

BRAINS, SCIENCE, AND NONORDINARY AND TRANSCENDENT EXPERIENCES: CAN CONVENTIONAL CONCEPTS AND THEORIES ADEQUATELY ADDRESS MYSTICAL AND PARANORMAL EXPERIENCES?

William Braud

Institute of Transpersonal Psychology
744 San Antonio Road
Palo Alto, CA 94303
e-mail: wbraud@itp.edu

Abstract: This chapter provides a balanced account of both the strengths and limitations of conventional cognitive science and neuroscience, as these attempt to address and explain nonordinary and transcendent experiences. These nonordinary and transcendent experiences include—but are not limited to—mystical, spiritual, and paranormal experiences. Although some findings and theories of experimental psychology, cognitive science, and neuroscience may explain, and are quite relevant to, certain aspects of these nonordinary experiences, these same explanatory concepts are not yet able to deal with other aspects of these experiences—particularly those well-researched cases in which the experiences yield veridical knowledge about sensorily inaccessible events or in which they are associated with objectively measurable, distant influences upon others or upon the physical world. The chapter also introduces information relevant to the issue of whether the human brain might wholly *produce* consciousness (and, hence, nonordinary and transcendent experiences) or whether it might serve, rather, as a vehicle for the *transmission and expression* of consciousness and of these exceptional experiences. The chapter ends with a fresh conceptualization of bodymind that transcends, yet continues to include, the previously recognized features of each of its members.

What if you slept, and what if in your sleep you dreamed, and what if in your dreams you went to heaven and there you plucked a strange and beautiful flower, and what if when you awoke you had the flower in your hand? Ah, what then?

Samuel Taylor Coleridge
Biographia Literaria (1817)

In this chapter, I hope to present a balanced account of both the strengths and limitations of conventional cognitive science and neuroscience, as these attempt to address and explain *nonordinary and transcendent experiences* (NTEs). These NTEs include, but are not limited to,

This is a version of the following book chapter: Braud, W. (2002). Brains, science, nonordinary & transcendent experiences: Can conventional concepts and theory adequately address mystical and paranormal experiences? In R. Joseph (Ed.), *NeuroTheology: Brain, Science, Spirituality, Religious Experience* (pp. 143-158). San Jose, CA: University Press, California. The chapter is copyright © 2002 University Press, California and is used with permission.

mystical, spiritual, and paranormal experiences. Although some findings and theories of experimental psychology, cognitive science, and neuroscience may explain, and be quite relevant to, certain aspects of these nonordinary experiences, these same explanatory concepts are not yet able to deal adequately with other aspects of these experiences. In particular, current cognitive science and neuroscience are unable to account for well-researched cases in which NTEs yield veridical knowledge about sensorily inaccessible events or in which they are associated with objectively measurable influences upon others or upon the physical world—at a distance, and beyond the reach of our conventional means of action and influence. I also will present material relevant to the issue of whether the human brain might wholly produce consciousness or whether it might serve, rather, as a vehicle for the transmission and expression of consciousness. Before treating attempts to understand or explain these nonordinary experiences, it is important to examine more closely the nature of the experiences themselves.

Nonordinary and Transcendent Experiences (NTEs)

Our familiar, ordinary experiences and actions have increasingly been brought within the growing framework of scientific understanding. Physical substrates—or, at least, physical correlates—have been found for many of our mundane activities (our sensations, movements, and memories) and even for some of our more exotic experiences (our imagery, dream conditions, and volitions). Nonetheless, there have always been forms of experience that have persistently evaded capture by science's explanatory net—experiences that intimate that there is more to our human nature and human potential than is portrayed by the conventional models and theories of physiology and psychology. It was to such exceptional experiences that William James (1890/1956) was referring when he suggested that

The great field for new discoveries . . . is always the unclassified residuum. Round about the accredited and orderly facts of every science there ever floats a sort of dust-cloud of exceptional observations. . . . Any one will renovate his science who will steadily look after the irregular phenomena. And when the science is renewed, its new formulas often have more of the voice of the exceptions in them than of what were supposed to be the rules. (pp. 299-300)

James (1902/1985) had similar experiences in mind when he wrote

Our normal waking consciousness, rational consciousness . . . is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. (p. 388)

Examples of these exceptional experiences, indicative of *something more* that lies beyond the range of our familiar forms of knowing, being, and doing, can be found in a new volume, published through the auspices of the American Psychological Association (APA). This recent book, entitled *Varieties of Anomalous Experience* (Cardena, Lynn, & Krippner, 2000), treats of unusual experiences in the following categories: hallucinatory experiences, synesthesia, lucid dreaming, out-of-body experiences, psi-related experiences [i.e., psychic or paranormal experiences], alien abduction experiences, past-life experiences, near-death experiences, anomalous healing experiences [including instances of mental, distant, psychic, and spiritual healing], and mystical experience. Although I feel the title of this book is unfortunate—because the term “anomalous” suggests that these experiences are not normal or natural—the publication of such a volume by the APA does indicate that such experiences are finally receiving at least some of the professional attention they deserve.

Historically, these unusual experiences have been given many names—*supernatural* or *paranormal* experiences being, perhaps, the most frequent of these. The 18th century scientist-turned-mystic, Emanuel Swedenborg (1756/1998), in his *Arcana Coelestia*, described experiences similar to these when he coined the term *remains*, which Swedenborg scholar Wilson Van Dusen paraphrased as “our inner memory of everything sacred . . . [our] personal treasure of spiritual understanding . . . [our] sacred personal collection of little realizations of heaven” (Van Dusen, 2001, pp. 97, 106). William James himself referred to these experiences as *white crows*, reminding us that “if you wish to upset the law that all crows are black, you must not seek to show that no crows are; it is enough if you prove one single crow to be white” (1890/1969, p. 41). In 1919, the irrepressible gadfly journalist Charles Fort used an equally picturesque phrase, *damned facts*, to describe similar recalcitrant exceptions and embarrassments to the received science of his day (Fort, 1941). Other names for these and similar experiences have included *peak experiences* (Maslow, 1962), *Minerva experiences* (Otto, 1966), *transpersonal experiences* (Grof, 1972), *extraordinary phenomena* (Masters, 1974), *transcendental experiences* (Neher, 1980), *extraordinary experiences* (Helminiak, 1984), *praeternatural experiences* (Nelson, 1989), *metanormal functioning* (Murphy, 1992), *exceptional human experiences* (EHEs, White, 1993), *wondrous events* (McClenon, 1994), *high holy moments* (Van Dusen, 1999, p. 76), and—as we have seen—*anomalous experiences* (e.g., Cardena, Lynn, & Krippner, 2000; Reed, 1988; Zusne & Jones, 1989). In this chapter I prefer to call these experiences *nonordinary and transcendent experiences* (NTEs)—nonordinary because of their relative rarity and unfamiliarity, and transcendent because they go beyond the conventional understanding of human potentials and of the world and because, under special circumstances, such experiences can trigger transformative changes, and working with such experiences can allow the transcendence of what one was before the experience. To facilitate our discussion, I will focus on two particular forms of these NTEs—mystical/unitive experiences and psychical experiences.

Mystical and unitive experiences are those in which there is a strong sense of greater connection, sometimes amounting to union, with the divine, other people, other life forms, objects,

surroundings, or the universe itself. Often, this is accompanied by a sense of ecstasy or of being outside of one's "skin-encapsulated [individual] ego" (Watts, 1963, p. 18) or self identity. Related to this is the *pure consciousness event* that has been studied extensively by Forman (1990, 1999), who defines this as "a wakeful though contentless (nonintentional) consciousness" (1990, p. 8), and considers this a form of introvertive mysticism (Stace, 1960).

Psychical experiences are those in which we learn about or influence the world through means other than the conventionally recognized senses, motor systems, or their mechanical extensions, or rational inference, in cases in which chance coincidence has been ruled out. The major forms of psychical experiences are well known as telepathy, clairvoyance, precognition, and psychokinesis; and these can be augmented by experiences and events suggestive of survival of bodily death.

Originally having the meaning of feeling (more literally, suffering) at a distance, *telepathy* is now understood as accurate, direct knowledge of the mental content or subjective experiences of another person, typically at a distance—a kind of mind-to-mind communication or interaction. An example would be my accurate discernment of a pain in the left thumb experienced, right now, by someone who is reading this chapter. Initially having the meaning, among the French, of clear or distant seeing, *clairvoyance* is now described as accurate, direct knowledge of some objective event—again, usually at a distance; this is a kind of mind-to-object communication or interaction. An historical example of clairvoyance is an incident, investigated by an agent of Immanuel Kant, in which the 18th century scientist-turned-mystic, Emanuel Swedenborg described the timing, nature, and progression of a fire that was raging in a distant city, 300 miles away; two days later, a messenger arrived and revealed the accuracy of Swedenborg's prior report. In *precognition*, one displays accurate knowledge of future events that, according to our conventional view of time, have not yet occurred and that could not have been predicted on the basis of rational inference, nor accounted for on the basis of chance coincidence; premonitory dreams are common examples of precognition. *Psychokinesis* (sometimes called telekinesis) indicates mind-matter interactions in which one's attention and intention may directly influence other persons, other living systems, or inanimate physical systems—usually at a distance; such psychokinetic influence are most often detected in sensitive physical or biological systems that are rich in free variability or randomness. It has been suggested that some instances of unusual healing (especially "distant healing") may involve psychokinesis. *Afterdeath* or *survival research* addresses findings that suggest that some aspect of human personality might survive the death of the physical body. This is the more controversial branch of psychical research that concerns itself with such phenomena as apparitions of the dead, hauntings, some poltergeist occurrences, mediumistic communications, mediumistic physical phenomena, out-of-body experiences, near-death experiences, and reports suggestive of past lives and reincarnation. The difficulties these psychical experiences pose for conventional cognitive and neuropsychological interpretations—and even for physical interpretations—are treated in detail, below.

Forms of Psychical NTEs That Brain Science Can and Cannot Adequately Address

Within each class of NTEs, there is a range of experiences that vary widely in their characteristics. Some experiences are true instances of their class, and we might call these *veridical NTEs*. Other experiences may superficially resemble veridical NTEs but, upon more careful examination, can be found to be ordinary experiences in disguise. Still other experiences may be complex blends of these two forms—they may be veridical NTEs that also happen to have some ordinary features, or they may be ordinary experiences that, nonetheless, possess some veridical, nonordinary qualities. The range and complexity of these experiences call for great care and discernment on the part of investigators who wish to study these phenomena seriously. Facile tactics of treating these experiences as homogeneous groupings that can be attributed entirely to quirks of the brain or to supernatural visitations simply will not do. Rather, careful attention to the *details* and *full nature* of the experience in question, and the ability to make sometimes subtle discriminations, are essential tools for adequate understanding in this area of study.

Let me illustrate the investigatory issues by means of a simple example. The *déjà vu* experience is characterized by an often intense feeling of familiarity upon encountering a situation that is “really” novel. I visit a foreign city that I have not previously visited or learned about. On my first stroll through the center of town I see someone who is wearing a light blue suit, holding a walking stick, and standing in front of a large glass window. I have a curious feeling of having seen this, done this, been here before. The feeling may be sufficiently eerie as to be accompanied by gooseflesh and a tingling of my spine or scalp. What are we to make of this experience? Several interpretations come to mind:

1. The experience is not really occurring; I am pretending to have such an experience in order to gain attention, to fool someone, or to play a game.
2. Although novel, the street scene does closely resemble one that I have seen before, and the familiarity is attributable to a real memory of something similar.
3. On this particular occasion, there is an unusual delay in the transmission of information across my corpus callosum and other fiber tracts that connect my two cerebral hemispheres; so, I really have experienced this before—a tiny fraction of a second before—in one hemisphere, before the information registers a second time in my other hemisphere.
4. I experience unusual firing of neurons deep beneath my temporal lobe, in my brain’s familiarity area, and the feeling of familiarity is simply a quirk of peculiar brain activity—a microseizure, as it were, in a particular, localized area of my brain; what I happen to be observing at the time (the street scene) is irrelevant to the familiarity experience.
5. I have had an earlier precognitive dream about this very encounter, and when I observe the street scene, I have already seen it before—in my prior dream—so, the experience naturally seems familiar.

Notice that, from the limited information of only my verbal report of having a *déjà vu* experience, an independent investigator could not know, with any certainty, which of these five

interpretations is most likely to be correct. Additional information is needed if we are to make a case for or against any one of these five potential explanations. To assess Interpretation #1, we would need additional information about my subjective experience at the time of the event in question; it might also be useful to know something about my history, motives, and predispositions. To assess Interpretation #2, information about my prior experiences and my memories would be needed. To assess Interpretations #3 and #4, a record of my brain activity during the event in question would be needed. To assess Interpretation #5, a record of the content of my earlier dream would be useful; for this to be convincing, the record should have been made before the later *déjà vu* experience.

With respect to the above scenarios, it is important to recognize two things. First, to infer the correctness of Interpretations #3 and #4 *in the absence of the requisite brain activity indicators* is entirely speculative, and to automatically conclude that one or both of these interpretations is correct is risky and no more likely to be true than any of the other interpretations. Second, if a prior record of the dream had been made, had been extremely rich in specific details, and is available for study, this record could provide prima-facie evidence in favor of Interpretation #5. Note also that, given a pre-existing and accurate dream record, *Interpretation #5 could be valid regardless of whether or not any or any combination of the first four interpretations also happen to be true.*

Now consider the following additional twist on this experience. What if, in addition to reporting the feeling of familiarity upon seeing this particular street scene, I supplement my report by saying that I have a feeling that if I pass the blue-suited person, with walking stick, near the large shop window, go to the next corner, turn right, and continue on for one and a half blocks, there will be small shop with a yellow elephant painted on its front door? What if I perform the experiment, check out the predicted location, and do, indeed, find what was described? What if had made that “elephant on the door” prediction at the time I experienced *déjà vu* and mentioned that I thought the experience would next unfold in that way? Or, what if the “elephant on the door” had also been included as part of my earlier dream record? In both of these cases, I can imagine no conceivable way in which the electrical or neurochemical activities within my brain—either at the time of the dream or at the time of the *déjà vu* experience—could account for the accuracy of my prediction. This is because the phenomenon to be explained does not behave—with respect to distance, time, or barriers—in ways that the known brain activities, or their concomitants or sequelae, behave. *Something more* is needed to account for this veridical NTE, above and beyond what currently is known about the brain and its functioning.

The possibilities and principles present in the above account illustrate well the strengths and limitations of attempts to explain, or explain away, certain unusual experiences based solely on the findings and constructs of brain science. If we replace the *déjà vu* experiences with any of a wide range of NTEs, similar alternative interpretations and arguments arise. We can generalize these possibilities further by substituting any of the varieties of psychical functioning (telepathy, clairvoyance, precognition, psychokinesis, afterlife or survival evidence) for the *déjà vu* experience, and slightly reframing the various interpretations in the following ways:

Ostensible psychical experiences such as telepathy, clairvoyance, precognition, psychokinesis, or experiences suggestive of an afterlife or survival of bodily death may be explained on the basis of

1. Fabrication or hoaxing of the experiences,
2. Misperceptions and distortions of observation or of memory,
3. Subtle sensory cues—whether consciously attended to or not—that might betray the nature of the event that is to be known or perceived,
4. Rational inference—through which the nature of the to-be-known-or-perceived event might be determined or guessed,
5. Chance coincidence, or
6. Quirks of the brain that simulate the psychical experience.

For those predisposed not to accept the reality of psychical experiences, parsimony would demand that the foregoing six explanations be considered immediately and that only after these possibilities have been carefully and completely ruled out would one entertain the possibility of the presence of a veridical NTE. Note, again, that if there is evidence of a specific and strong correspondence between the content of a subjective experience and the content of some referent event (distant or remote in space or in time), the absence of the first five of these explanations would guarantee that the referent event would be conventionally inaccessible to brain and cognition. Further, if these five possible explanatory conditions are absent, the presence or absence of Explanation #6 becomes irrelevant in identifying the experience as a veridical NTE. In other words, brain quirks—of any sort—can explain a subjective experience but cannot explain *the presence of an accurate connection between that subjective experience and some inaccessible referent event*. For example, a particular brain pattern can be shown to underlie—and “explain”—an image of her son that arises in the mentation of a mother sitting before a hearth and idly watching the dancing flames, but the presence of that brain pattern cannot explain the sudden arising of that particular image at the precise moment that the son is experiencing a life-threatening situation, thousands of miles away (an instance of so-called *crisis telepathy*), nor can the brain pattern explain the strong correspondence that happens to occur between the two conventionally unconnected events of the mother’s imagery and the distant son’s desperate, momentary circumstance and need. Stated in still another way, brain activities (or any other bodily activities or conditions) can explain many, and perhaps all, subjective experiences themselves, but cannot explain the timely and accurate *connections* or *relationships* between those subjective experiences and meaningfully related distant events.

Difficult and Easier Discriminations

It is often difficult to analyze and evaluate psychical experiences that occur spontaneously in everyday life circumstances. It is not always clear whether there are or are not peculiar brain activities associated with these experiences. Often, it is difficult to determine, with certainty, whether the confounding factors of deliberate misrepresentation, hoaxing,

misperceptions, distortion of observations or of memory, subtle sensory cues, rational inference, or chance are present or absent in any given case. Because brain activities and conditions are active in all of these confounding factors—it is likely that brain activities are present in all cognitive activities because they serve as the vehicles of expression for these activities—in this sense, brain activities can “explain” many NTEs. If it were possible to connect an NTE with some conventionally inaccessible referent event, however, and if it were possible to rule out the confounding factors just mentioned, then veridical NTEs could be identified fairly unambiguously even in everyday life circumstances. Indeed, for the past 12 decades—dating, at least, from the founding of the Society for Psychical Research (SPR) in England in 1882—countless observations and records have been made of apparently genuine veridical psychical experiences. These have been published in the *Proceedings of the SPR* and the *Journal of the SPR*, in the *Proceedings and Journal of the American SPR*, and in similar psychical research and parapsychology journals in many countries, and these findings have been compiled and discussed in numerous scholarly volumes (e.g., Myers, 1902; Stevenson, 1970; Wolman, 1977). These reports of spontaneous psychical experiences vary greatly in the quality of the evidence that they present. As would be expected, this evidence has been questioned by counteradvocates of these claims—with varying degrees of plausibility and success—and a number of reasonable critiques of this literature have been published (e.g., Kurtz, 1985).

Ruling out possible confounds more effectively and identifying veridical NTEs more unambiguously become possible when these experiences, or experimental analogs or models of these, are brought into the laboratory for careful study. Large numbers of experimental studies of telepathy, clairvoyance, precognition, and psychokinesis have been conducted and reported in professional parapsychology journals (e.g., the *Journal of Parapsychology*), as well as in many “mainstream” journals (e.g., *Nature*, the *Journal of Experimental Psychology*, *Psychological Bulletin*, and many clinical and medical journals). Through the years, the investigations of experimental parapsychology have become increasingly sophisticated, criticisms of earlier work have been effectively met, and present studies match or exceed those of conventional behavioral and biomedical research in the tightness of their designs and in their safeguards against artifacts and confounding variables. The experimental designs effectively rule out the possibility of ordinary sensory cues, rational inference, and chance coincidence, so that if consistent relationships are found between subjective experiences and distant and shielded target events, such evidence cannot be explained in terms of conventional informational or energetic transfers or mediation, nor can these *correspondences* (see previous section) be accounted for in terms of the brain activities or conditions of the research participants. Even a cursory review of the vast literature of experimental parapsychology is beyond the scope of this chapter. Rather than attempting to summarize the results of these investigations, I will simply indicate some of the more important sources to which interested readers may go to acquaint themselves, first hand, with the methods and outcomes of these studies. These resources include the *Proceedings and Journals* mentioned earlier in this section, the *Journal of Parapsychology*, the *European Journal of Parapsychology*, the *International Journal of Parapsychology*, and careful and extensive treatments of relevant literature in volumes by Broughton (1991); Griffin (1997); Krippner (1977-1994); Kurtz (1985); Radin (1997); Targ, Schlitz, and Irwin (2000); and Wolman (1977).

Extensive reviews and meta-analyses are available for compilations of findings from the largest and most successful research projects. These projects include studies of remote viewing (clairvoyance experiments usually involving distant geographical sites, buildings, and natural and human-made features as targets; Nelson, Dunne, Dobyms, & Jahn, 1996; Utts, 1996); waking state of consciousness, free response, extrasensory perception studies (Milton, 1993); dream telepathy studies (Child, 1985); mixed telepathy and clairvoyance under conditions of sensory restriction (“ganzfeld” studies; Bem & Honorton, 1994; Storm & Ertel, 2001); experiments conducted under conditions of nonordinary states of consciousness induced by relaxation, hypnosis, and meditation techniques (Honorton, 1977; Schechter, 1984; Stanford & Stein, 1993; Storm & Thalbourne, in press); precognition experiments (Honorton & Ferrari, 1989); psychokinesis experiments involving inanimate electronic and mechanical random target systems (Dunne & Jahn, 1992; Dunne, Nelson, & Jahn, 1988; Radin & Ferrari, 1991; Radin & Nelson, 1989; psychokinesis (direct mental influence) studies involving living target systems (Braud & Schlitz, 1991; Schlitz & Braud, 1997); and even time-displaced psychokinesis (retroactive intentional influences) studies (Braud, 2000).

Although these processes of telepathy, clairvoyance, and precognition have been noticed and recorded throughout history, and also have been documented in careful laboratory studies, their existence, to some, remains controversial. Alternative explanations and critiques of such phenomena have been made, again, throughout history, by skeptics and counter-advocates of such claims. In my opinion, these phenomena are genuine. The evidence is more than adequate scientifically, and there appear to be increasing reasons to accept that psi phenomena are real and not accounted for by conventional scientific models. I base this judgment upon my own experiences of them, my observations of their occurrence in my own laboratory under well-controlled conditions, similar observations by colleagues whose work I know and trust, and from my examination of much of the published literature on these phenomena. A reasonable and balanced approach to judging claims about these processes would be to examine carefully and dispassionately the published primary reports, read the critics’ arguments, read the counterarguments to these, recall your own—and others’—lived experiences of similar incidents, and then draw conclusions based upon the fullest possible amounts of evidence and argument.

Aspects of Veridical Psychological NTEs That Brain Science Can and Cannot Adequately Explain

As mentioned previously, neuroscience and cognitive science can adequately account for the nature of the physiological and psychological conditions that occur in persons while they are having veridical psychological NTEs. They can identify the brain states that might be present during NTEs, and they can explain a great deal about the processes underlying these brain states and how these brain states change and are influenced in conventional ways. Neuroscience, cognitive science, and conventional psychology are also valuable in that they can help us identify and understand unusual physiological and psychological conditions that can simulate and be mistaken for veridical NTEs (abnormal electrical and epileptiform activities in the brain’s temporal regions, memory distortions, nocturnal “paralysis” due to extreme reductions of muscle tension during certain sleep and dream conditions, various dissociative conditions, profound

changes in attention, etc.). What current brain science *cannot* explain is how brain conditions that allow the expression of accurate psychical knowledge come to occur at times that match the arising of the distant target events with which these physiological and subjective conditions are so well correlated and which can be so faithfully mirrored or described by these physiological and subjective changes and contents. Brain science can help me understand what the physiological substrates of an image of an apple might be, but it cannot help me understand why that particular substrate should happen to arise at the precise moment that someone 1,200 miles away is viewing a picture of an apple and holding a strong intention that I become accurately aware of what that person is viewing, in a mixed telepathy/clairvoyance parapsychology experiment.

The reason brain science is of no help in explaining the kinds of curious meaningful and co-arising correspondences with which parapsychology and psychical research deal has to do with the nature of the paradigm with which brain science currently is aligned. According to this paradigm, brain states can only be created or influenced by genetic predispositions, local internal bodily and psychological conditions, information that arrives through the conventionally recognized senses, and direct or indirect influences of the four forces currently recognized by contemporary physics (electromagnetism, gravitation, strong nuclear force, and weak nuclear force). Both parapsychology and conventional science recognize that, given our present understandings of the processes just mentioned, none of them—alone or in combination—can adequately account for the findings of psychical research or for the curious behaviors of the phenomena found in this field of study. For brain science to adequately address psychical findings, its paradigm must be expanded to allow for other processes or principles to influence brain functioning or it must admit that some subjective (experiential) events might exist or change independent of brain or of brain activity changes.

We can clearly illustrate the difficulties that neuroscience and cognitive science face, in attempting to explain veridical psychical NTEs within the current paradigm, by examining how pathways of action typically are handled within this paradigm. If—in instances of telepathy, clairvoyance, or precognition—a person acquires new and accurate knowledge about a distant “target” event, how might such knowledge be acquired? Brain science contends that new information can be made available to the brain only through conventional sensory channels or through recombinations of already available information. If conventional sensory signals are blocked—as in all well-designed parapsychology experiments—what could remain that could carry the requisite information? A *transmission model* would assume that information or energy is transferred from point to point—from a target source or “sender” to a percipient or “receiver”—carried by some form of mediator through some sort of channel. An early form of this model was the mental radio analogy. Just as intelligence could be conveyed electromagnetically from a transmitter to a receiver, so too, perhaps, psychical knowledge or influence could be similarly transmitted and received. [It is not well known that a major instrument of modern neuroscience, the electroencephalograph or brain-wave device, was invented by the German scientist Hans Berger, in 1924, in an attempt to detect and measure weak electromagnetic emanations of the human brain that he believed might be the carriers of

telepathic communication (see Brazier, 1961; Roll, 1960).] Many hypothetical carriers have been proposed for these psychic transmissions, including electromagnetic waves, neutrinos, tachyons, and so on. The latest contender is extremely low frequency (ELF) radiation. All such transmission models, however, face serious difficulties in explaining the operating characteristics of psychical effects. These effects occur over great distances, and they do not seem to decline appreciably with distance, as do conventional forces. No method has yet been found to physically shield or prevent psychical effects or to amplify them. The psychical process has great discriminating power, or acuity, which is difficult or impossible to handle via conventional information carriers. Whereas ELF radiation does have great shield-penetrating power and can carry information over great distances with minimal signal loss, its information handling capacity is low (due to its long, slow waves)—too low to be able to handle the kinds of rich and rapid knowledge that sometimes can be communicated psychically. Furthermore, we know of no conventional mechanism or process through which information could be encoded from the brain of a sender onto an ELF carrier wave and then properly decoded by the brain of a receiver. Most difficult of all, for the physical and neuroscience paradigm, is the apparent disregard of psychical events for the usual constraints of time: Conventional forces interact with matter in the present moment and do not travel forward or backward in time; however, future and past events are psychically accessible, in instances of precognition, retrocognition, and retroactive intentional influence. In summary, the brain is a physical organ, and known physical organs simply do not operate in ways in which psychical events and experiences have been shown to operate.

Can Brain Science Adequately Address Mystical and Spiritual Experiences?

Thus far, we have been focusing on veridical psychical NTEs. Let us turn now to mystical and spiritual experiences and explore whether brain science fares any better in accounting for these forms of nonordinary and transcendent experience.

As in the case of psychical NTEs, it is clear that brain science can, indeed, account for some of the features of mystical and spiritual experiences. Intriguing findings relating brain states or conditions to certain types of mystical and spiritual experiences have recently been reported by neuroscientists, including d'Aquili and Newberg (1993, 1999); Fenwick (1996); Fischer (1971); Newberg, d'Aquili, and Rause (2001); and Persinger (1983, 1987). Brain stimulation studies and brain monitoring studies have linked activities in certain brain loci to subjective features similar to those that occur in mystical and spiritual experiences. These include changes in spatial and temporal perception, the feeling of a loss of the sense of self, and the feeling of “presences” of various sorts. These findings, along with descriptions of the methods that have yielded them, are provided, in great detail, in other chapters of this book. Important research on the *psychological* characteristics of mystical and related experiences has been carried out, as well, by investigators outside of this neuroscience tradition (e.g., Deikman, 1963, 1966, 1971; Forman, 1990, 1999).

The four most important characteristics of the mystical experience have been described as its ineffability, noetic quality, transiency, and passivity (James, 1902/1985). Additional characteristics attributed to this experience have included feelings of unity, numinosity, loss of

ego, an altered appreciation of space and time, perceptual experiences and alterations, changes in affect, transformative changes, and paradoxicality (e.g., Stace, 1960). Other “spiritual” experiences have shared various of these qualities, and, in addition, may have included feelings of the presence of the divine, of angelic or other spiritual presences, and self-perceived encounters with various spiritual entities. An important “neurotheological” project would be to investigate carefully whether and how each of the qualities of naturally-occurring mystical and spiritual experiences might also occur in laboratory-induced versions of these experiences. Such studies—although difficult and challenging to do well—could be helpful in determining how closely the ostensibly mystical or spiritual experiences studied or induced in the laboratory resemble the naturally-occurring forms: Are they virtually identical, identical in some aspects only, or different in important ways? It is possible that neuroscientific and cognitive considerations may adequately account for some, but possibly not all, of the features of mystical and spiritual experiences.

The extensive studies just suggested should be carefully designed so as to exclude or eliminate the possible biasing role of the investigators’ own beliefs and expectations, subtle suggestive features of the settings and experimental procedures, and various other demand characteristics (Orne, 1962) of the experiments. It is well known that study outcomes can be influenced importantly by these various experimenter effects (Rosenthal, 1976). I suspect that some, or even a great deal, of the findings of various neurotheological studies (e.g., the work of Persinger and his co-workers [Cook & Persinger, 1997, 2001]) might have been contributed by subtle and not-so-subtle experimenter effects and demand characteristics that had not been adequately controlled for in these investigations, rather than by the ostensible interventions. I consider this an extremely important methodological consideration in evaluating results of prior work and in planning more adequate future investigations.

In a recent paper (Braud, 2002a), I suggested ways in which various psychological principles might account for the *alleged ineffability* of the mystical experience. Ineffability, of course, refers to an inability to report adequately, in words, the contents of an experience. The psychological principles addressed in the cited paper included (a) an expansion of awareness from a limited, focal, readily-described center to an extremely rich, complex, and extensive—and, hence, difficult or impossible to articulate—margin of the field of consciousness (building on seminal contributions by Frederic Myers [1903] and by William James [1910/1980]), (b) an attentional shift from a discrete figure to a large, complex, and novel ground, (c) limitations imposed by the nature of the “object” of the experience and by our vehicles of perception and cognition, (d) difficulties of memory transfer from nonordinary to ordinary states of consciousness (building on findings of the state-dependent features of some forms of learning and memory), and (e) constraints imposed by brain structures, culture and tradition, and self-fulfilling prophecies. These principles—alone or in combination—might account for some of the limitations of vehicles of expression of mystical and spiritual (and, indeed, many other nonverbalizable) experiences. However, such explanations leave open the possibility that exposure to a transcendent realm may actually occur in such experiences.

Studies of the *noetic* features and the possible transformative impacts of mystical and spiritual experiences—both in everyday life and in the laboratory—could play extremely important roles in investigating the adequacy of neuroscience and cognitive science explanations of such experiences. I treat noetic features and transformative impacts together because, often, profound life-changing outcomes and dramatic aftereffects have issued from the noetic aspects of mystical and spiritual experiences. These noetic aspects are occasions of *knowing* that occur during the experiences; this knowing has a direct, insightful, revelatory, deep, authentic quality and an impact for the experiencer that is beyond what is typically provided by or through the more familiar discursive intellect. The noesis-related changes can range from fresh perceptions, through major changes in one’s worldview, to callings and changes in vocation, to experiences of profound transformation, rebirth, and “conversion” (*metanoia*: change of heart or consciousness). A brief sampling of profound, life-changing impacts would include life changes in the founders and followers of the major religions and spiritual and wisdom traditions (e.g., the changes following experiences of “cosmic consciousness”; see Bucke, 1901/1966), the transformative changes experienced by persons who have had near-death experiences (see Greyson, 2000) or profound experiences—which can be maintained over periods of at least 24–27 years—facilitated by psychedelic (entheogenic) chemicals (e.g., Doblin, 1991; Pahnke, 1966), and the life-impacts of exceptional experiences occurring in religious or spiritual contexts (e.g., James, 1902/1985; Pratt, 1920/1934). Waldron (1998) provided a recent report of the life-impacts of transcendent experiences having strong noetic features. She found that these noesis-rich experiences addressed important life issues; had clearly discernable phases of integration; had profound significance to the percipient that resulted in a life orientation; had continuing noetic influences in the person’s life; eventually led to creative expression of the meaning contained in the experience; and had significant impacts on the experiencer’s belief system, relationships, and sense of self.

It will be important to examine whether the types of experiences studied in the laboratory can have the depth of noesis found in the types of natural experiences mentioned above, and whether there are similarly profound aftereffects or consequences in the case of the experiences occurring in the laboratory. Examining the *fruits* of the various experiences can provide one way of helping us understand whether the experiences studied by neuroscientists and cognitive scientists are similar to those occurring more naturally, in everyday life conditions. Appropriate studies of the short- and longer-term aftereffects of laboratory-induced experiences have not yet been carried out. Because such aftereffects are vital aspects of the natural, to-be-explained mystical and spiritual experiences, it would be premature to conclude too much about their nature and causes from laboratory studies that have not yet addressed the presence or degree of life-impacts.

The nature of the proffered “explanation” of an NTE can also help determine its impact. An unusual experience interpreted as a quirk of the brain may not have as much of a life-altering impact as the same experience interpreted in terms of its—often profound—subjective appreciation or its personal meaning and significance. How one frames the nature and meaning of an experience—especially an NTE—and how one chooses to understand and work with that experience, more deeply and more fully, can importantly influence whether or how that

experience might influence one's life or even eventuate in major transformative changes (see White, 1997). Simple interpretations as quirks of the brain would not seem to have such transformative power.

The noetic aspects, themselves, of mystical and spiritual experiences—quite apart from their possible life-impacts—have an even more direct relevance to the adequacy of interpretations based solely on brain functioning. If knowledge is gained in some of these experiences which, upon later examination, is found to have veridical aspects that could not have been explained on the basis of the experiencer's prior experience or access to that knowledge, such accurate content could not be explained readily on the basis of what is currently known about brain functioning. This kind of evidence would be a special case of the veridicality of knowledge already discussed above, in the section on psychical NTEs.

Does the Brain Produce or Transmit Consciousness?

It would be foolish to deny that certain brain structures and activities are *associated* with certain forms of consciousness. Such associations are supported by voluminous findings from research and clinical observations in neurology, psychophysiology, clinical and experimental neuropsychology, and related areas. However, the presence of a correlation, alone, does not provide sufficient information for concluding whether brain activities produce consciousness, or consciousness produces brain activities, or whether both consciousness and brain activities might be produced by something else. To prematurely conclude the first of the three possibilities just mentioned may be to fall prey to what might be called *the fallacy of the legless flea*. The possibility of this fallacy is suggested by the following fictional cautionary tale.

Once upon a time, there was an investigator who wished to find the locus of the organs of hearing of fleas. He laboriously trained a flea to jump whenever he uttered the word "jump." He then carefully analyzed his flea's anatomy to find where its ears might be located. He would say "jump," and observe a jump as an indicator that the flea had, indeed, heard him. He removed flea leg after flea leg, and the flea continued to jump whenever he commanded. When, finally, the flea did not jump, once he had removed the flea's final leg, he concluded that the flea's ears were located on that last leg, because, obviously, the flea had not heard his last jump command.

The point of this tale, of course, is to remind us not to confuse the ability to *have* an experience with the ability to *express* that experience in an observable way. To prematurely conclude that conscious content or activity might be impossible without corresponding brain content or activity may be to commit a more sophisticated and subtle form of the legless flea fallacy. This issue can be expressed, in more familiar terms, by asking whether brain structures and activities might *produce* or, rather, *transmit* consciousness.

One of the earliest statements of the brain's possible transmissive, as opposed to productive, role in consciousness was that of Ferdinand Canning Scott Schiller (1891/1894):

Matter is an admirably calculated machinery for regulating, limiting, and restraining the consciousness which it encases. . . . If the material encasement be coarse and simple, as in the lower organisms, it permits only a little intelligence to permeate through it; if it is delicate and complex, it leaves more pores and exits, as it were, for the manifestation of consciousness. . . . Matter is not that which *produces* consciousness, but that which *limits* it and confines its intensity within certain limits: material organization does not construct consciousness out of arrangements of atoms, but contracts its manifestation within the sphere which it permits. This explanation . . . admits the connection of Matter and consciousness, but contends that the course of interpretation must proceed in the contrary direction. . . . If, *e.g.*, a man loses consciousness as soon as his brain is injured, it is clearly as good an explanation to say the injury to the brain destroyed the mechanism by which the manifestation of consciousness was rendered possible, as to say that it destroyed the seat of consciousness. . . . If the body is a mechanism for inhibiting consciousness, for preventing the full powers of the Ego from being prematurely actualized, it will be necessary to invert . . . our ordinary ideas . . . [italics in original] (pp. 293-296)

The possible role of the brain as a releasing, permissive, or transmissive organ or vehicle of consciousness, rather than a producer of consciousness, was elaborated by William James (1898/1960). Just as a prism alters incoming white light to form the characteristic colored spectrum, but is not the source of the light; and just as the lengths of the pipes of an organ determine how the inflowing air yields certain tones and not others, but are not, themselves, the source of the air; so, too, argued James, the brain may serve a permissive, transmissive, or expressive function, rather than solely a productive one, in terms of the thoughts, images, feelings, and other experiences it allows. Henri Bergson (1914) and Aldous Huxley (1954) later expressed similar views of the brain as a *filter* or *reducing valve*, which served to block out much of, and allow registration and expression of only a narrow band of, perceivable reality, rather than as—necessarily—a *generator* of consciousness.

Today, this distinction of brain as producer or transmitter is often expressed picturesquely by asking whether the brain more closely resembles a light bulb (which is the source of the light it produces, and without which the light can no longer exist) or a television receiver (which modifies and expresses images from electromagnetic fields that exist apart from itself and which latter can continue to exist even in the absence of the receiver). The answer to this question has relevance to whether spiritual (or any other) experiences can be completely explained by identifying brain structures and activities that are associated with those experiences (a brain-as-producer view), or whether particular brain structures and activities might simply allow the registration or expression of something that might exist, in some form, apart from the registering/expressive structures and functions (a brain-as-transmitter view).

To find activity in a particular brain area does not mean that there is no independent referent or trigger of that activity. If brain mapping indicates a pattern of activity in the brain's occipital lobe, this could be a result of spontaneous, endogenous neural firings in that area. However, it also could indicate the presence of an external visual stimulus. So, too, neural firing patterns in some "spiritual center" or "God center" of the brain could be caused by spontaneous or contrived endogenous activities of a local, internal sort. However, such firings would not necessarily rule out an independently-existing spiritual or divine "trigger" for such activity.

The answer to this production versus transmission question has relevance, also, to the issue of whether it might be possible for consciousness to survive, in some form, following the death of the physical body. Of course, if a strong case ever could be made for the survival of some aspects of personality or of some forms of active consciousness, after death—including afterlife evidence that could not be explained readily on the basis of psychic functioning in the living—then such evidence would be strongly suggestive that a functioning brain may not be essential to the presence of at least some forms of consciousness. Findings and discussions of issues relevant to afterlife and survival research can be found in recent works by Doore (1990), Murphy (1992), Griffin (1997), Tart (1997), Greyson (2000), and Mills and Lynn (2000). F. W. H. Myers' classic *Human Personality and Its Survival of Bodily Death* (1903) remains an outstanding resource, even today.

An intriguing case that has a bearing on this production/transmission issue was recently reported by cardiologist Michael Sabom (1998; see, also, Greyson, 2000, pp. 338-341). Sabom described a near-death experience that occurred while its experiencer—a woman who was having an unusual surgical procedure for the safe excision and repair of a large basilar artery aneurysm—met all of the accepted criteria for brain death. The unusual medical procedure involved the induction of hypothermic cardiac arrest, in order to insure that the aneurysm at the base of the brain would not rupture during the operation. The patient's body temperature was lowered to 60 degrees Fahrenheit, her heartbeat and breathing ceased, her brain waves flattened, and the blood was completely drained from her head. Her electroencephalogram was totally flat (indicating no cerebral electrical activity) and auditory evoked potentials (normally elicited by clicks presented through molded earplugs that had been inserted into her ears) ceased (indicating cessation of brainstem functioning). Ordinarily—at regular body temperature—the brain cannot function without its oxygen supply for more than a few minutes. Lowering the body and brain temperature to 60 degrees F.—by chilling the blood in a bypass machine before returning it to the body and brain—however, can reduce cellular metabolism so that the brain can tolerate complete cerebral blood flow for the 45 minutes or so required for the brain operation. The patient later reported that, apparently while under these "brain death" conditions, she had a near-death experience (NDE) in which she was able to observe and hear details of objects and happenings in the operating room with accuracy. She also experienced classic components of the NDE, including a tunnel vortex, a bright light, and different figures in the light (many deceased family members, including a distant cousin of whose death she had been unaware).

On the face of it, the experience described above might suggest that mental functioning was occurring in the absence of the usual brain conditions upon which such functioning is taken to depend. The experience cannot be explained by temporal-lobe seizure-like activities, because the continuously monitored EEG indicated no such activity. The patient's eyes had been taped shut and her ears had been blocked by the molded ear speakers that had been inserted into her ears to demonstrate that even brainstem responses to clicks were absent. If she was indeed able to describe accurately various events that transpired after she had been anesthetized, she could not have been observing them through usual sensory means, nor could she have inferred the specific details that she reported.

To me, however, there are still ambiguities in this case that prevent our considering it a definitive demonstration of mental functioning in the absence of brain functioning. These reservations have to do with the timing and accuracy of the reported events, as well as the thoroughness of auditory masking by the earplugs. A satisfactory evaluation of this striking case would require answers to the following questions:

1. Were the descriptions of operating room events and objects sufficiently detailed so as to compel confidence in their accuracy?
2. Did the earplugs adequately prevent hearing of the various operating room sounds (conversations, particular musical selections) that were occurring during the operation (recognizing that even with closed ears there may have been the possibility of hearing via bone conduction); were these possibilities considered and adequately discounted?
3. Just *when* did the patient's subjective experiences occur, relative to the actual temporal occurrence of the events described? Only if the experiences themselves occurred *during* the periods of actual "brain death" would they have a bearing on the possibility of mentation in the absence of brain functioning. At first, this may seem a curious question. However, given the evidence for precognitive and retrocognitive experiences—from careful work in experimental parapsychology and psychical research—it is possible that the patient became aware of the during-brain-death-period events but became aware of these before or after the period of brain death, when the brain was functioning normally, and misconstrued the temporal ordering of subjective experiences and described events.
4. And, finally, the patient did not die; certainly there were residual processes (perhaps anatomical, perhaps biochemical, and perhaps even extremely subtle electrical processes) that continued to function even during the "brain death" period at sufficient levels so as to allow the continuation of, and return to, full brain and body functioning after the hypothermic operation. Even if the subjective experiences did occur during the brain-death period, sufficient brain functioning must still have been present to allow memories of the experiences to have been formed and persist until later (this assumes, of course, that brain functioning is necessary to support registration, storage, and retrieval of memories).

If the above four sets of questions could be adequately addressed, the intriguing findings from this and similar cases would pose great difficulties for attempts to account for unusual experiences solely on the basis of current models of brain functioning and activity.

The Need for Different, More Inclusive, and More Integrated Models and Conceptualizations?

In this chapter, thus far, brain and mind have been discussed as though they might be separate entities or qualities, and the nature and possible directions of their interactions have been addressed, either explicitly or implicitly. This way of framing the discussion is but a revisiting of the perennial issue of the nature of the mind-body interactions or the “mind-body problem.” The fact that philosophers, psychologists, and scientists have wrestled with this issue for so long, and have made so little satisfactory progress in this area, suggests that we may have been asking the wrong questions or framing our conceptualizations in incomplete ways. It seems time for fresh, more inclusive, and more integrated conceptualizations or models of these topics of study.

Rather than distinguishing body (brain structure and functioning) and mind (as revealed in not only the unusual experiences treated in this chapter but also in every mundane subjective experience), would it not be more satisfactory to speak, instead, of bodymind (or brainmind) as an integrated unit or process which has both materialistic/mechanical substrates and functions and also mentalistic/psychical/spiritual substrates and functions? This would require each side of the perennial debate to stretch their conceptualizations of both brain and mind, to extend each member of this perhaps misleading and only apparent duality, so that the resultant expanded conceptualization (bodymind/brainmind) transcends yet continues to include what had previously been acknowledged. This expanded construct would be given, and would operate on the basis of, the well-recognized physicalistic properties and principles that have been discovered through brain science. The same construct, however, would also be given, and operate on the basis of, other properties and principles discovered through phenomenological, parapsychological, and mystical/spiritual investigations. So, for example, aspects of this construct could respond to sensory information, electromagnetic fields, and so on, in a customary fashion. However, other aspects of this construct could respond to nonlocal events and distant information, and perhaps even to nonsensory, psychical, or spiritual/mystical realms, quite directly and in ways that may not be mediated by familiar physical laws and structures.

This thesis can be stated in several alternative ways: Brain may function as a bioassay for mind; mind may function as a psychoassay for brain; “spirit” may be real, but of a different sort of reality that can be perceived, under special conditions, by a different faculty of bodymind (one that traditionally has been known as the *imagination*; see Braud, 2002b). The “perceptions” or prehensions of the imagination may sometimes remain ineffable; at other times, these may be dramatized or personified (through vehicles of thoughts, feelings, and images) so that the referents of these experiences can somehow become available to the experiencer and expressible to others. This new approach could deal adequately with both the familiar facts of brain science and with the experiential realities with which psychical research and the religious, spiritual, and wisdom traditions have concerned themselves.

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Institute of Transpersonal Psychology

744 San Antonio Road

Palo Alto, California 94303

William Braud, Ph.D. is Professor and Research Director at the Institute of Transpersonal Psychology in Palo Alto, California.

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