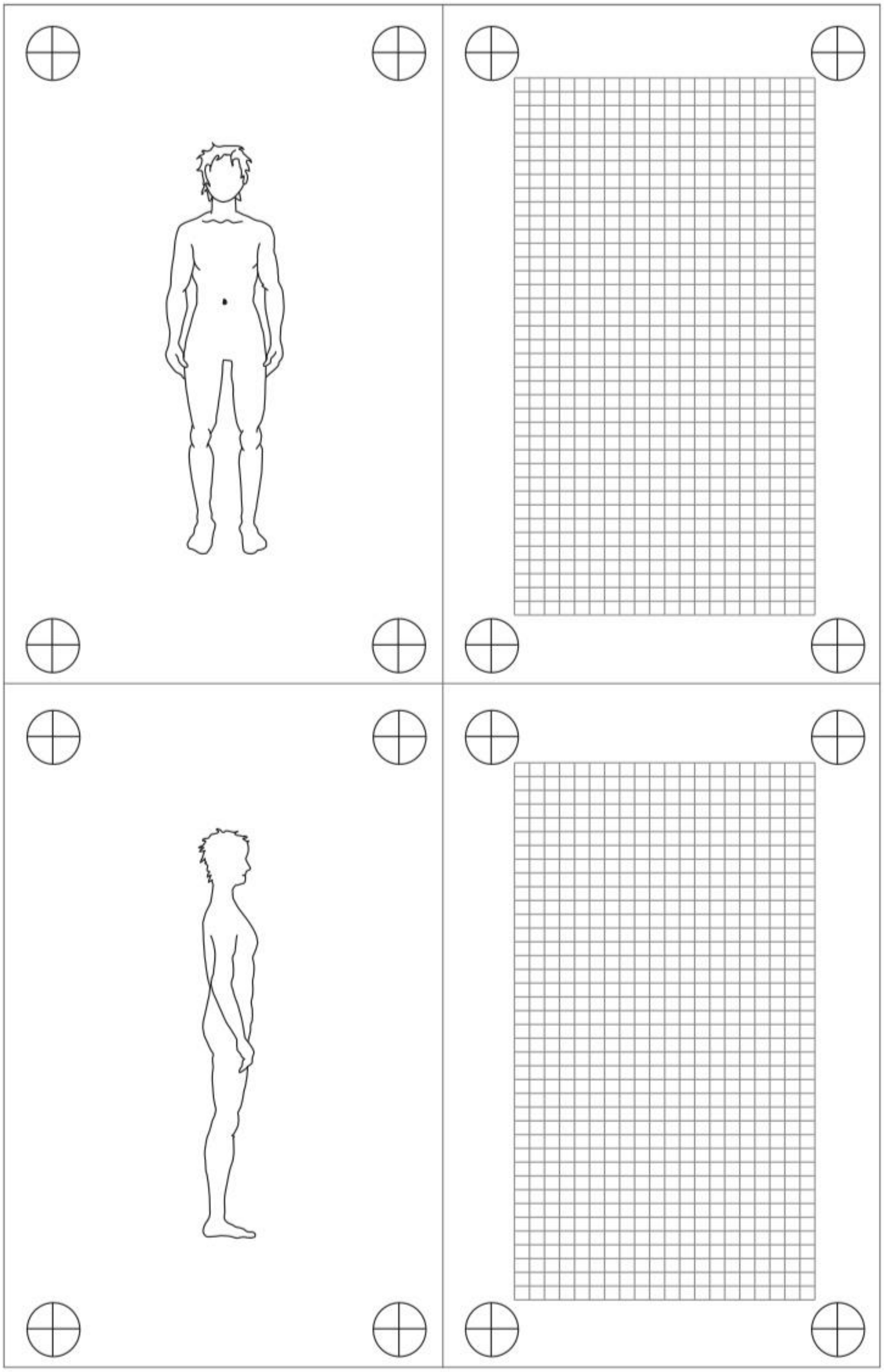
____28. It is important for me to maintain harmony within my group. (Sing28)

____29. I act the same way at home that I do at school (or work). (Sing29)

____30. I usually go along with what others want to do, even when I would rather do something different. (Sing30)

Note. Singelis (1994).

APPENDIX D: SOMATIC PHENOMENOLOGY BODY MAPS



Note. Hartelius (2021, Figure 8.1, p. 94).

APPENDIX E: WATTS CONNECTEDNESS SCALE

Using the sliding scale provided below, please answer the following questions relative to a moment when you have felt the most connected with others or a pet.

In that moment of connection, how did you feel?

Please rate your feelings on a sliding scale by dragging the slider to the corresponding position between 0 (not at all) to 100 (entirely):

Connectedness to self

1. My mind has felt connected to my heart/emotion.
2. I have felt connected to my senses (touch, taste, sight, smell, hearing).
3. I have felt connected to a range of emotions.
4. If l had chosen to, I could have “sat with” painful memories.
5. I have felt connected to my body.
6. I have been able to fully experience emotion, whether positive or negative.

Connectedness to others

7. I have felt trapped in my mind.
8. I have felt alone.
9. I have felt connected to friends and/or family.
10. I have felt connected to a community.
11. I have felt unwelcome amongst others.
12. I have felt separate from the world around me.

Connectedness to world

13. I have felt connected to all humanity.
14. I have felt connected to a purpose in life.

15. I have felt connected to nature.
16. I have felt connected to a spiritual essence (in the secular or religious sense).
17. I have felt connected to a source of universal love.
18. I have seen things from a broad perspective, “the bigger picture.”
19. I have felt that everything is interconnected.

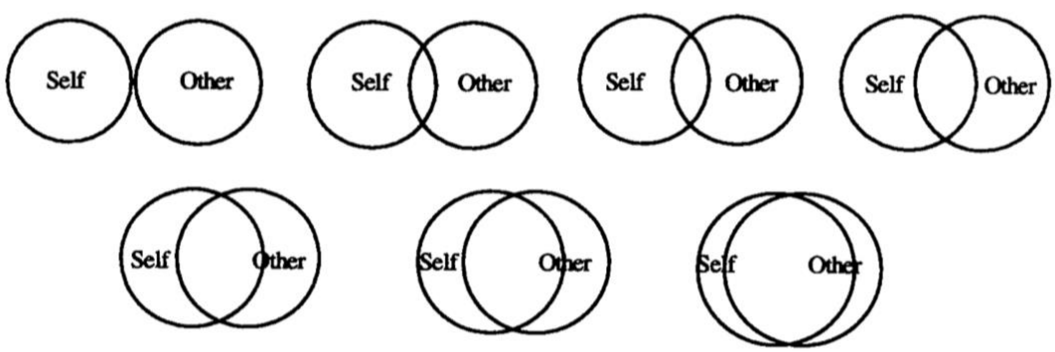
Note. Watts et al. (2022, Figure 1, p. 8).

APPENDIX F: THE INCLUSION OF OTHER IN THE SELF (IOS) SCALE

Please choose a pair of circles below that best describes your relationship with an **intimate partner**.

1 = no overlap
2 = little overlap
3 = some overlap
4 = equal overlap
5 = strong overlap
6 = very strong overlap
7 = most overlap

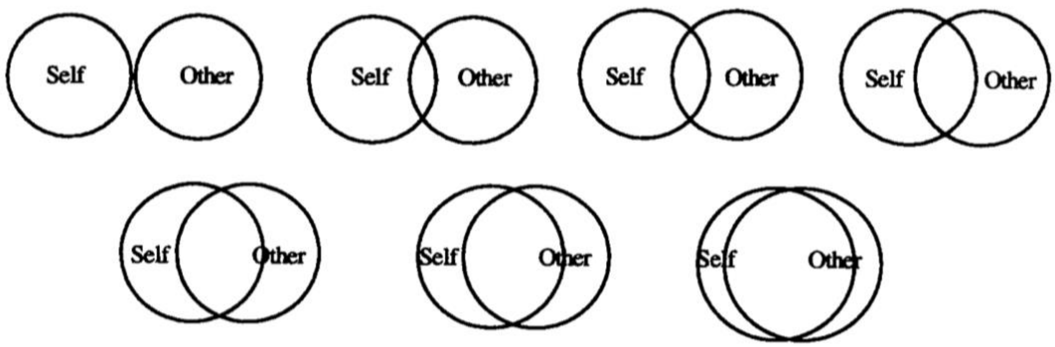
1 2 3 4



5 6 7

Please choose a pair of circles below that best describes your relationship with **close family**.

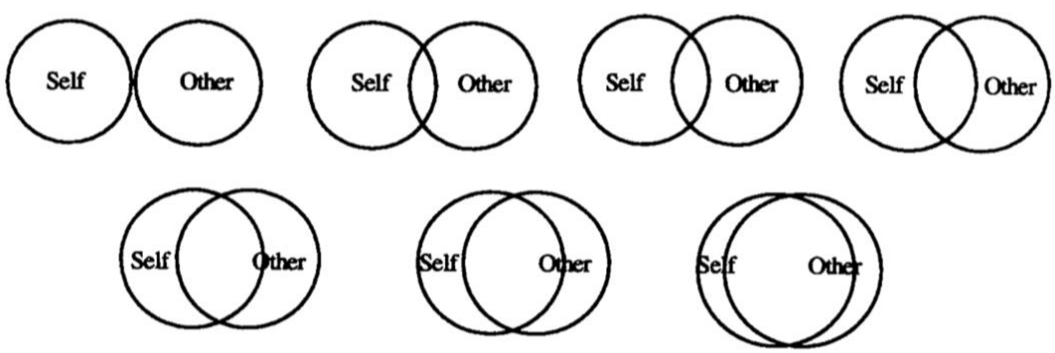
1 2 3 4



5 6 7

Please choose a pair of circles below that best describes your relationship with **friends.**

1 2 3 4



5 6 7

Note. Aron et al. (1992, Figure 1, p. 597).

APPENDIX G: QUALITIES OF CONNECTION MEASURE (QCM)

Using the 5-point Likert scale below, please rate the quality of your subjective experience of connection with others by answering the question:

When connecting with others, how much do you experience each of these qualities?

	Not at all	A little bit	Moderately	Very much	Completely
Respect	○	○	○	○	○
Appreciation	○	○	○	○	○
Warmth	○	○	○	○	○
Heartfelt	○	○	○	○	○

APPENDIX H: CALL FOR PARTICIPATION

Subject: Dissertation study on the "felt sense of connection"

You are invited to participate in a dissertation study conducted by a doctoral student in the Integral and Transpersonal Psychology PhD program at the California Institute of Integral Studies in San Francisco. The study examines what it means to engage with the world from a state of connectedness. By taking part in this study, you will contribute to the understanding of the transpersonal aspect of the nature of a strong feeling of connection with others. The survey takes place online and will take approximately 30 minutes. The researcher is looking for participants who are currently experiencing, or have previously experienced over the past year, a strong emotional connection with another person (or a pet). The survey will be confidential. Two hundred participants will be selected, of which 18 will be invited to a one-on-one online 60-minute interview with the researcher and compensated with $30.

If interested, please fill out the pre-survey at: www. [withheld for privacy] qualtrics.com

Please forward to friends or colleagues who might be interested.

Thank you!

APPENDIX I: DEMOGRAPHICS QUESTIONNAIRE

Please put an X next to your choice:

1. **Sex assigned at birth**

   ☐ Male ☐ Female ☐ Intersex ☐ Prefer not to say

2. **Age: ____________**

3. **Race:**

   ☐ Asian ☐ White or Caucasian

   ☐ Black or African American ☐ Latino or Hispanic

   ☐ Native American/First Nations ☐ Mixed race

   ☐ Pacific Islander ☐ Other *(please specify):*________

4. **Highest Education Level Completed:**

   ☐ High School Diploma/GED ☐ Bachelor's Degree

   ☐ Technical School Degree ☐ Master's Degree

   ☐ Associate Degree ☐ Doctoral Degree

   ☐ Other *(please specify):*______________

5. **Occupation: _____________**

6. **Income level:** ______ Higher ______ Middle ______ Lower

7. **Were you raised in a religious or spiritual tradition?**

   ☐ Christian ☐ Buddhist ☐ Spiritual, but not religious

   ☐ Jewish ☐ Hindu ☐ Atheist/Agnostic

   ☐ Muslim ☐ Taoist ☐ Other *(please specify):* ______

8. **Do you follow a particular religious or spiritual tradition now?**

☐ Christian ☐ Buddhist ☐ Spiritual, but not religious

☐ Jewish ☐ Hindu ☐ Atheist/Agnostic

☐ Muslim ☐ Taoist ☐ Other *(please specify):* ______

9. **How often do you feel a strong connection:**

☐ Every day ☐ 1/month

☐ 1-2/week ☐ less than 1/month

☐ 2-3/month ☐ Other *(please specify):*________________

10. **With whom or with what do you most often feel strongly connected:**

(choose all that apply)

☐ Family member ☐ Stranger ☐ Other *(please specify):* ______

☐ Lover ☐ Pet

☐ Friend ☐ Nature

APPENDIX J: INCLUSION/EXCLUSION CRITERIA

Inclusion criteria

Please answer YES or NO next to your choice

_____ Participant has, or recurrently had experienced a strong emotional connection with other people or a pet over the past year

_____ Is fluent in spoken and written conversational English

_____ Is age 25 to 65 years old

_____ Resides in the United States

_____ Is able to commit approximately 30 minutes to fill out questionnaires, and in some cases to answer additionally a 60-minute online interview compensated with $30

People of any sex, race, educational level, and religious or spiritual traditions are eligible.

Exclusion criteria

Please answer YES or NO next to your choice

_____ Have you ever been diagnosed with psychiatric and/or neurological serious disorders, such as psychosis

_____ Was the intense connection with others and situations experienced while under drugs, whether recreational or medical

Use of substances or drugs, whether recreational or medical, are prohibited during the tests.

APPENDIX K: SELF-LOCATION ASSESSMENT

Regardless of your knowledge of biology, please feel your body and choose one answer per question:

1. Which of the following do you consider a better characterization of how you function in the world:
    a. Rational and logical -1
    b. Emotional +1
2. Which of the following do you think would be a more accurate reflection of how others might characterize your interpersonal style:
    a. Interpersonally cold -1
    b. Interpersonally warm +1
3. Which factors are more important in moral decision-making processes:
    a. Emotional factors +1
    b. Rational considerations -1
4. Which of the following locations do you think of as the location of your "self"?
    a. Liver 0
    b. Brain -1
    c. Heart +1
    d. Intestines 0
5. Which of the following maxims do you consider to carry more importance in life:
    a. Follow your heart +1

b. Use your head -1

6. When you care about someone, where in your body do you think the caring comes from:

   a. Liver 0

   b. Heart +1

   c. Brain -1

   d. Somewhere else or don't know 0

7. When you feel authentic, or true to yourself, where in your body do you feel the authenticity:

   a. Liver 0

   b. Brain -1

   c. Heart +1

   d. Somewhere else or don't know 0

8. When you feel close to someone, where in your body do you feel the closeness?

   a. Liver 0

   b. Heart +1

   c. Brain -1

   d. Somewhere else or don't know 0

9. When you are making decisions, where in your body do you feel that a decision comes from?

   a. Heart +1

   b. Brain -1

c. Liver 0

d. Somewhere else or don't know 0

10. When you feel empathy for someone, where in your body do you feel the empathy?

    a. Brain -1

    b. Heart +1

    c. Liver 0

    d. Somewhere else or don't know 0

11. When you feel a strong conviction about something, where in your body is the conviction coming from?

    a. Brain -1

    b. Liver 0

    c. Heart +1

    d. Somewhere else or don't know 0

12. When you experience beauty, where in your body do you feel the recognition of beauty?

    a. Liver 0

    b. Heart +1

    c. Brain -1

    d. Somewhere else or don't know 0

13. When it comes to knowing, which part of the body do you trust the most?

    a. Brain -1

    b. Heart +1

c.	Liver	0
d.	Somewhere else or don't know	0

14. When you feel a strong connection with someone, where in your body do you sense the connection?

a.	Liver	0
b.	Brain	-1
c.	Heart	+1
d.	Somewhere else or don't know	0

APPENDIX L: EMAIL TO SELECTED PARTICIPANTS

Dear [Potential Participant]

I am pleased to inform you that you have been selected to participate in my dissertation research study on the nature of a strong feeling of connection with others. This study will investigate aspects of what it means to engage with the world from a state of connectedness. Your participation will contribute to further the understanding of the transpersonal aspect of the phenomenon and the ways that adopting such state of consciousness can impact humanity and its interactions with its environment.

Participation in this study will require a time commitment of approximately 30 minutes in the first phase, involving 200 participants, and followed by a second phase for 18 selected participants who will be invited to participate in a 60-minute interview with the researcher and compensated with $30.

Please find attached the Informed Consent Form, which will provide you with more information, the Participant Bill of Rights, and the Confidentiality Statement. Please fill out the Informed Consent Form and send it back to me by email at [information withheld for privacy]

I appreciate your diligence in completing and returning the signed form by ___________. As soon as I receive your signed Consent Form, I will send you the link to the assessments to be completed.

Thank you for your trust and interest.

Kind regards,

Marie Sester
Doctoral Student
California Institute of Integral Studies
[information withheld for privacy]

APPENDIX M: INFORMED CONSENT FORM

To: Research Participant

From: Marie Sester, Primary Researcher

Dear Participant,

I am a doctoral student in the Integral and Transpersonal Psychology PhD program at the California Institute of Integral Studies in San Francisco. I would like to invite you to participate in a dissertation study that I am conducting on the nature of a strong feeling of connection with others. The study examines what it means to engage with the world from a state of connectedness. By taking part in this study, you will contribute to the understanding of the transpersonal aspect of the phenomenon and the ways that adopting such state of consciousness can impact humanity and its interactions with its environment. Additionally, you may gain a deeper understanding of your relationship with others and of some of your reactions in lived experiences.

Participation in this study will require eligibility, and a time commitment of approximately 25 to 30 minutes. There are no right or wrong answers; rather the researcher is solely interested in your authentic sensations and feelings. The eligibility survey should take approximately 5 minutes, including reading this Informed Consent, some Inclusion/Exclusion questions, demographics, and a sorting questionnaire. Two hundred (200) eligible applicants will be invited to take the main survey (approximately 20 minutes), and they will receive a small monetary compensation from Qualtrics. Eighteen (18) main survey participants will then be selected and emailed an invitation to participate in a 60-minute individual zoom interview and will be compensated an additional $30 to thank you for your time. Those selected for an interview will also be given the Confidentiality Statement, the Participant Bill of Rights, and the Transcriber/Assistant Confidentiality Agreement.

Protecting your privacy is essential to this research. As with any online related activity, the risk of a breach of confidentiality is always possible. To the best of our ability this study will remain confidential. All responses and information during the process, from recruitment information to analysis feedback, are treated as confidential. Individual answers to survey questions are only reviewed by this researcher and her dissertation members. True identities are protected by the attribution of a pseudonym to ensure anonymity. The researcher will alter any information that may identify a participant in this study and will not use any identifying information in any public discussion or publication of the results from this study. The interviews are conducted as a video conference, through a secure password protected service. The website is only accessed from a private, password-protected computer; data are only transferred to a password-protected document. After confirming that all the data records are accurate the website data are irrecoverably deleted. All paperwork, including the copies of the signed Informed Consent Forms, the recordings, and other materials are kept in a personal safe on private property to which only the researcher has access. The transcriber and the researcher are the only individuals with access to the recordings. The interviewee's identity will be concealed from the transcriptionist.

The transcriber will be required to sign a confidentiality form. All hardcopy and electronic data for the study will be destroyed within three years of completion of this research project, unless the participant requested otherwise for the materials pertaining to them.

Participant Rights:

Your participation in this research study is completely voluntary. You may choose not to participate. If you decide to participate in this research survey, you have the right to refuse to answer particular question(s), as well as to discontinue participation at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized in any way. The risks involved are minimal. Since you will be answering questions about your life experience, it is possible they may stir up memories or uncomfortable feelings. If the interview becomes too much, we can pause for a rest or terminate moving forward.

Your participation in this project does not guarantee direct benefits, nor is there any financial compensation for participating in the survey, except for participants selected for the interview who are awarded $30. However, your participation will contribute to the advancement of the scientific understanding of the nature of connectedness, which can enhance humankind's wellbeing and saneness.

If you have any questions about this study or would like to obtain additional information, I can be contacted at any time throughout this study for questions or concerns:

Marie Sester, Doctoral Student [email withheld for privacy]

This research has been reviewed and approved by the Human Research and Review Committee (HRRC) at the California Institute of Integral Studies for research involving human participants. The researcher absolves the California Institute of Integral Studies of liability. If you have any concerns or are dissatisfied at any time with any part of the study, you may report your concerns (anonymously, if you wish) to the Coordinator of the Human Research Review Committee, California Institute of Integral Studies, 1453 Mission Street, San Francisco, CA 94103, by email to hrrcoffice@ciis.edu

Signing below indicates that:

• you have read and understood the above information

• you have received a copy of this Informed Consent, the Confidentiality Statement, and the Participant Bill of Rights

• you voluntarily agree to participate

• you are at least 25 years of age

The results will be published through ProQuest Dissertation Database in electronic form and will be accessible in hard copy through the CIIS library.

I attest that I have read and understand this consent form. Any questions I have about this research study and my participation have been answered to my satisfaction. I understand that my participation is entirely voluntary and that no pressure has been applied to encourage participation. My signature indicates my willingness to participate in this research study and to have the results published.

Participant Name______________________

Participant's Signature______________________

Date___________

If interested in a summary of the results, please provide email here:

____

APPENDIX N: CONFIDENTIALITY STATEMENT

Your privacy with respect to the information you disclose during participation in this study will be protected within the limits of the law. However, there are circumstances where a researcher is required by law to reveal information, usually for the protection of a patient, research participant, or others. A report to the police department or to the appropriate protective agency is required in the following cases:

1. if, in the judgment of the researcher, a patient or research participant becomes dangerous to himself or herself or others (or their property), and revealing the information is necessary to prevent the danger

2. if there is suspected child abuse, in other words if a child under 16 has been a victim of a crime or neglect

3. if there is suspected elder abuse, in other words if a woman or man age 60 or older has been victim of a crime or neglect.

APPENDIX O: PARTICIPANT BILL OF RIGHTS

You have the right to:

- be treated with dignity and respect
- be given a clear description of the purpose of the study and what is expected of you as a participant
- be told of any benefits or risks to you that can be expected from participating in the study
- know the researchers' training and experience
- ask any questions you may have about the study
- decide to participate or not without any pressure from the researcher or his or her assistants
- have your privacy protected within the limits of the law
- refuse to answer any research question, refuse to participate in any part of the study, or withdraw from the study at any time without any negative effects to you
- be given a description of the overall results of the study upon request
- discuss any concerns or file a complaint about the study (anonymously, if you wish) with the Human Research Review Committee, California Institute of Integral Studies, 1453 Mission Street, San Francisco, CA 94103, via email: hrrcoffice@ciis.edu

APPENDIX P: LETTER OF DENIAL

Dear Candidate,

I want to thank you for your interest in participating in my research project on the nature of a strong feeling of connection with others. Unfortunately, the quota of participants for the study has already been reached.

I am grateful for your time and interest.

Kind regards,

Marie Sester

Doctoral Student

California Institute of Integral Studies

APPENDIX Q: REVISED SELF-LOCATION ASSESSMENT

(Sample)

Regardless of your knowledge of biology, please feel your body and choose one answer per question:

1. Which of the following do you consider a better characterization of how you function in the world:
   a. Rational and logical -1
   b. Intuitive and feeling +1
2. Which of the following do you think would be a more accurate reflection of how others might characterize your interpersonal style:
   a. Interpersonally reserved -1
   b. Interpersonally warm +1
3. Which factors are more important in moral decision-making processes:
   a. Intuitive and feeling factors +1
   b. Rational considerations -1
4. Which of the following locations do you think of as the location of your "self"?
   a. Gut +1
   b. Brain -1
   c. Heart +1
   d. Somewhere else or don't know 0
5. Which of the following maxims do you consider to carry more importance in life:

a. Follow your heart +1

b. Use your head -1

6. When you care about someone, where in your body do you think the caring comes from:

    a. Gut +1

    b. Heart +1

    c. Brain -1

    d. Somewhere else or don't know 0

7. When you feel authentic, or true to yourself, where in your body do you feel the authenticity:

    a. Gut +1

    b. Brain -1

    c. Heart +1

    d. Somewhere else or don't know 0

8. When you feel close to someone, where in your body do you feel the closeness?

    a. Gut +1

    b. Heart +1

    c. Brain -1

    d. Somewhere else or don't know 0

9. Which aspect of you carries the strongest influence in making important decisions?

    a. Heart +1

b. Brain -1

c. Gut +1

d. Somewhere else or don't know 0

10. When you feel empathy for someone, where in your body do you feel the empathy?

    a. Brain -1

    b. Heart +1

    c. Gut +1

    d. Somewhere else or don't know 0

11. When you feel a strong conviction about something, where in your body is the conviction coming from?

    a. Brain -1

    b. Gut +1

    c. Heart +1

    d. Somewhere else or don't know 0

12. Which aspect of you carries the strongest influence in experiencing beauty?

    a. Gut +1

    b. Heart +1

    c. Brain -1

    d. Somewhere else or don't know 0

13. When it comes to knowing, which part of the body do you trust the most?

    a. Brain -1

    b. Heart +1

c. Gut +1

d. Somewhere else or don’t know 0

14. When you feel a strong connection with someone, where in your body do you sense the connection?

    a. Gut +1

    b. Brain -1

    c. Heart +1

    d. Somewhere else or don’t know 0

ProQuest Number: 30988319

INFORMATION TO ALL USERS
The quality and completeness of this reproduction is dependent on the quality and completeness of the copy made available to ProQuest.

Distributed by ProQuest LLC (2024).
Copyright of the Dissertation is held by the Author unless otherwise noted.

This work may be used in accordance with the terms of the Creative Commons license or other rights statement, as indicated in the copyright statement or in the metadata associated with this work. Unless otherwise specified in the copyright statement or the metadata, all rights are reserved by the copyright holder.

This work is protected against unauthorized copying under Title 17, United States Code and other applicable copyright laws.

Microform Edition where available © ProQuest LLC. No reproduction or digitization of the Microform Edition is authorized without permission of ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346 USA