

The Language of Entrepreneurship: Energetic Information Processing in Entrepreneurial Decision and Action

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ABSTRACT

Building upon the quantum-holographic theory of nonlocal communication presented at last year's AGSE conference (Bradley, 2006), this paper extends the theory to include both nonlocal communication (intuition) and nonlocal agency—the subtle but significant (scientifically measurable) effect that intentionally focused bio-emotional energy can have on nonlocal objects and events. I draw on quantum holography and research on the psychophysiology of nonlocal interaction—mind/matter and mind/living systems interaction—to show how entrepreneurs not only use their passionate attention to intuitively locate a future business opportunity but can also actively shape its actualization into reality by their sustained passionate intentions. It is their greater attunement to an order of energetic information beyond space/time that taps them into the rationality of implicit potentials and sets them apart from other business actors. In short, energetic information is the language of creativity and entrepreneurship: it is the means by which future opportunities can be intuitively located and intentionally actualized into being.

INTRODUCTION

In a previous work (Bradley, 2006) I developed a theory to explain entrepreneurial intuition—accurate foreknowledge of a future event that informs entrepreneurial decision and action that is *not* based on reason or logic, or on memories or extrapolations from the past. The theory views intuition as a process of nonlocal communication by which energetically encoded information, normally outside of the range of conscious awareness, is immediately sensed and perceived by the body's psychophysiological systems (McCraty, Atkinson, & Bradley, 2004a; 2004b). The theory explains how information about a future event is spectrally enfolded in the radiation of energy as an implicit field of information which exists as a domain apart from space and time. Passionate attentional bio-emotional energy directed to the object of interest (such as a potential future business opportunity) attunes the psychophysiological systems—via energetic resonance—to the quantum level of the object, which contains holographically-encoded information on the object's future potential. The body's perception of such implicit information about the object's future is experienced as intuition.

But successful entrepreneurs bring more than a passionate attentional focus to their quest for a new opportunity; they also direct intense, passionate *intention* to the object of interest as well (Roberts & King, 1996). A large body of experimental evidence has documented the human ability to directly interact with nonlocal objects and events and actually effect their future organization and behaviour. It is postulated that the same processes of energetic resonance described in the quantum-holographic theory of intuition (Bradley, 2006) are also the means by which passionate intentional bio-emotional energy radiating from an individual can affect the object of interest's actualization from potential into reality as an entity in the space-time world.

By way of overview, the energetic resonance between the entrepreneur's psychophysiological systems and the nonlocal object of interest establishes a two-way quantum-holographic communication channel between the percipient and the object. The incoming wave field of energy radiating from the object to the percipient contains quantum-level information about the object's future which is experienced as intuition. The outgoing wave field of bio-emotional energy from the entrepreneur contains a quantum-hologram encoding the entrepreneur's mental intention as energetic information which is communicated back to the nonlocal

object. Part of the energy wave field containing the quantum-hologram is absorbed by the object and the information it contains *in-forms*—gives shape to—the object’s future organization and behavior. These processes of energetic resonance are greatly amplified in groups and organizations with a coherent socio-emotional order. This strengthens the effects of nonlocal interaction which, in turn, enhances the entrepreneur’s likelihood of locating and actualizing a future economic opportunity. Thus, attunement to energetic information and the access it provides to the implicit order of future potential is what sets the entrepreneur apart from the ordinary business person. In short, energetic information is the language of creativity and entrepreneurship: it provides access to the “zone” from which the future can be intentionally envisioned and actualized into being (Tomasino, 2007).

What follows is organized into two main sections. I begin with an overview of the voluminous body of psychophysiological evidence documenting, beyond scientific doubt, the human ability for nonlocal communication and nonlocal agency. I then move to the primary task of theory construction—to explain how creative individuals process and perceive energetically-encoded information not only to locate future opportunities and but also to intentionally effect the actualization of these opportunities into economic reality. The paper concludes by showing how the theory provides an understanding of the psychophysiological and quantum-holographic processes by which implicit information informs entrepreneurial intuition and purposeful action.

SCIENTIFIC EVIDENCE

While intuition has long been recognized as a key component entrepreneurship (e.g., Agor, 1984; Myers, 2002), and has been investigated with conventional social science instruments (e.g., Allison & Hayes, 1966; Lieberman, 2000), to my knowledge, there is only one study—currently being conducted—that has specifically investigated the psychophysiological basis of entrepreneurial intuition (Gillin et al., 2006; Gillin et al., 2007). Fortunately, however, there is a large body of experimental evidence systematically documenting what appears to be a general human ability for nonlocal interaction. In reviewing this work I have divided it into research on nonlocal communication (telepathy, remote viewing, and intuition) and studies on nonlocal agency (mind/matter and mind/living systems interaction).

Nonlocal Communication

Despite the voluminous body of rigorous experimental research documenting nonlocal communication as a scientific fact (see Radin’s informative review, 1997a), the majority of mainstream scientists still regard the findings of these studies as anomalous (see Walach & Schmidt, 2005).

Prior Research

In the 1930s Joseph Rhine (1964; 1981) conducted pioneering studies on telepathic *person-to-person* information communication using a “forced choice” card test with a deck of 25 cards in sets of five geometric symbols. In 27 of 33 laboratory experiments, involving almost one million trials, he found statistically significant results in which a “receiver” correctly identified the symbol mentally transmitted by a “sender,” in a different room, from a randomly selected card. Replication studies at other laboratories yielded a 61% statistically significant success rate, compared to 5% expected by chance. In the 1960s, Charles Tart (1963) added physiological measures to record the receiver’s bodily response when a stimulus was administered to the body of a “sender,” who was located in a separate room. He found that the receiver’s brain waves and peripheral blood volume changed significantly when the stimulus was applied near to or on the sender’s body. A meta-analysis (Schlitz & Braude, 1997) of 19 laboratory studies conducted in the 1980s and 1990s, involving “healers” sending their thoughts on a randomized schedule to receivers, found statistically significant changes in the receivers’ bodies using Galvanic Skin Response (GSR) measures when the senders’ thoughts were focused on them. Another 40 studies, conducted during this time, employed a Ganzfeld procedure (to isolate the receivers from normal visual and auditory stimuli) and Faraday cages and steel wall screening (to block electromagnetic radiation), and found that the receivers’ overall accuracy rate in correctly identifying which of four images had been sent by a sender, exceeded the rate expected by chance by a factor of 10^{15} to 1 (Radin, 1997a: 87-88).

Rhine (1964; 1981) was also a pioneer in research on *place-to-person* information communication, in which a receiver is to identify a randomly selected distant target, also unknown to the experimenter. In the

1930s he conducted 34 studies involving 792,000 trials, and found success rates above those expected by chance. Using the remote viewing protocol they developed in the 1970s (Puthoff & Targ, 1976), scientists at the Stanford Research Institute collaborated with the CIA to conduct a series of follow-up studies in the 1980s and 1990s (May et al., 1988; Puthoff, 1996; Targ, 1994). Involving more than 1,000 trials, the accuracy rates of the receivers' descriptions of the remote targets (scored by an independent panel of judges) exceeded chance by a factor of 10^{20} to 1.

Turning to the work on *future-to-person* information communication, Honorton and Ferrari (1989) conducted a meta-analysis of the 309 studies (published in English) conducted on precognition between 1935 and 1989. All of the studies were laboratory controlled experiments in which subjects had to predict a target that would be selected in the future by a randomized procedure. Conducted by 62 different researchers and involving more than 50,000 subjects in nearly two million trials, the accuracy rate of correct predictions exceeded chance by 10^{25} to 1.

Before moving on, I want emphasize the scientific significance of this voluminous body of evidence. As Radin (1997a) reports, from meta-analyses of the results of the experiments on each of the three kinds of nonlocal communication briefly reviewed here, *the likelihood that an intuitive effect is true exceeds the certainty of measurement in experiments verifying quantum mechanics—the most accurate scientific description of reality* (see Penrose, 1989, or Nadeau & Kafatos, 1999).

Recent Studies

The first studies showing evidence of changes in brain activity that preceded an unknown stimulus were conducted by Levin and Kennedy (1975). Warren et al. later found significant differences in event-related potentials (ERP)¹ between target and non-target stimuli presented during forced-choice precognition tasks (Warren et al., 1992a; Warren et al., 1992b). In a series of gambling studies, Don et al. extended these findings by showing that enhanced negativity in the ERP's was widely distributed across the scalp in response to future targets (Don et al., 1998; McDonough et al., 2002). Because the research subject's overt guessing accuracy was no better than chance, these researchers concluded that the ERP effect was an indicator of "unconscious precognition."

Other studies broadened the focus beyond the brain and investigated whether the human autonomic nervous system (ANS) could unconsciously respond to randomly selected future emotional stimuli. With electrophysiological measures of skin conductance level (SCL) and of heart rate and blood volume, Radin (1997a, 1997b, 2004) used randomly selected emotionally arousing or calming photographs to evoke an emotional response, and found a significantly greater change in electrodermal activity around 5 seconds before a future emotional picture than before a future calm picture. These results have since been replicated (e.g., Bierman, 2000; Bem, 2003; Radin, 2004), and a follow-up study, using functional magnetic resonance imaging, found brain activation in regions near the amygdala (which handles the processing of strong emotions such as fear and rage) *before* emotional pictures were shown, but not before the calm pictures (Bierman & Scholte, 2002). Finally, a recent study, conducted by McCraty, Atkinson, and Bradley (2004a & 2004b), augmented Radin's protocol by adding measures of brain response (EEG) and heart rhythm activity (ECG), and found that not only did both the brain and heart receive the pre-stimulus information some 4-5seconds before a future emotional picture was randomly selected by the computer, but that the heart appeared to receive this information even before the brain. The consistent finding from these studies is that the *body typically responds to a future emotionally arousing stimulus four to seven seconds prior to experiencing the stimulus.*

Entrepreneurial Intuition

Murray Gillin and his associates have recently found evidence suggesting that measures of ANS activity are predictive of entrepreneurial intuitive ability (Gillin et al., 2007). Their evidence comes from the preliminary results of a pilot study which incorporates electrophysiological instrumentation within a multi-methods approach to investigate intuition in a sample of 8 serial entrepreneurs from the Cambridge

1. Event-related potentials are voltage fluctuations that are associated in time with some physical, mental, or emotional occurrence. These potentials can be recorded from the scalp and extracted from the ongoing electroencephalogram (EEG) by means of filtering and signal averaging.

Technopol. Figure 1 shows evidence of separation between wins and losses in the mean heart rate pattern for the Roulette Experiment that begins at about 6 seconds prior to the outcome result being displayed, and shows evidence of clear separation in the mean skin conductance pattern in the Roulette Experiment and also some separation in the Business Case Experiment prior to the event occurring—especially around 6 to 7 seconds before the outcome result is displayed. Gillin et al. conclude that “there is clear evidence that informational input was received by the ANS some 6 to 7 seconds before the outcome of the investment choice was known, and also that the physiological measures were able to detect intuitive perception of a future outcome in four of the eight entrepreneurs” (Gillin et al., 2007: 13).

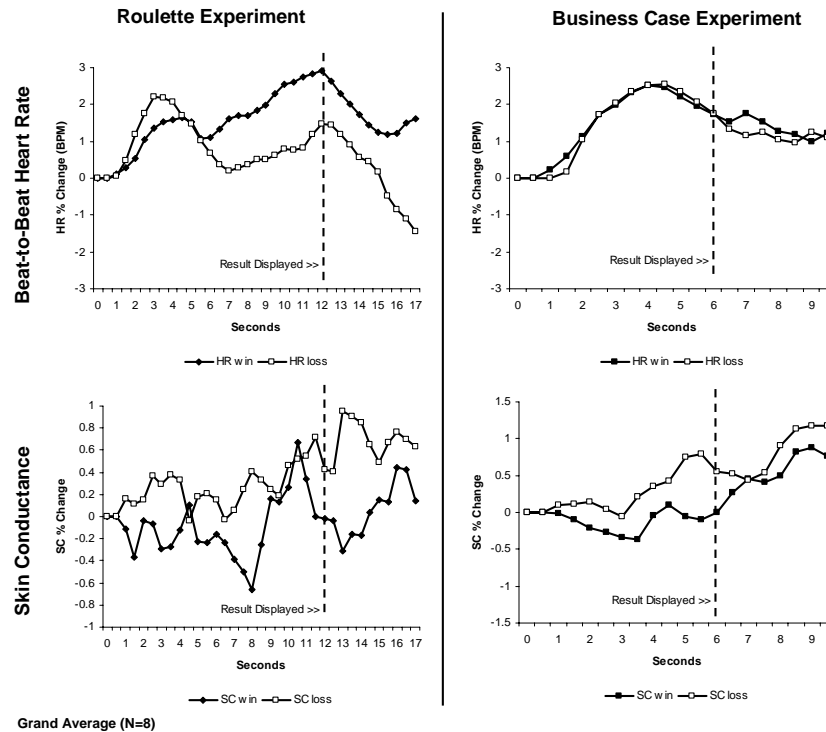


Figure 1. Grand Average of the Physiological Recordings During the Post-Investment Period for the Roulette and Business Case Experiments.

Collective Intuition

In presenting one further piece of evidence of nonlocal communication—only this time at the collective level—we transition from internal responses to nonlocal interaction obtained from recording electrophysiological activity *within* the body, to external measures of the affect of bio-emotional arousal on physical devices placed *outside* and far away from the body.

The evidence comes from the internet-based Global Consciousness Project (GCP) which has been collecting the output continuously generated by Random Number Generators (RNGs)² in more than 40 sites throughout the world to determine if there is a correlation between global events of mass consciousness and periods of non-random order generated by the RNGs. Independent analyses of the RNG output in the hours *before* the terrorist attacks took place in the United States on the morning of September 11, 2001, suggest, as shown in Figure 2, that there was *implicit global foreknowledge of the impending terrorist attacks some three to four hours before the first plane crashed into the North Tower of the World Trade Center at 8:45*

2. The RNGs are hardware circuits that use inherent electronic noise to generate truly random bits. Each RNG is attached to a personal computer which collects 200 random bits per second and transmits packets of data over the Internet to a central server in Princeton, New Jersey, USA, for data archiving. By May, 2002, the GCP network comprised approximately 50 RNGs located throughout North and South America, Europe, Asia, Africa, and Australia (Radin, 2002). See Nelson (2002) and Radin (2002) for further information.

a.m. (Nelson, 2002; Radin, 2002).³ This anomalous pattern of RNG output could *not* be explained by artifacts such as electrical disturbances or high levels of mobile phone use.

As postulated below, the energetic resonance of the bio-emotional energy generated by the body in processing precognitive energetic information about an impending future event is amplified in social aggregations which share an interest (explicit or implicit) in the common event.

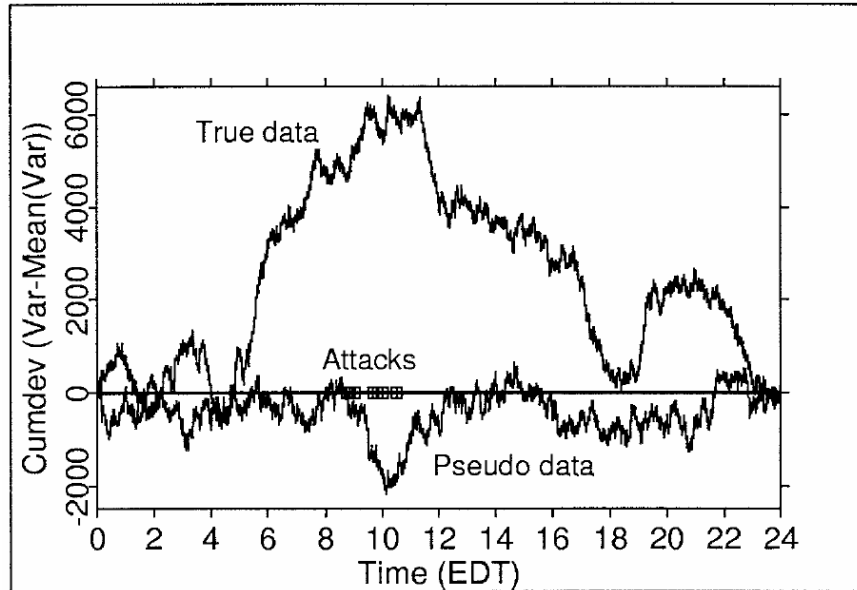


Figure 2. Cumulative deviation of variance across eggs (RNGS) for each second on September 11, 2001. Times of the separate events in the terrorist attacks are marked with rectangles on the zero line. The curve labeled “Pseudo Data” shows a control calculation using a pseudo-random clone data set for each day (From Nelson, 2002, Figure 3).

The important conclusion from this large body of research, for our purpose here, is that intuitive perception of a future event is related to the degree of emotional significance of that event. Also, that the response to and processing of pre-stimulus information about a future event is not confined to the brain alone. Instead, the evidence suggests that the heart and brain and possibly other organs in the body are all involved together in responding to information from nonlocal sources.

Nonlocal Agency⁴

The question of nonlocal agency rests on the scientific evidence for mind-matter interaction—the degree to which an individual’s mental intention can cause a measurable affect on the behaviour of a physical object/system or a living organism/system. In the brief summary that follows, I use Radin’s (1997a) division of this research into two categories: studies on mind-matter effects, and studies on mind-living system effects.

Mind-Matter Effects

This question of the effect of the mind on the physical universe is a postulate of quantum theory, wherein the observer’s choice to conduct an experiment in a certain way determines what is actually observed—that the observer’s act of measuring the state of the quantum system causes the wave function of uncertainty (all possible states of the quantum system) to collapse to the certainty of the observed outcome. Of the three studies Radin found in mainstream physics investigating this question, one produced results exactly at chance and two produced positive results beyond chance.

3. Scargle (2002) and May & Spootiswoode (2001) offer a different interpretation of the September 11 data.

4. This section draws on Radin’s comprehensive review (1997a: 128-156).

Radin found hundreds of “conceptually identical” dice tossing experiments and RNG experiments conducted by *psi* researchers designed to test the proposition that the outcomes produced by these physical systems could be influenced by mental intention. The results of a meta-analysis he conducted with Ferrari (Radin & Ferrari, 1991) of 148 dice tossing experiments conducted from 1935 to 1987, involving 2,569 research subjects, produced a small but statistically significant, positive result—an overall success rate of 51.20%, with the odds against the involvement of chance calculated to be $>1^9$ to 1. Radin teamed up with Nelson and conducted a comprehensive meta-analysis of the 832 RNG experiments on the effect of mental intention on RNG output, conducted by 68 researchers from 1959 to 1987. They found that the overall experimental effect was just under 51%, with odds against chance of $>1^{12}$ to 1 (Nelson & Radin, 1987, 1990; Radin & Nelson, 1989).

The largest number of RNG experiments was conducted at the Princeton University PEAR Lab (Nelson et al., 1984, 1991), which, by 1996 had conducted 1,262 studies, involving 108 research subjects. Across the entire PEAR database, these studies had an overall experimental effect also just under 51% with a combined odds against chance of 4^3 to 1. Nelson et al. found that there were no “star” performers—no psychic “superstars”—which suggests that such mind-matter interaction ability is distributed throughout the general population. Importantly, they also found that the experimental effects were not related to the distance between the research participant and the RNG, and it was not related to the timing of the subject’s mental intention. Such space- and time-independence—evidence of nonlocality—has been reported by other researchers conducting RNG experiments (e.g., Schmidt et al., 1986).

Additional evidence comes from the Global Consciousness Project, mentioned above, which has been examining the output from RNGs placed throughout the world to test the hypothesis of a direct relationship between global events of mass interest (e.g., the 1996 Olympic Games Opening Ceremony) and the generation of non-random RNG output. This hypothesis appears to be strongly confirmed by the results of an analysis of 104 global events, investigated as of May, 2002, which had a combined overall significance of $p < 3 \times 10^{-7}$ (Radin, 2002).

Radin sums up the results of the mind-matter studies in this way:

After sixty years of experiments using tossed dice and the modern progeny, electronic RNGs, researchers have produced persuasive, consistent, replicated evidence that mental intention is associated with the behaviour of these physical systems. We know that the experimental results are not due to chance, selective reporting, poor experimental design, only a few individuals, or only a few experimenters. ... today virtually no serious criticisms remain for the best RNG experiments. Informed sceptics agree that *something* interesting is going on (Radin, 1997a: 144-145; emphasis in the original).

But there is some compelling evidence that *more* than mental intention is involved. In a videotaped study of therapy sessions his Reichian bio-psychiatric practice, Blasband (2000) found a significant correlation between the direction of the shift in the output of an RNG unit he placed in his office and the valence of emotion spontaneously expressed by his patients.

Mind-Living System Effects

Radin reports locating at least 130 publications involving controlled experiments on the effects of mental intention on living systems (including enzymes, cells, DNA, bacteria, plants, animals and humans). Of the 131 studies reported, Radin found that 56 studies had positive results with an overall odds against chance success rate of $>1^{12}$ to 1.

Most studies have been on the effects of nonlocal mental interactions on humans, and most of these were conducted by William Braud and his colleagues in experiments on subjects trying to mentally influence the autonomic nervous system (ANS) of remote percipients, as measured by blood pressure and muscle tremor (Braud, 1981; Braud & Schlitz, 1989, 1991). Thirty-seven experiments involving 655 sessions were conducted, with 153 individuals acting as senders and 499 humans or animals acting as receivers. While a 5% success rate would be expected by chance, 57% of the experiments produced independent significant effects with a combined odds against chance of 1^{14} to 1. In a subset of studies, Braud and Schlitz (1991) measured the receiver’s electrodermal activity to record unconscious fluctuations in emotion, while a

sender at a remote location was instructed on a random schedule to try to arouse or calm the receiver purely by thinking about that person. Over the 400 sessions, the average effect size was ~53%,⁵ with a combined odds against chance of $>1^6$ to 1.

Another set of experiments test a receiver's awareness of being watched by sender in a remote location. Such "staring studies" have been conducted for more than eighty years. Today, these experiments involve monitoring the receiver's ANS activity while the sender stares at the receiver on random schedule from a remote location over a one-way closed-circuit video system. Radin (1997) conducted a meta-analysis of experiments conducted from 1913-1996, and found an overall effect of 63%, with odds against chance of $>3^6$ to 1.

There is little scientific doubt that focused mental attention from a remote location has a subtle but measurable unconscious affect on an individual's ANS.

A QUANTUM-HOLOGRAPHIC THEORY OF NONLOCAL INTERACTION

Nonlocal communication and nonlocal agency belong to a class of consciousness phenomena that has eluded the light of scientific understanding and have long remained an enigma. Included in this class are intriguing yet perplexing phenomena such as ESP, clairvoyance, remote viewing, intuition, mind/matter mind/living systems effects and other forms of nonlocal interaction often collectively referred to as *psi*. While there is no scientific doubt about the existence of these phenomena, explaining *how*—the mechanisms and processes by which—such space/time-defying interaction occurs has not been possible until relatively recently.

Three scientific developments have opened the door to rational explanation. The first is the discovery of the hologram—specifically, the principle of distributed organization by which information about an object is spectrally encoded throughout a field of potential energy by the radiating oscillations of energy waveforms (Gabor, 1948). The second is the empirical discovery of quantum entanglement or nonlocality—that everything in the universe at the subatomic level is interconnected and nonseparable (Aspect et al., 1982; Tittel et al., 1998). The third is the discovery of quantum coherence—that subatomic emissions from macro-scale objects are not random but exhibit coherence at the quantum level, reflective of an object's material organization and event history (Schempp, 1992). Coupling these developments in physics with the psychophysiological evidence reviewed above on the involvement of mental attention/intention and positive emotions in nonlocal interaction provides the key to the door of scientific understanding. This makes possible an explanation that is rational: an account that does not rest on unverifiable metaphysical processes or invoke divine or supernatural intervention; an account that is grounded in known sensory systems in the body and psychophysiological processes of information communication—one that does not require postulation of a yet-to-be-discovered sixth sense; and an account that is amenable to scientific verification.

In constructing the outlines of a general theory of nonlocal interaction, I will be aided by the principles of quantum holography (Pribram, 1991). Quantum holography is based on Gabor's (1946) energy-based concept of information, the *logon*, and it provides the foundation for a non-determinist kind of holographic organization (Bradley & Pribram, 1998; Bradley, 2002). Gabor's concept of information—the encoding of information in energy oscillations at *any* frequency—is a general concept that applies to energetic information communication at *both* the 4-dimensional macro-scale world and the micro-scale of quantum reality. Logons are not discrete units of information but overlap with each other and occur as a modularized series of space-time-constrained sinusoids in which the data in each module are spectrally enfolded, to some degree, into the data of adjoining logons. This overlap among logons has a significant implication for information communication from the future, in that each logon, in Gabor's words, contains an "*overlap [with] the future*" (Gabor, 1946: 437; my addition and emphasis). This means, in effect, that each unit of information, by virtue of its spectral enfoldment with adjoining units, contains information about the future order energetically encoded in the unit that succeeds it (Bradley, 1998; Bradley & Pribram, 1998).

5. The "average effect size" for these electrodermal studies is about 0.25 (effect sizes range from +1, absolute success in the predicted direction, to -1, absolute success in the opposite direction).

The theory is developed in two parts. I begin with an explanation for nonlocal communication by focusing on the energetic resonance between the wave field of attentional bio-emotional energy from the percipient and the wave field of energy oscillations emitted from a nonlocal object. I then extend the account to include nonlocal agency by focusing on the radiation of quantum-holographically encoded intention in the wave field bio-emotional energy from the percipient to the object.

Nonlocal Communication⁶

From the micro-scale of the quantum domain to the macro-scale of the 4-dimensional world, all objects and entities in the universe are energized in a constant state of oscillation at different energy frequencies. The energetic oscillations from all objects generate energy wave fields that radiate outward and interact. As a wave field of *any* kind interacts with a physical object, a part of the wave is reflected directly from the object's surface and part of the wave's energy is absorbed, causing the object to become energized and emit another wave outward back towards the source of the initial wave. The interaction among these wave fields generates an interference pattern which, at the moment of conjunction of the object and reference waves—the instant the interference pattern is created—both waves *are spatially and temporally coherent*. As a holograph, the interference pattern spectrally encodes phase-dependent information about the object's internal and external organization and also encodes its event history (Schempp, 1992; Mitchel, 2000). However, as noted above, in order to decode the spectrally encoded information, a reference wave is required, and Marcer (1998) has established “that *any* waves reverberating through the universe remain coherent with the waves at the source, and are thus sufficient to serve as the reference to decode the holographic information of *any* quantum hologram emanating from remote locations” (Mitchell, 2000: 302; my emphasis).

At the quantum level, the area of intersection in the interference pattern is a quantum hologram containing quantum level information reflecting this macro-scale process. Because the area of intersection involves an interaction between wave fronts, in which the radiation of energy in one wave front is modularized by the constraint of the wave front of radiating energy in the other, it is equivalent to Gabor's quantum or unit of energetic information, the logon (~ ½ cycle; Pribram, 1991). This means that the quantum hologram is essentially a logon, or a Gaussian-constrained hologram, in Pribram's (1991) terms. And since each logon contains nonlocal information about the future, then each quantum hologram also contains quantum level information about the future organization of the macro-scale object with which it is associated.

Marcer (1998) has shown that the act of perception requires both an incoming wave field of sensory information about the object *and* an outgoing wave field of attentional energy, and that a relationship of “*phase-conjugate-adaptive-resonance*” must exist between the two wave fields in order to perceive an object in the macro-scale 4-dimensional world. Phase-conjugate-adaptive-resonance is a process in which the incoming and outgoing wave fields are phase-conjoined by the percipient's act of attention, in that s/he tunes into and maintains “vibratory resonance” with the object's energetic oscillations at the quantum level—that “the perceived object and the percipient's perceptual system as locked in a resonant feedback loop.”⁷ Mitchell (2000: 302) makes the important point that nonlocal quantum information can still be processed by the brain “even in the absence” of space-time (electromagnetic) signals to establish the phase-conjugate-adaptive-resonance condition. All that is required is an “icon,” a symbol representing the object, which “seems sufficient” for the brain to pay attention to the object and to thus establish phase-conjugate-adaptive-resonance with the quantum level of the object.

It can be shown (see Figure 3a), that when two interpenetrating wave fields are radiating synchronized oscillations at the same energy frequency, the conjunction of individual waves creates a spatially and temporally coherent channel of interaction connecting the object source points of the two wave fields (Bradley, McCraty, & Rees, 2004). This channel is essentially a logon pathway for optimal information

6. Some parts of this section draw heavily on my previous paper (Bradley, 2006).

7. “Marcer (1997) has proposed that ... resonance requires a virtual path mathematically equal but opposite to the incoming sensory information about the object. Further, that it is the incoming space/time information (visual, acoustic, etc.), which decodes the information of the quantum hologram and establishes the condition of *pcar* [phase-conjugate-adaptive-resonance] so that accurate three dimensional perception is possible” (Mitchell, 2000: 297).

communication, and it is also generated in systems involving multiple objects with synchronized oscillations at the same energy frequency (see Bradley, 2006, Figure 8). But this does not hold for interaction between wave fields radiating energy oscillations at varying frequencies (see Figure 3b); in such cases effective communication is impeded by spatial and/or temporal incoherence in the pattern of interpenetration between the wave fields.

Figure 3a.

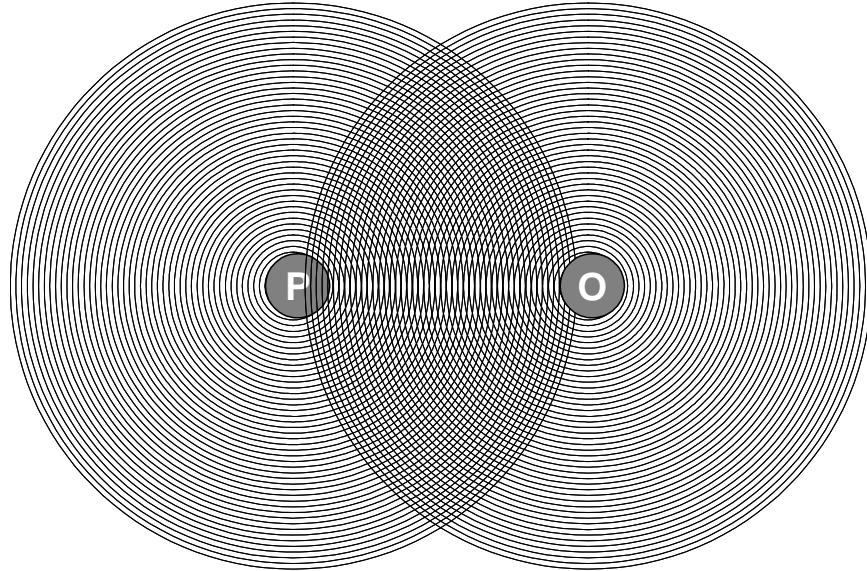
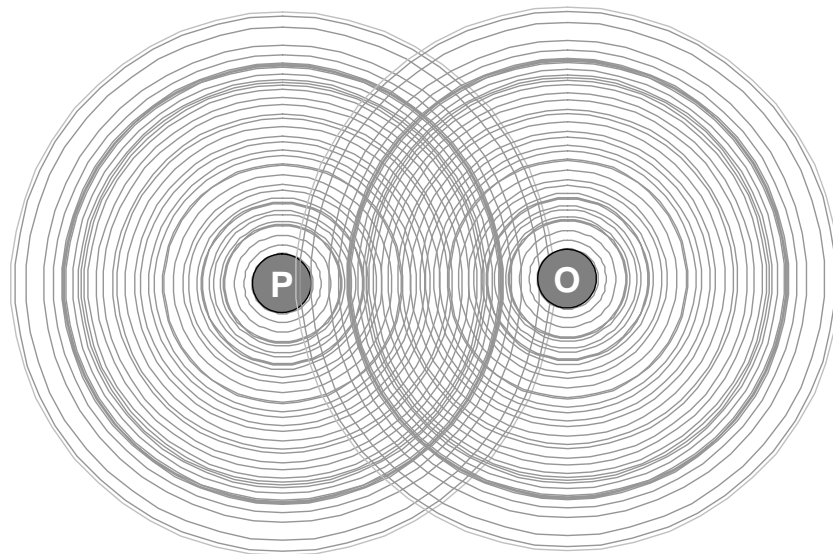


Figure 3. Figure 3a shows how a channel of coherent interaction is created between a percipient (P) and an object (O) when their two interpenetrating wave fields are radiating synchronized oscillations at the same energy frequency. This also holds for systems involving a percipient and multiple objects in that coherent channels of interaction are created both between the percipient and each object and also among the objects themselves. However, this does not hold for interaction between wave fields radiating energy oscillations at different frequencies, as shown in Figure 3b; effective communication is blocked by an incoherent pattern of interpenetration between the two wave fields (from Bradley, 2006; adapted from Bradley, McCraty, & Rees, 2004; © Institute of HeartMath and Institute for Whole Social Science, all rights reserved).

Figure 3b.



However, when wave fields at different energy frequencies oscillate in *harmonic resonance* (see Bradley, 2006: Figure 8), a coherent channel of communication emerges from the radiation of synchronized oscillations across the wave fields. Thus when the set of wave fields constitute a harmonic series—two waves, four waves, eight waves, and so forth, per cycle, with synchronized wave peaks and troughs across the series—oscillatory resonance creates a coherent channel of communication across the different frequencies of individual wave fields. This provides for a logon pathway of optimal nonlocal information communication across different scales of organization: from the quantum level micro-scale domain, to the 4-dimensional macro-scale world, and vice a versa. Since the overlap among logons means information about future order is spectrally enfolded, this creates an information processing mechanism by which foreknowledge of the future is contained in the logon or nonlocal quantum hologram at hand.

When the dynamics of these interactions are considered, information communication at hyper-speeds emerges as a third wave field, radiating in all directions, from the point source of the interaction of wave fronts in the two wave fields, as described elsewhere (Bradley, 2006). This third wave field encodes the quantum holograms created by the interaction of the two original wave fields, and, as such, is a likely mechanism for nonlocal information communication at hyper-speeds. Moreover, when wave fields from different scales of organization are in harmonic interaction, an emergent oscillatory resonance is generated for nonlocal information communication within and between macro and micro-scales of organization at hyper-speeds.

As already noted, the act of conscious perception requires both an incoming wave field of sensory information about the object *and* an outgoing wave field of attentional energy. Based on recent research, it is clear that more than the brain is involved in the act of attention.⁸ The body's psychophysiological systems generate numerous fields of energy, at various frequencies, that radiate outwards from the body as wave fields in all directions. Of these, the heart generates the most powerful, rhythmic electromagnetic field. Not only does a massive deceleration in the heart's pattern of rhythmic activity occur at the moment of mental attention, which would generate a great change recorded in the outgoing wave field, but it is also clear from recent research that nonlocal perception is related to the percipient's degree of emotional arousal generated by an object. It is the individual's *passion* or "rapt attention," as Radin (1997a) calls it—the biological energy activated in the individual's emotional connection to the object of interest—that generates the outgoing attentional wave directed to the object. And since it is well established that the heart's energetic pattern of activity reflects feelings and emotional experience (Tiller, McCraty, & Atkinson, 1996; McCraty et al., 2006),⁹ it is likely that the heart is instrumental in generating the outgoing wave of attentional energy directed to the object.

The calming of extraneous thoughts and adoption of positive emotional interest involved in the act of "paying attention to" distant locales or nonlocal objects establishes a relationship of phase-conjugate-adaptive-resonance with the quantum level of an object at the distant location. Research at the Institute of HeartMath and elsewhere has found that attention is significantly enhanced when a focused, self-generated positive emotional state is sustained (McCraty, 2002; McCraty et al., 2006: 32-37). Maintenance of a positive emotional state induces a shift to a coherent order in the heart's beat-to-beat pattern of rhythmic activity (Figure 4), marking the movement to a global state of increased synchronization and harmony in psychophysiological processes, referred to as *psychophysiological coherence* (McCraty et al., 2006; Tomasino, 2007). Compare, in Figure 4, the coherent order of smooth, sine-wave-like waveforms generated by the heart's beat-to-beat pattern of rhythmic activity during a sustained positive emotional state such as appreciation or love, to the incoherent order of erratic, irregular waveforms produced in a negative emotional state like anger or frustration. While the interpenetration between the outgoing coherent wave fields generated in the state of psychophysiological coherence and the incoming wave fields of quantum

8. See the review of research in McCraty et al. (2006).

9. The research shows that information about a person's emotional state is communicated both throughout the body *and* into the external environment via the heart's pattern of activity. The rhythmic patterns of beat-to-beat heart activity change significantly as we experience different emotions. In turn, these changes in the heart's beating patterns create corresponding changes in the structure spectra of the electromagnetic field radiated by the heart, as discussed in a moment (see McCraty et al., 2006).

coherence from objects and events outside the body creates a oscillatory channel of energetic resonance for information communication, such communication is impeded when the body's psychophysiological systems are in a state of incoherence, as shown in Figure 3b above.

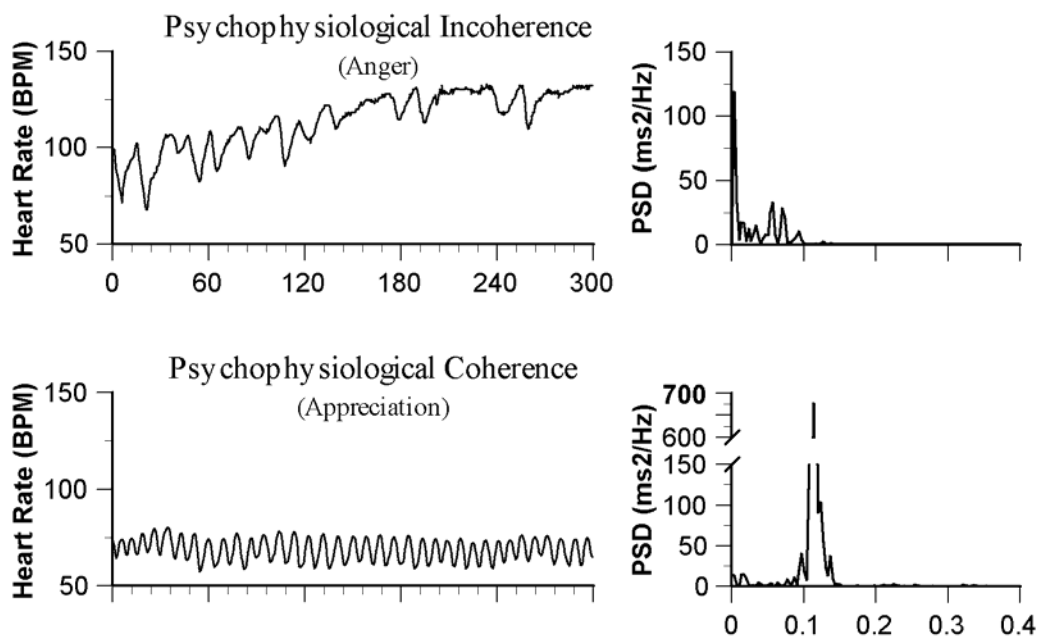


Figure 4. This figure shows typical heart rhythm patterns during two different psychophysiological modes—Psychophysiological Coherence and Psychophysiological Incoherence. Negative emotions, like anger or frustration, generate a highly erratic pattern (incoherent) of beat-to-beat heart rhythm activity, whereas positive emotions, like appreciation or love, generate a highly ordered sine-wave-like pattern (coherent). (Adapted from McCraty et al., 2006; © Institute of HeartMath, reproduced with permission).

But there also is electrophysiological evidence of a “deeper” internal state in which the body's psychophysiological systems seem optimally organized for connection to and communication with the nonlocal quantum world. In the example from an Institute of HeartMath study (McCraty et al., 2006) shown in Figure 5, an individual undergoes a phase transition from the state of psychophysiological coherence to enter *emotional quiescence*—a qualitatively different “hyper-state” of emotional experience.¹⁰ Notice how the slower-frequency, larger-amplitude, smooth, sine-wave-like pattern of heart rate variability for psychophysiological coherence rapidly transitions to the higher-frequency, lower-amplitude sine-wave-like pattern of emotional quiescence. Moreover, although the ECG spectra for emotional quiescence actually form a harmonic series (Figure 6), those for psychophysiological coherence (not shown) do not. It is thus postulated that while psychophysiological coherence provides a communication channel for intuitive perceptions that can inform day-to-day experience, the harmonic order of emotional quiescence is the channel, via *energetic resonance*, to a deeper connection to nonlocal quantum reality, whereby intuitive understanding—including spiritual insight—of oneself, others, and the underlying order of the universe is accessed.

To the degree that a coherent relationship of energetic resonance between the object and the percipient is maintained—that the object's quantum wave field and the attentional wave field of the percipient are locked in a resonant feedback loop—the individual's psychophysiological system (the brain, the heart, and

10. The subjective experience of emotional quiescence is a state in which the intrusion of normal mental and emotional “chatter” is reduced to a point of internal quietness, to be replaced by a profound feeling of peace and serenity and a heightened awareness of the movement of energy both within one's body and between oneself and other people; the feeling of being “totally alive” and “fully present” in the moment; the experience of an all-embracing, non-judgmental love (in the largest sense); and a sense of increased connectedness with one's higher self or spirit, and with “the whole” (McCraty et al., 2006: 33-34, 37-43).

the body as a whole) can receive and process nonlocal information as quantum holograms. In essence, it is the continuous resonant feedback loop between the outgoing coherent wave fields of bio-emotional energy generated by the body's psychophysiological systems and the incoming wave fields from objects that is the basis of nonlocal perception, in that the interaction between the two enables the body to receive and process quantum-holographic information about nonlocal objects and events spectrally encoded in the oscillatory radiation of energy.

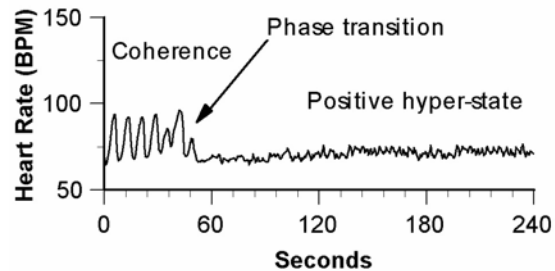


Figure 5. Phase-shift to a positive hyper-state. This figure shows a typical example of the phase transition observed in a subject moving from the Psychophysiological Coherence mode to a positive hyper-state referred to as Emotional Quiescence. Note the abrupt change from the larger-amplitude sine wave-like heart rhythm pattern distinguishing the Coherence mode to the much higher-frequency and lower-amplitude rhythm which marks the onset of the Emotional Quiescence positive hyper-state. (From McCraty et al., 2006; © Institute of HeartMath, reproduced with permission).

Figure 6.

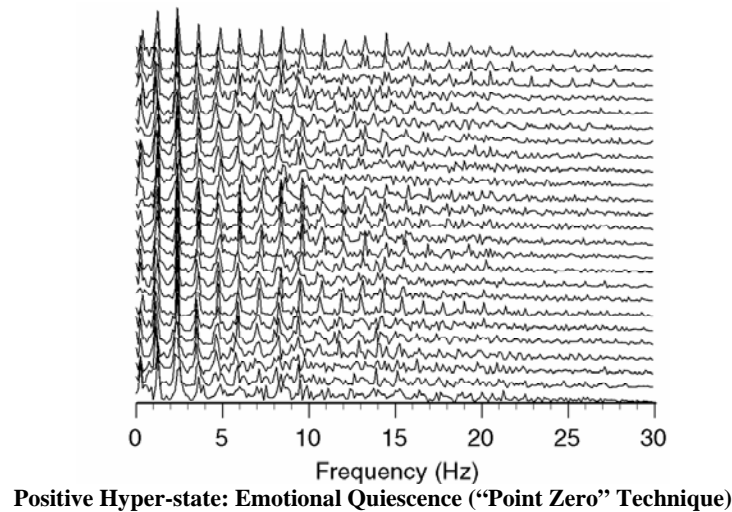


Figure 6. Waterfall plots of ECG spectra. The Figure shows the waterfall plot of ECG spectra for the state of Emotional Quiescence. The coherent structure of standing waves, which form a harmonic series that is also constant from spectrum to spectrum, is due to the very low HRV in this mode (From McCraty et al., 2006; © Institute of HeartMath, reproduced with permission).

One pathway of virtually instantaneous nonlocal information communication is at the quantum level through quantum coherence. Another pathway for information communication at hyper-speeds appears likely when a third emergent wave field is generated by the interaction between incoming and outgoing wave fields at the same frequency, or by harmonic resonance when wave fields of different frequencies interact, as described above. It is evident that the heart plays a significant role in the body's sensing and processing of the quantum holograms of nonlocal objects and events, in that our study of intuition, as noted above, found that the heart receives information about future events *before* the brain (McCraty, Atkinson, & Bradley, 2004b). It is even possible that the pre-stimulus heart-generated change in afferent neural signals observed in our study is actually a signal to the brain about the incoming quantum-holographically encoded information about the intuitive event. Once received, such quantum-holographic information about

distant objects is decoded and converted by the brain, through a reverse Fourier transform process, into mental imagery, feelings, and other sensations as described by Pribram (1991).

Nonlocal Agency

These multi-level psychophysiological and quantum-holographic processes of energetic resonance not only provide a channel for nonlocal information communication, but they are also the means by which passionate *intention* may affect objects and events distant in space/time. I will expand the theory of nonlocal communication, just described, to sketch an understanding of how this occurs.

I begin with the assumption that a thought or an intention is a distinct pattern of electrical activity in the brain, and that as a unit of information it is energetically encoded as a quantum-hologram. The act of attention involves the generation of an outgoing wave field of bio-emotional energy from an individual directed towards the object of interest. And, insofar as this act includes an intentional disposition (e.g., a preference, a desire, a goal, or a plan) this intention is recorded as implicit information spectrally encoded as a quantum-hologram in the outgoing wave field. The more passion with which the intention is held, the greater the activation of the individual's bio-emotional energy, and, hence, the stronger the recording of the quantum-hologram of intention in the out-going wave field.¹¹

There are two pathways by which the quantum-hologram of intention is transmitted to a nonlocal object. To the degree that the outgoing wave field of the intentional energy is coherent and attuned to the resonant frequency of the object, one pathway is created by the mechanism of energetic resonance between the individual's outgoing wave field and the incoming wave field of energy oscillations generated by the object. A second pathway is created when the wave field of intentional energy is organized as a harmonic series. This creates the potential for a multi-level channel across macro and micro scales of organization whereby the quantum-hologram of intention is transmitted, via harmonic resonance, across wave fields at different energy frequencies to the quantum level of the object.

As the outgoing wave field interacts with the nonlocal object, the impact of each wave front reflects a part of the wave back from the object's surface towards the individual. However, part of the wave's energy is actually *absorbed* by the object. Since the record of the individual's intention is spectrally encoded and distributed throughout the entire outgoing wave field, the part that is absorbed by the object actually contains a quantum-hologram of the individual's intention. Thus, as energetically encoded information, the quantum-hologram of the individual's passionate intention can influence, via energetic resonance, the future potential of the object's material organization and behaviour. And insofar as the outgoing wave field is organized as a harmonic series, the quantum-hologram of intention is transmitted to the quantum level of the object, by harmonic resonance with the coherent wave field of quantum emissions from the object. Here, as energetically encoded information, the quantum-hologram of intention can effect a subtle but significant change in the quantum organization of the object, thereby implicitly *in-forming*—literally, giving shape to—(Bohm & Hiley, 1993) the object's future macro-scale organization and behaviour.

Social Amplification of Nonlocal Effects

In terms of the quantum-holographic theory of nonlocality described here, the effects of both attentional and intentional emotional energy will be amplified and thus be significantly stronger when certain conditions are present in social groups and organizations. Such conditions are that the group has a membership boundary, an engaging shared collective purpose or ideology, and, most importantly, that its members are bio-emotionally attuned to one another through a fully interconnected network of mutually reciprocated relations of positive affect, modulated by relations of social control, as I have described elsewhere (Bradley, 1987; Bradley & Pribram, 1998).

11. Empirical support for the importance of passion to boost the energetic affect of intention comes from Nelson et al.'s analysis of the PEAR RNG data (Nelson et al., 1991). They found that the effect size pattern observed for an individual repeating the same experiment numerous times—of an initial large effect, followed by a decline to plateau at a stable performance level—was consistent with that found in other *psi* experiments and also in studies showing how changes in motivation affect performance of other human skills. This underscores why sustained high levels of motivation—passionate intention—is likely to be important in producing mind-matter interaction effects of larger magnitude.

The harmonious group order that emerges from this bonding pattern generates a self-reinforcing collective field of coherent bio-emotional energy which amplifies nonlocal interaction effects in much the same way that a signal of radio waves from distant stars and galaxies is amplified by an array of radio telescopes. By attuning all members to the same resonant socio-emotional frequency, the group generates a powerful collective receptive field of coherent bio-emotional energy through which implicit nonlocal information is accessed and amplified due to a stronger resonant feedback loop, both to the field of the group and to that of the individual member. For the individual group member, this eases the individual's shift to a state of psychophysiological coherence which facilitates stronger access to nonlocal interaction. And to the degree to which the group collectively focuses passionate attention or passionate intention on a nonlocal object or event of common interest, the nonlocal effect is further amplified. Conversely, in socially incoherent groups, involving relations predominantly of negative affect, the wave field of collective energy is too disorganized for energetic resonance with the energy wave field from a nonlocal object. This impedes access to nonlocal information and also limits any intentional influence on the object's future.

Empirical support for this expectation comes from the PEAR studies (Nelson et al., 1984, 1991) in which two people cooperate by focusing the same mental intention on the same RNG. These studies found that whereas same-sex pairs, irrespective of gender, produced an effect at chance level or slightly negative outcomes, mixed-sex pairs produced an amplification effect twice that of individuals. Of particular interest, is their finding that a bonded pair—a married couple or close family members—produce an amplification effect more than four times that of an individual. A similar amplification effect on RNG output has been found repeatedly in studies of social groups with a high degree of social coherence and a common emotionally-intense focus, such as workshops and therapy groups (see Radin, 1997a). This amplification effect was also found in a remote viewing study in which the researchers took care create “a feeling of community and coherence of intention within the group” (Targ & Katra, 2000). There is also evidence from the Global Consciousness Project of the amplification of nonlocal effects in social aggregations joined by explicit or implicit emotional connection to a common event, as mentioned above from a meta-analysis the RNG output associated with 104 global events of world-wide mass interest (Radin, 2002). Together, these findings document a significantly enhanced amplification of the nonlocal effect of attentional and intentional emotional energy in coherent groups and large-scale social aggregations.¹²

CONCLUSION

Before concluding with an important epistemological implication of the theory, I will briefly show how the theory provides an understanding of the psychophysiological and quantum-holographic processes by which energetically encoded information informs entrepreneurial intuitive foreknowledge and intentional action.

Recapitulation

Focused passionate attention directed to the object of interest (such as a future business opportunity) attunes the entrepreneur's psychophysiological systems to the quantum level of the object, which contains implicit, holographically encoded information about the object's future potential. Such emotional attunement—*coherence*—brings the outgoing wave field of attentional energy from the entrepreneur's psychophysiological systems into energetic resonance with the incoming wave field of energy from the object. The energetic resonance between the two wave fields of energy creates an optimal channel for communication of nonlocal information. The body's perception of such implicit information about the object's future is experienced as an intuition. However, insofar as the entrepreneurial act of perception is more than interest in the object and involves a passionately-held coherent intention directed to the object as well, a quantum-hologram containing the entrepreneur's energetically-encoded mental intention is communicated through the communication channel to the quantum-level of the object. Once absorbed by the object, the quantum-hologram of intention can produce subtle but significant effects on the nonlocal object's future organization and behavior. In this way, a sustained passionately-held vision for the future, such as a plan or a goal, is communicated into the energy domain of potential and actualized into reality by

12. This is consistent with the conclusion of Nelson et al. (1998) who list group resonance in emotionally meaningful contexts, subjective and emotional contents, profound personal involvement, deeply engrossing communication, spiritual engaging situations as situations in which nonlocal intentional emotional effects are most likely.

the quantum-hologram of the entrepreneur's mental intention. Constructing and maintaining a socially coherent group for the entrepreneur's business activity is optimal in that the nonlocal interaction effects are amplified in a socially coherent group by a resonant feedback loop between the collective bio-emotional field of the group and that of the individual member.

The theory leads to three testable hypotheses:

- 1) The more coherent the passionate *attentional* interest directed to the object of interest, the greater the body's psychophysiological system's access to the field of quantum holographic nonlocal information, and, hence, the greater the entrepreneur's intuitive foreknowledge about the object of interest.
- 2) The more coherent the passionate *intentional* interest directed to the object of interest, the greater the body's psychophysiological system's ability to communicate the quantum-hologram of the entrepreneur's intention to the nonlocal object, and the more likely the effect on the object's future organization and behavior.
- 3) The more socio-emotionally coherent the group the entrepreneur builds for his/her business venture, the greater the amplification of nonlocal interaction effects and, hence, the greater the likelihood of intuitively locating a future business opportunity and intentionally actualizing it into economic reality.

An Epistemological Implication

Behind the theory is an implicit distinction between two fundamental types of information. One is based on the interaction of energy waves, in which information about the structure, event history, and future behavior of objects is spectrally encoded in the oscillations of energy as quantum holograms. The other is based on abstract symbols and logic, and involves the assignment of meaning to discrete units of information in a system of culturally defined symbols and logic (language). Energetic information fits with Gabor's (1946) concept of *minimum of uncertainty* and its elementary unit of information, the logon. Symbolic information fits with Shannon's (1949) concept of information as *reduction in uncertainty* and its unit of information, the Binary digiT (the BIT).

Both kinds of information are involved in perception (Pribram, 1991). In the case of the entrepreneur, symbolic information is involved in processing the cognitive aspects (reason and logic) of economic life; energetic information is involved in processing the configural aspects of economic interactions and transactions. Creative individuals, like serial entrepreneurs, are more attuned to the processing of energetic information, which directly encodes the flow of patterns and processes—including future potentials—of the economic domains in which they operate. But within the terms of the "rational" framework of modern economic life, there is a strong bias to give more weight to cognitive information than to information apprehended via senses and emotions. This bias is paradoxical because neuropsychological processing of the sensory or configural aspects of perception is actually concerned with the representation of images of objects (Pribram, 1991); that is, it is an *object-ive re*-presentation system that enables the individual to navigate through the ontological reality of his/her environment. By contrast, the cognitive aspects of perception, which are concerned with comprehension and understanding (Pribram, 1991), have their basis in a shared sociocultural reality denoted and expressed by the set of *arbitrary* signs and symbols in language—*viz*, a shared categorical framework for interpreting *subjective* experience.

The point is *not* to say that the sensory-configural aspects of perception, and hence energetic information, should be accorded more weight than the symbolic information contained in reason and logic. That would involve sacrificing accumulated human knowledge for raw, moment-by-moment sensory experience. Rather, the point is that the longstanding bias to cognitive approaches in social science has given short shrift to an order of energetic information that constitutes the rational basis of intuition, and, by extension, rationally *in*-forms the creative actions dedicated to actualising a passionately-held vision of the future.

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