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Journal of **Near-Death Studies**

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JOURNAL OF NEAR-DEATH STUDIES (formerly ANABIOSIS) is sponsored by the International Association for Near-Death Studies (IANDS). The *Journal* publishes articles on near-death experiences and on the empirical effects and theoretical implications of such events, and on such related phenomena as out-of-body experiences, deathbed visions, the experiences of dying persons, comparable experiences occurring under other circumstances, and the implications of such phenomena for our understanding of human consciousness and its relation to the life and death processes. The *Journal* is committed to an unbiased exploration of these issues and specifically welcomes a variety of theoretical perspectives and interpretations that are grounded in empirical observation or research.

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Editor's Foreword

It is with great humility and gratitude that I begin my tenure as editor of the *Journal of Near-Death Studies*. I am humbled by the magnitude of the job. For over a quarter century, near-founding *Journal* editor Bruce Greyson has dedicated his penetrating mental acuity, commitment to objectivity, and exacting writing standards to the publication of a wide range of well-presented perspectives on the topic of near-death and related phenomena. And with his status as a psychiatrist holding respected academic appointments at the University of Virginia and the University of Connecticut, he has infused credibility into the field of near-death studies – a crucial factor in the development of a field that both honors, and also often challenges the limits of, the prevailing Western worldview of positivism, materialism, and scientism.

Dr. Greyson has accomplished this feat on a grand scale. My own analysis of periodical literature through 2001 revealed that articles from the *Journal* represented 64% of all scholarly journal publications addressing near-death experiences. In an update of the literature through 2005, I found that authors had published 15 times more articles on near-death experiences (NDEs) in this *Journal* than in the journal with the next highest publication rate of such articles. In addition to its broad scope and high quality, the *Journal* is the clear leader in quantity of publications on NDEs.

Even to the end of Dr. Greyson's tenure as editor, he made a substantial contribution to the field, devoting his last issue of the *Journal* to the heretofore under-addressed topic of cross-cultural NDEs. It is my intention to proceed with editorship of this *Journal* on the basis of the example Dr. Greyson has set. As daunted as I feel in facing this process, I am equally grateful for the opportunity and for the confidence both Dr. Greyson and the IANDS Board of Directors has communicated in inviting me to become the third editor of the *Journal*. I also am very grateful to the Consulting Editors who have agreed to continue lending their expertise to the *Journal*. Metaphorically speaking, rather than attempt to fill Dr. Greyson's giant shoes, I hope to stand on the shoulders of this giant, seeing the field of near-death studies on its continuing journey into a far-reaching future.

My work in the field of near-death studies began in the mid-1980s when chaplain Leroy Joesten and I conducted the first study of veridical perception among resuscitated cardiac arrest patients in a hospital setting and when I wrote my doctoral dissertation on visual perception during the material out-of-body phase of the NDE – when NDErs report having viewed the material world from outside their bodies. Since then, I have been a scholar of near-death and related experiences, their role in human development, and counseling implications of them. Upon completion of my Doctor of Education degree in counselor education, I took a position as assistant professor of counseling at the University of North Texas, where my colleagues and I in the counseling program prepare professional counselors to work in a variety of settings from elementary schools to private practice. I am now a professor and chair of the Department of Counseling and Higher Education. For my colleagues in the higher education program, higher education refers to post-secondary institutions of learning. For me, it means educating about scholarly inquiry into higher states of consciousness and stages of development. It fits my sense of life purpose to embark on this journey of editing the *Journal of Near-Death Studies*.

As a first step on this journey, I am initiating a new section of the *Journal* entitled "Brief Reports." In this section, researchers may report studies in which the methodology and/or results may not warrant the more in-depth treatment of a full-length article. A particular challenge in the publication arena is the tendency of editors not to publish studies with null results, despite the fact that such results may actually contribute to the body of knowledge as much as results involving statistical and practical significance do. As a result of Brief Reports of no more than about 1,500 words, future investigators will be able to reference studies involving less rigor and/or null results and, if they wish, to contact the Report author(s) for more in-depth information.

Another early step on this journey is this, the first of a few transition issues between Dr. Greyson's editorship and my own. These transition issues will include material that Dr. Greyson accepted and that I endorsed and edited. I consider the focus of this first issue a kind of personal gift from Dr. Greyson, because it addresses my own long-standing fascination for what NDEs might reveal about the nature of consciousness, with particular attention to the role that veridical perception in NDEs might play in that revelation.

The theme of this issue is the view that mind transcends physical matter. Beginning at the end of the issue, research psychologist Carlos

Alvarado describes in a Letter to the Editor several cases of apparitions of living persons seen within days prior to those persons' actual deaths. Such cases contribute to a view that mind transcends physical limits. Just prior to Dr. Alvarado's Letter is Dan Punzak's review of *The Spiritual Brain*, in which he includes three points. One point is that an excellent companion volume to *The Spiritual Brain* is another book, *Irreducible Mind*. Conveniently, just before Mr. Punzak's review is neurobiologist David Presti's review of *Irreducible Mind*, in which he speculates that *Irreducible Mind* may play a major role in a scientific revolution regarding the prevailing view of the relationship between mind and matter. Both Mr. Punzak and Dr. Presti note that the respective authors of the books they reviewed addressed the topic of veridical perception in NDEs. That topic is the focus of the article that precedes Dr. Presti's review, in which Netherlands IANDS affiliate Rudolf Smit reports his findings from an in-depth investigation of an often-cited NDE anecdote of the veridical type. A third point in Mr. Punzak's review is his regret that the authors of *The Spiritual Brain* did not posit an actual theory of how mind and brain are related. Happily, such a theory is exactly the topic of the article by Robert Mays and Suzanne Mays that opens this issue.

I welcome feedback from readers and look forward to my tenure as editorial steward of this *Journal*.

Janice Miner Holden, Ed.D.
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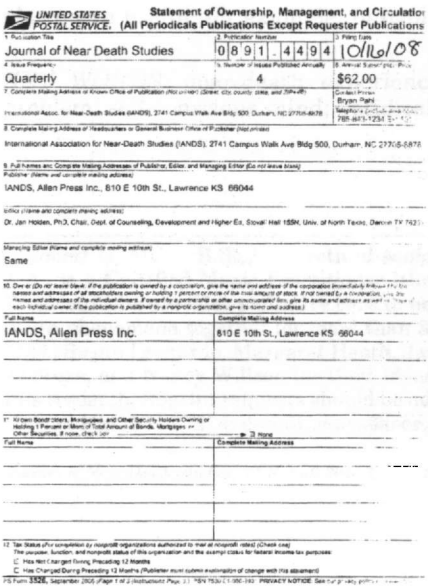

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The Phenomenology of the Self-Conscious Mind

Robert G. Mays, B.Sc.
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Chapel Hill, NC

ABSTRACT: The phenomenon of a near-death experiencer's veridical perceptions during the out-of-body experience (OBE) strongly suggests the existence of a *self-conscious mind* as a "field of consciousness," a region of space where a person's consciousness exists. In the out-of-body state, the mind appears to be nonmaterial and completely independent of the physical body. Ordinarily, though, the self-conscious mind appears as an autonomous entity united with the brain and body. In this united state, the self-conscious mind operates through the mediation of the brain. This view is supported by evidence from neurological phenomena such as subjective antedating of sensory experiences and mental force. This evidence suggests that a nonneural agency induces conscious experience and self-conscious awareness. Phenomena from OBEs, including apparent subtle interactions with physical processes such as light, sound, and physical objects, as well as reported interactions with "in-body" persons, support the view that the self-conscious mind is able to interact in some physical way with the brain. Neurological phenomena such as Benjamin Libet's (1985) delayed awareness of willed action can be reconsidered successfully in light of this view. Such efforts might also prove useful, for example, in explaining phantom limb phenomena.

KEY WORDS: near-death experience; out-of-body experience; mind-body problem; self-conscious mind; veridical perception.

Robert G. Mays, B.Sc., is a retired senior software engineer and Suzanne B. Mays, A.A., is a Certified Music Practitioner (through the Music for Healing and Transition Program) who provides palliative care to hospitalized patients. They have studied near-death phenomena together for more than 30 years. They are grateful to Mark J. Eisen, M.D., Susan Leonardo, Margaret Heath, James Hoesch, Bruce Kirchoff, Ph.D., Connirae Andreas, and Nancy Willson for their ideas and thoughtful encouragement throughout this research. Reprint requests should be addressed to Mr. Mays at 5622 Brisbane Drive, Chapel Hill, NC 27514; e-mail: mays@ieee.org.

In the near-death experience (NDE), the apparent locus of an experiencer's self-conscious awareness shifts from being within the body to outside the body. Near-death experiencers frequently find themselves hovering several feet over their physical bodies, watching the efforts to revive them. The shift of consciousness outside the body is a primary characteristic of most NDEs. While outside the body, the near-death experiencer (NDEr) retains the faculties of perception, thought, volition, memory, and feelings, as well as self-awareness, in short, nearly all of the faculties of ordinary consciousness. In a number of cases, the NDE has been shown to have occurred when the body and brain were clinically dead, as in cardiac arrest, that is, with a flatlined electroencephalogram (EEG), no pulse or respiration, and lack of pupil or gag reflexes (van Lommel, van Wees, Meyers, & Elfferich, 2001). NDErs may still have rich cognitive experiences during the period of complete loss of cortical and brain stem activity, including having veridical perceptions of their immediate physical environs that are later verified.

The fact that self-conscious awareness appears to operate with full mental faculties outside of the body, when the body and brain have ceased to function, contradicts the prevalent view of neuroscience that consciousness can occur only when there is physical brain activity. Yet the NDE appears to be a continuous, seamless experience of the *same self* who retains a continuity of memory from before the start of the NDE to after the return to the body, like any other significant life experience.

Furthermore, if self-conscious awareness can separate from the body and operate *independent* of it for a time, then self-conscious awareness probably operates as an autonomous entity *as well* in the body, although it is intimately united with the body and brain. Thus, the phenomenon of the NDE-related out-of-body experience (OBE) can provide indications of what aspects of consciousness are in fact independent of the brain. Conversely, various "neural correlates of consciousness" can provide indications of how an autonomous conscious entity operates when united with the brain. These two perspectives of consciousness, existing for a time outside the body and, in the usual case, united with it, together argue strongly for the existence and agency of a *self-conscious mind.*

The OBE Component of the NDE

The focus of this paper is the OBE component of the NDE, in which the experiencer feels separated from the body but still has veridical

experiences of the ordinary physical environs. The proportion of NDErs who report an OBE as part of their experience has variously been reported as 75 percent (Greyson & Stevenson, 1980), 83 percent (Greyson, 1983), and 100 percent (Sabom, 1982). The difference among these different studies may be due to the definition of an OBE. The OBE is defined as the experience of one's consciousness being separated from one's physical body. In the Weighted Core Experience Index (WCEI) for NDEs, Kenneth Ring (1980) assigned a score of 2 if the individual described a "clear out-of-body experience" and 1 if the individual had a sense of bodily separation without this experience. In his NDE Scale, Bruce Greyson (1983) assigned 2 if the individual clearly left the body and existed outside it and 1 if the individual lost awareness of the body. Our definition is more narrow: a clear sense of separation from the body accompanied by perceptions of the physical world, but not necessarily perceptions of one's body.

A striking example of the clear experience of separation from the body is the case of George Ritchie (1998, pp. 28–30 & 51; Ritchie & Sherrill, 1978, pp. 36–41 & 96–99), which included an unusual OBE with apparent veridical perceptions and a very elaborate NDE. Ritchie, aged 20, a recent recruit in the Army, appeared to die of acute lobar pneumonia in the hospital at Camp Barkeley, located near Abilene, TX, around 3:00 A.M. on December 20, 1943. Ritchie had been unconscious but woke up and found himself sitting on his bed with another person lying in the bed. He remembered his urgent need to get to Richmond for the beginning of his medical training and realized that he had missed the train. Ritchie rushed out of the hospital ward building, passing straight through its metal rear door, and found himself flying rapidly, about 500 feet up, over the frozen landscape. The night was clear and crisp, but he did not feel cold. He saw that he was traveling east, from the position of the North Star to his left in the night sky.

Ritchie came upon a broad river with a long, high bridge and a sizeable city on the far bank. He felt he should stop to get directions to Richmond and "landed" outside a white, red-roofed, all-night café on a corner, with a "Café" sign above the door and a blue neon "Pabst Blue Ribbon Beer" sign in the large, right, front window. In trying to speak to a passerby, Ritchie realized that others could not see him. When he leaned on the guy-wire of a telephone pole, his hand passed through it, and he realized that somehow he had been separated from his body and now needed to get back to it. Ritchie rapidly returned to the

hospital but had difficulty finding his body in the 2300-bed hospital. He finally recognized his body by the ring on his hand. A sheet had been placed over his head, and he realized that he had died. Still, he was awake, thinking, and experiencing, but without a body. Frantically, Ritchie clawed at the sheet to draw it back, but he grasped only air.

Ritchie then encountered a Being of Light whom he understood to be Christ. He had a life review and further extensive experiences in other realms. Ritchie ultimately returned to his body under the sheet, his throat on fire and his chest in pain. An orderly noticed his hand had moved and persuaded the doctor to inject adrenalin directly into the heart muscle, an unusual medical procedure at that time. Ritchie revived and ultimately recovered. In notarized statements some 14 years later, the doctor in charge confirmed that Ritchie had been dead at least eight to nine minutes, and the attending nurse confirmed that Ritchie had been pronounced dead at two different times but had been given the injection into the heart. The nurse confirmed that after Ritchie had recovered, he told her that he had had an unusual, life-changing experience but did not go into details.

Ten months later, after flunking out of medical training, Ritchie was driving with three Army buddies back to Camp Barkeley to finish basic training. They drove south from Cincinnati and came to Vicksburg where they stayed overnight. Ritchie had never been to Vicksburg before. The next morning, Ritchie recognized how the river flowed next to Vicksburg and, as they drove through the city, he recognized that up the street they would come to the café where he had "landed" the previous December. Ritchie sat there in the car in front of the café. He recognized the neon Pabst sign in the window (now out) and the guy-wire, exactly as they had appeared earlier. The all-night café was 524 miles directly due east of the hospital door at Camp Barkeley.

Ritchie's NDE was unusual for the extent and duration of the OBE component and for its apparent veridical perceptions of physical reality. These aspects probably resulted from Ritchie's strong desire not to miss the start of his medical training at the time of his "death." His desire propelled him away from the hospital to a strange city many miles away, whereas most NDE OBEs occur in the general vicinity of the NDEr's body. Paul Edwards (1996) critiqued Ritchie's account and dismissed his recognition of the river and bridge, the city of Vicksburg, and the café as a *déjà vu* experience to which Ritchie would be prone, to supply the needed rational support for his experience. Edwards

supplied no justification for this assessment, but his use of this term is incorrectly applied to Ritchie's experience. The standard definition of *déjà vu*, "any subjectively inappropriate impression of familiarity of a present experience with an undefined past" (Brown, 2004, p 12), does not apply, because Ritchie stated that he *recognized* specific details of the building and the locale from memory of a specific experience, hardly an "impression of familiarity with an undefined past."

In the following three sections, we present a more detailed phenomenology specifically of the OBE component of the NDE.

Continuity of Consciousness with Cessation of Brain Function

Several prospective studies of cardiac arrest survivors have been conducted that provide an unambiguous model of the NDE during the dying process (Greyson, 2003; Parnia & Fenwick, 2002; Parnia, Waller, Yeates, & Fenwick, 2001; Sartori, Badham, & Fenwick, 2006; Schwaninger, Eisenberg, Schechtman, & Weiss, 2002; van Lommel et al., 2001). The NDE occurs with reasonable frequency during cardiac arrest, sometimes with an OBE component that includes veridical elements (Sabom, 1982, 1998; van Lommel et al., 2001). The physiology of cardiac function, respiratory function, cerebral electrical activity, and cerebral blood flow following cardiac arrest is well-known and corresponds to the criteria for determination of death: no cardiac output; no spontaneous respiration; and fixed, dilated pupils. Within 10 seconds after an arrest, blood flow to the brain, electrical brain activity, and brain stem function all rapidly cease and the patient loses consciousness. For a period, the patient may be considered clinically dead, even if he or she is subsequently successfully resuscitated. Nevertheless, during the arrest, some patients report vivid, conscious, out-of-body perceptions of themselves and their physical environs that are characteristic of the NDE.

Within the first 10 seconds or so of cardiac arrest, the velocity of blood flow in the middle cerebral artery (V_{mca}) drops to zero centimeters per second, and blood pressure drops to less than 20 millimeters of mercury (Clute & Levy, 1990; de Vries, Bakker, Visser, Diephuis, & van Huffelen, 1998; Gopalan, Lee, Ikeda, & Burch, 1999; Parnia & Fenwick, 2002). V_{mca} is a reliable measure of overall cerebral blood flow. Also during the initial 10 seconds or so, the patient's EEG changes first by a short-term increase in alpha frequencies, then a drop in both alpha and beta frequencies, an

increase in delta frequencies, and finally a decrease in delta frequencies (Visser, Wieneke, van Huffelen, de Vries, & Bakker, 2001). The EEG then declines to zero or isoelectricity (that is, it "flatlines") within 10 to 20 seconds after the arrest (Clute and Levy, 1990; de Vries et al., 1998; Losasso, Muzzi, Meyer, & Sharbrough, 1992; Vriens, Bakker, de Vries, Wieneke, & van Huffelen, 1996). The patient *loses consciousness* prior to isoelectricity, during the increased delta activity, that is, about 10 seconds after arrest (Aminoff, Scheinman, Griffin, & Herre, 1988; Brenner, 1997). Also just prior to isoelectricity, the patient may exhibit short muscle spasms and jerking (Brenner, 1997). With the decline of cortical electrical activity, *brain stem electrical activity* also declines simultaneously to isoelectricity, as observed by monitoring brain stem auditory evoked potentials during induced cardiac arrest in hypothermic circulatory arrest procedures for treatment of cerebral circulatory aneurysms (Spetzler, Hadley, Rigamonti, Carter, Raudzens, Shedd, & Wilkinson, 1988). Brain stem isoelectricity is also consistent with the observed loss of consciousness and general loss of autonomic function and reflexes associated with brain stem activity: no spontaneous respiration; no pupillary response to light; and no corneal reflex, gag reflex, or cough reflex. Because brain stem electrical activity mirrors cortical electrical activity as a result of the level of cerebral blood flow, it is reasonable to infer that virtually *all* brain electrical activity ceases in the first 15 seconds, on average, of cardiac arrest.

With the onset of cardiopulmonary resuscitation (CPR), such as chest compressions, defibrillation shock, artificial respiration, and administration of drugs, low level cerebral blood flow (reperfusion) can resume. With reperfusion, the EEG may begin to recover, even before cardiac function is restored (Losasso et al., 1992). EEG recovery follows the pattern of EEG changes at cardiac arrest in reverse order (Brenner, 1997). As the arrest duration increases, *EEG recovery time*, the time measured from cardiac recovery to return to normal EEG, increases even more. For example, an arrest of 40 seconds duration will result in an EEG recovery time of about an additional 80 seconds (de Vries, Visser, and Bakker, 1997; Vriens et al., 1996). Even after short periods of unconsciousness of 60 to 90 seconds, the patient is usually dazed, slow to respond, or confused for about 30 seconds after regaining consciousness (Aminoff et al., 1988).

If the arrest lasts longer than a threshold of about 37 seconds, when circulation subsequently resumes there is a period of cerebral

"hyperfusion" during which blood flow and oxygen uptake in the brain are much greater than normal (de Vries et al., 1998; Smith, Levy, Maris, and Chance, 1990). Data for longer periods of cardiac arrest are available from animal experiments. In induced cerebral ischemia in rabbits from 2.5 to 15 minutes, specific regions of the brain develop circulatory defects that inhibit or prevent reperfusion, a phenomenon called "multifocal no-reflow" (Ames, Wright, Kowada, Thurston, and Majno, 1968). The no-reflow defects occur during the arrest and increase in number as the duration of ischemia increases. The defects are probably caused by reduced post-arrest blood pressure, increased blood viscosity, disseminated blood clots, and compression of blood vessels due to swelling (Buunk, van der Hoeven, & Meinders, 2000). If the defects are too severe, the global hyperfusion and hyperoxia that ensue are not able adequately to reoxygenate the affected regions. Thus, the longer the cerebral ischemia, the larger will be the areas of permanent damage. The regions that were most susceptible to no-reflow damage in animal experiments were the striatum, thalamus, and hippocampus, as well as various regions of the cortex (Kågström, Smith, & Siesjö, 1983). These results are consistent with findings in humans (Fujioka, Nishio, Miyamoto, Hiramatsu, Sakaki, Okuchi, Taoka, & Fujioka, 2000; Kinney, Korein, Panigrahy, Kikkes, & Goode, 1994) and are consistent with observed cognitive and memory deficits in cardiac arrest survivors (Dougherty, 1994; Sauvé, Walker, Massa, Winkle, & Scheinman, 1996).

The usual duration of cardiac arrest is 1 to 2 minutes in cardiac care units (van Lommel, 2006), 5 minutes in nonmonitored hospital wards (Herlitz, Bång, Aune, Ekström, Lundström, & Holmberg, 2001), and even longer in an out-of-hospital cardiac arrest. In the Dutch prospective study of 344 cardiac arrests (van Lommel et al., 2001), 68% of the 344 patients were successfully resuscitated in the hospital. Of these, 81% were resuscitated within 2 minutes of arrest, and 80% were unconscious less than 5 minutes, and another 13% were resuscitated within 1 minute of arrest and were unconscious less than 2 minutes. The remaining patients in the study received CPR outside the hospital (usually in an ambulance) or were resuscitated both out of and in the hospital. Of these 110 patients, 80% were in arrest longer than 2 minutes, and 56% were unconscious longer than 10 minutes. Overall, 36% of the 344 patients were unconscious longer than 60 minutes. These statistics are probably typical of cardiac arrest resuscitation in general: The typical in-hospital cardiac arrest

survivor is in arrest for 1 to 2 minutes and is unconscious 2.5 to 5 minutes. The typical out-of-hospital cardiac arrest survivor is in arrest for about 4 to 10 minutes and is unconscious about 10 to 60 minutes or longer.

From the foregoing description of cardiac arrest physiology, the *period of global cerebral isoelectricity* typically goes from 15 seconds after the arrest to 5 to 10 seconds after the start of CPR but reverts to isoelectricity when chest compressions are stopped if cardiac function has not restarted. Even with the restart of electrical activity, the EEG does not return to normal for a considerable time after rhythmic delta activity reappears, depending on the length of the arrest (de Vries et al., 1997; Vriens et al., 1996). In a best-case scenario of an arrest of only 40 seconds, the EEG recovery time would be an additional 80 seconds. In longer arrest times, the EEG recovery time and corresponding cognitive functions would be influenced by the multifocal no-reflow effects that occur and would be considerably longer. Similarly, the *period of unconsciousness* goes from 10 seconds after the arrest to some time after the return of normal EEG, probably followed by a period of dull or confused consciousness. In cardiac arrests of 2 minutes or longer, the duration of unconsciousness is probably most influenced by multifocal no-reflow effects.

During the period of global cerebral isoelectricity and loss of consciousness, some cardiac arrest survivors report vivid NDEs that include OBEs with apparent veridical perceptions of the events of their resuscitations. Their perceptions can place the time of their conscious experience, which can then be correlated with the likely state of their brain function, such as minimal cerebral activity (for example, during CPR or defibrillation) or no cerebral activity (for example, in arrest). Frequently, their veridical perceptions include the *onset* of the resuscitation efforts (Sabom, 1982, pp. 28–31, 53, 87–113), when global cerebral isoelectricity was very possible.

One example of the apparent continuity of consciousness through a period of complete cessation of cerebral activity was documented by Michael Sabom (1998). Pam Reynolds, age 35, underwent surgery in 1991 for a large basilar artery aneurysm at the base of her brain. The complex procedure involved hypothermic cardiac arrest, which included lowering her body temperature to 60 degrees Fahrenheit, stopping her heart and breathing, and draining the blood from her brain (Spetzler et al., 1988). At this point, Reynolds was in "standstill" and, by all measures, was dead. The aneurysm was then excised, her

blood and body temperature restored, and her heart and breathing restarted.

Anesthesia was induced at 7:15 a.m., Reynolds's eyes were taped shut, and molded ear plugs were placed in her ears and taped, which emitted 100 decibel clicks at 11 to 33 clicks per second (a deep hum, three to four octaves below middle C, as loud as a jackhammer at two meters). At 8:40 her body was draped, and around 8:45 Reynolds experienced an NDE OBE, as the surgeon began cutting through her skull with a specialized pneumatic surgical saw to access her brain. Her vision in the OBE was more focused and clearer than normal. As she hovered over the surgeon's shoulder, she noticed that the saw resembled an electric toothbrush with a peculiar shape. It used interchangeable blades that were kept in a container resembling a socket wrench case. Reynolds also heard comments from a female doctor about her veins and arteries being too small. Reynolds continued to have a deep NDE involving a tunnel vortex, entering an incredibly bright light, and meeting a number of deceased relatives.

During the time of her NDE, the surgical procedure continued: Blood cooling started at 10:50, and Reynolds's heart was stopped at 11:05. The EEG monitor registered cerebral isoelectricity. Brain stem function, measured by evoked potential electrical activity in response to the 100 decibel clicks, also gradually went to zero. Reynolds was brought to standstill about 11:25 with the blood drained from her body. The surgical excision of the aneurysm was completed, and her blood flow was restarted. At this point, the EEG and brain stem monitors showed resumption of electrical activity. At 12:00 Reynolds's heart was restarted. At 12:32 p.m., the bypass machine was removed, and around 2:00 the surgical wounds were closed. In her NDE, Reynolds was brought back through the tunnel by her deceased uncle and saw her body. She did not want to get back into the body because it looked terrible to her, like a corpse. Nevertheless, with a little push, she reentered her body. When Reynolds came back to her body, she heard the younger surgical assistants playing a particular song in the background.

Later, Sabom verified that Reynolds's perceptions of the surgical saw and of the doctor's comment about her veins were accurate. However, both of these perceptions occurred around 8:45, while Reynolds was under anesthesia but well prior to cortical isoelectricity, which went from about 11:05 until perhaps 11:45. The time of her return to the body can be established as having occurred around the

time of surgical closure (that is, 2:00), because Reynolds could identify music being played in the background (Sabom, 2007, p. 258). The entire NDE was thus framed at the beginning and end by veridical perceptions and included the period of documented standstill.

In this account, we have a conscious NDE OBE with veridical perceptions during a surgical procedure but not during cerebral isoelectricity. However, the NDE continued *with no apparent interruption* through an extended period of probably 40 minutes of monitored cortical isoelectricity. Reynolds's account did not indicate a sense at any point of her NDE that her consciousness was diminishing or fading, or that she was being drawn back to her body, except after coming back, when she was "pushed" back into her body. Thus, whereas the veridical perceptions occurred at a point when Reynolds was under anesthesia and, therefore, unconscious, they occurred while there was still some electrical brain activity consistent with anesthesia. Nevertheless, the initial OBE component was part of a *continuous conscious experience* that spanned a period of about 40 minutes of global cortical isoelectricity. One would expect that Reynolds would have had no experience whatsoever, given that she was anesthetized during the entire time and had no cortical electrical activity during a major portion of the surgery.

Keith Augustine (2007a, 2007b) claimed that Reynolds's experience was more readily attributable to anesthesia awareness: He proposed that Reynolds's anesthesia failed and that she was able to hear the pneumatic saw, inferring its shape and socket wrench case from prior experiences at a dentist's office, and to hear the doctor's comment about the size of her veins and arteries, despite the molded speakers in her ears. He suggested that during standstill, Reynolds slipped into unconsciousness but resumed her anesthesia awareness after rewarming; therefore, she would not have felt any period of unconsciousness. However, Reynolds's experience was not consistent with the typical patient experience of anesthesia awareness, which is characterized by pain, helplessness, terror, paralysis, and postoperative distress (Osterman, Hopper, Heran, Keane, & van der Kolk, 2001). Augustine's explanation also does not account for Reynolds's failure to notice the brain stem evoked potential tests blasting in her ears. These tests were conducted about 25 times during the procedure: prior to surgical opening; during the bypass, cooling, arrest, and rewarming; and prior to surgical closing. Reynolds could hear the doctor's voice through the coverings in and around her ears but not the

100 decibel tests directly in her ears. In a study of unconsciousness in 100 patients, Madelaine Lawrence (1997) described 27 cases of "total unconsciousness." In those cases, there was a *discontinuity* in the subjective experience – that is, experiencing one thing and then experiencing something different, with no transition – with some patients also having a distinct warning of the impending unconscious episode. If Reynolds's experience included a period of unconsciousness, we would expect her account to include a similar discontinuity, and probably also a warning that her consciousness was fading. Reynolds reported neither of these experiences.

In a cardiac arrest with an NDE, even with the onset of global cerebral ischemia and cerebral isoelectricity, the patient appears to experience a continuity of consciousness, generally with a perspective out of the body, looking down. The patient generally experiences no disruption in consciousness (except for the change in perspective) at a time when all electrical brain activity has almost certainly ceased. The patient experiences a lucid, vivid consciousness of the physical environs and still possesses all of the faculties of ordinary consciousness. The patient appears to experience complete continuity of consciousness even when the cerebral electrical activity resumes, until there is a clear transition back to the body, at which point the patient's consciousness continues, now with an in-body perspective, or the patient becomes unconscious and wakes up later. During the entire period of out-of-body consciousness, the patient appears to medical personnel to be completely unresponsive and unconscious.

Thus, the phenomenon of NDEs during cardiac arrest, with veridical out-of-body experiences of the physical environs during the period of global cerebral isoelectricity, challenges the hypothesis that consciousness is entirely dependent on brain function. Under ordinary circumstances this hypothesis is correct, because the loss of electrical brain activity nearly always results in unconsciousness. However, the cases of NDEs during cardiac arrest are notable exceptions which show that, once separated from brain function in an NDE, the patient's consciousness appears to continue in an OBE. Even after brain electrical activity resumes, consciousness continues to operate independently until there is a sense of reuniting with the body. Any interruption in consciousness during the NDE OBE would be evident, because the transitions in losing and then regaining consciousness would be remembered as discontinuities (Lawrence, 1997). Such interruptions are never reported in these NDEs. The patient's

consciousness functions with all of the attributes of ordinary consciousness, in a *continuity of self-conscious experience* that spans when the patient was in the body, through the OBE, and back through the time of reuniting with the body. The patient experiences the transitions out of and back into the body as natural, albeit unusual, occurrences and is able to integrate the entire experience in memory.

Veridicality of NDE OBE Perceptions

The foregoing account of the continuity of consciousness during periods of global cerebral isoelectricity rests on the validity of veridical perceptions during the NDE OBE, because these perceptions establish that the NDE consciousness occurred at a time of global cerebral isoelectricity or, at minimum, profound physical unconsciousness. The evidential value of these perceptions depends on corroborative evidence that the perceptions were real (that is, "veridical") and that they could not have been imagined or mentally constructed at some other time, for example, having been inferred from subliminal sensory awareness during anesthesia, from prior general knowledge, from expectations derived from earlier experiences, from information supplied by others after the fact, from lasting physical aftereffects such as soreness or burns from a defibrillation, or from lucky guesses (Blackmore, 1993).

There are hundreds of accounts of purported veridical NDE OBE perceptions. Usually they are checked by the NDErs themselves soon after the experience. The perceptions are frequently self-verified, as in the case of Ritchie described above, or are verified by asking one other witness, as in "I told the doctor what I saw and he said it happened just that way" (Moody, 1975, pp. 98–100; Moody & Perry, 1988, pp. 170–172). In some cases, the NDE is reported by the attending physician who provided the verification (Parnia, 2006, p. 77). In some cases, the perceptions were of unusual events occurring in other parts of the hospital (Moody & Perry, 1988, pp. 18–20).

As a rule, NDE OBE perceptions are found *informally* to be veridical, that is, they appeared real, were checked with witnesses, and were verified. In contrast, reports that perceptions in an NDE were found to be *nonveridical* are rare. Janice Holden (2008) reported results of a study of NDEs with purported veridical perception that could not have been the result of normal perception and that was corroborated by the NDEr or others. Of 93 cases, 92 percent appeared

completely accurate, 6 percent had both accurate and erroneous elements, and less than 1 percent were completely erroneous.

Thus, one would expect that NDE OBE perceptions would be easily proven *formally* to be veridical. However, in only a few cases have NDE researchers been able to corroborate experiencers' perceptions more thoroughly by checking independently more than one source. Two examples of corroborated veridical NDE perceptions are those of Al Sullivan (Cook, Greyson, & Stevenson, 1998) and the patient with the nurse peeking around the curtain (Sartori et al., 2006). In the first case, Sullivan, 56 years old, underwent emergency coronary bypass surgery and while unconscious felt himself leave his body. He was able to look down and saw his surgeon "flapping his elbows" as if trying to fly. On regaining consciousness, he related his observation to another physician, who confirmed that the surgeon had this peculiar habit to avoid touching the sterile operating field. Nine years later, the surgeon confirmed that it was his regular habit to point with his elbows, so as not to touch anything until the actual surgery.

In the second case (Sartori et al., 2006), a 60-year-old man recovering from surgery was asked by a physiotherapist to get up and sit in a chair. Within 5 minutes, the patient's blood pressure dropped and his condition deteriorated, including a brief episode of cardiac arrhythmia that reverted spontaneously. He was put back in bed and was deeply unconscious. The physiotherapist was concerned that she had caused the episode and nervously poked her head around the bedside screens from time to time to check on the patient. Upon recovering, the patient immediately reported that he had floated out of his body and could see the doctor and nurses working on him. He also reported that he saw the nervous-looking physiotherapist hiding behind the curtains and poking her head around to check on him. The patient's perceptions were corroborated by Penny Sartori, who was present during the procedure.

In both of these cases, the central veridical perception was an unusual occurrence of a purely visual perception when the patient was unconscious. In both cases, the perception was later independently corroborated, in the latter case within a short time.

Thus, the evidence so far for veridical perception during NDE OBE is abundant, but veridicality has been demonstrated reasonably conclusively in only a few cases (see also the NDEr who saw the nurse opening a glass vial in another room, Moody & Perry, 1988, pp. 19–20). The lack of full, formal corroboration needs to be balanced

against the large number of cases of informal verification and the near absence of *nonveridical* elements in reported NDE OBE perceptions. The cases of informally verified veridical perceptions and those with good corroboration together strongly suggest that the NDEr's experience of viewing events outside of the body are correct and that consciousness operates completely independent of the body during NDE OBE.

Phenomenology of the NDE OBE

It is important for the present discussion to develop the phenomenology specifically of the NDE OBE in more detail, drawing from various general phenomenological descriptions of the NDE and from individual NDE accounts in the literature.

First, the process of leaving the body is frequently accompanied by a hissing, whirring, or whooshing sound (Moody, 1975, pp. 29–30; Ring, 1980, pp. 94–95) and occasionally by tingling throughout the body (Grey, 1985, p. 48; Ring & Valarino, 1998, pp. 13–14). There does not appear to be a consistent part of the body through which the nonmaterial body leaves the physical body. A few NDE OBErs observe a thin thread or cord attaching their nonmaterial body to the physical body.

Second, the apparent locus of consciousness shifts from within the physical body to outside and appears to have an independent existence. NDE OBErs can generally perceive their immediate physical surroundings, including their physical bodies, with a perspective some 4 to 8 feet above it, frequently at the ceiling in a corner of the room. There is a complete separation of the self from the physical body, which now generally appears as an "empty shell" (Sabom, 1982, p. 21). A few NDErs observe that their physical body still moves and interacts with the physical world, but they are detached from it (Gibson, 1992, pp. 234–236; Harris & Bascom, 1990, p. 23; Steiger, 1994, pp. 97–98). There is a continuity of the individual's sense of self and of memory, which continues from being in the body, to out of the body, and then back to the body. The individuals feel themselves to be the same persons throughout the experience.

Third, individuals feel no pain, as in physical bodily pain, even when painful medical procedures are performed on the body (Sabom, 1982, pp. 31, 100). They have the feeling that they have been freed from the

body, and they typically report feeling elated at that sense of freedom. They feel weightless and tireless, a general warmth, and completely at peace. However, during hellish types of NDEs, they apparently can experience injury to the nonmaterial "body" and emotional pain (Dovel, 2003, p. 87; Storm, 2000, p. 20).

Fourth, Raymond Moody (1975) found that a large majority of individuals reported they had some sort of nonmaterial body during the NDE (p. 42), although other researchers found a lower percentage: 58% of individuals (Greyson & Stevenson, 1980). The "body" has a quality variously described as translucent, "cloud-like," and an "energy pattern" (Serdahely, 1993, p. 88) and as shaped either like the physical body or like a sphere or ovoid (Lundahl & Widdison, 1997, p. 108; Moody, 1975, pp. 42–50). For other NDErs, their consciousness appears to be a single point or focus.

Fifth, a surprising number of people who had their NDEs during infancy or early childhood report that they were "adults" during their NDEs (Moody & Perry, 1988, pp. 74–76). Cherie Sutherland (1995, pp. 13–14) characterized the reports of the NDEs of very young, pre-linguistic children as quite complex when they were later reported. It appears that most reports of an NDE OBE that was experienced by a neonate or infant describe the experience from an adult perspective, with the NDEr at the time apparently having fully-developed perception and thought, and retaining memory of the experience, similar to having an adult mind in a child's body (Atwater, 1994, pp. 12–13, 24–26; 2003, pp. 8, 64–65, 236–238; 2007, pp. 55–56; Fenwick & Fenwick, 1995, pp. 183–184; Morse & Perry, 1990, pp. 40–42; Ring & Valarino, 1998, pp. 107–112; Serdahely & Walker, 1990; Sutherland, 1995, pp. 56–57, 82–83, 136–138).

Sixth, existing sensorimotor or structural defects or disabilities such as blindness, deafness, lameness, or missing limbs are absent in most NDErs, but not in all cases (Gibson, 1992, pp. 229–230; 1999, p. 130; Grey, 1985, pp. 87–88; Moody & Perry, 1988, p. 86). In one study, out of 60 NDErs who reported having a nonmaterial "body," 46 had no pre-existing defects, 12 reported their pre-existing defects were absent, and 2 reported such defects were still present (Greyson & Stevenson, 1980). NDErs with poor vision can see clearly (Ring & Valarino, 1998, pp. 60–62). NDErs who are blind or visually impaired, including those blind from birth, claim to see during their NDE OBEs (Moody & Perry, 1988, p. 171; St. Claire, 1997, p. 127), and, in a few cases, visually-based knowledge that could not have been obtained by ordinary means

can be corroborated independently (Ring & Cooper, 1997). NDErs who are middle-aged or older may feel or "see" themselves as much younger (Grey, 1985, pp. 87–88; Sabom, 1982, pp. 21–22).

Seventh, the ordinary mental and cognitive faculties of perception, thought, volition, memory, and feelings are present, although sometimes in modified form, as detailed below. There is a heightened sense of reality (Sabom, 1982, pp. 16, 22). There is enhanced clarity of thought, perception, and memory, with lucid mental processes when separated from the body. The NDEr's volition operates without any constraint or limitation of the physical body. The individual can direct movement simply by thinking or desiring it and then move very quickly or seemingly instantaneously (Moody, 1975, pp. 50–52).

Eighth, the individual has visual perception including color, but the perception has much greater acuity than in the body. Vision during the NDE OBE for some experiencers appears still to require light (Ritchie & Sherrill, 1978, p. 37), but others experience very bright illumination. The NDE OBEr also has a kind of "zooming" or "wrap-around" vision involving simultaneous 360 degrees vision around an object, through it, and within it (Benedict, 1996, p. 42; Moody, 1975, pp. 51–52; Ring & Cooper, 1999, p. 162). The wrap-around vision appears to operate effortlessly. The visual acuity and wrap-around vision may by explained partly by the ability of NDErs to will to focus their attention without the limitations of the physical eyes or the constraint of a particular perspective dictated by the position of the physical body (Moody, 1975, pp. 51–52). The vision during the NDE OBE appears to be a special form of perception, a kind of simultaneous seeing and knowing, which has been termed "mindsight" (Ring & Cooper, 1999).

Ninth, visual perception also appears to work for objects not visible to ordinary physical sight. NDE OBErs can sometimes see their own nonmaterial "bodies," such as their limbs and clothing, and even describe details of the limbs' structure (Moody & Perry, 1988, p. 10). The NDEr can see other individuals who are also out of their bodies during the NDE in so-called "group" NDEs (Eulitt & Hoyer, 2001; Gibson, 1999, pp. 128–130; Moody & Perry, 1988, p. 173). These fellow NDErs are also "seen" to have a bodily form.

Tenth, individuals can sometimes hear physical sounds such as physical speech, the beeping of monitoring machines, or the hum of fluorescent lights (Ring & Valarino, 1998, p. 63; Sabom, 1982, p. 100), but many experiencers report not hearing anything in the immediate

physical environs. Individuals can also "hear" people speak by thought transfer or telepathy (Moody, 1975, pp. 52–53). Some individuals report that they can sense the texture of surfaces of objects by touch, or that they perceive a slight resistance in passing through solid objects (Gabbard & Twemlow, 1984, p. 158; Moody & Perry, 1988, p. 9), but in general there is no apparent interaction between the NDEr's "body" and physical objects. The NDEr's "body" appears to be completely nonmaterial. The NDEr cannot be heard when speaking and is invisible to ordinary sight (Moody, 1975, pp. 44–45) but may apparently be sensed by animals (Corcoran, 1996, p. 81).

Eleventh, the process of returning to the physical body can be a gradual return such as walking back or falling back through the tunnel, or a quick snapping back into the body, or simply waking up instantly back in the body. The self-conscious perspective then returns to being fully within the physical body (Moody, 1975, pp. 82–83; Serdahely, 1993, p. 88). The individual's memory of NDE and OBE events is generally very vivid and long-lasting upon returning to the body (van Lommel et al., 2001, pp. 2041–2042).

In the overall gestalt of the NDE OBE, the individual retains all of the perceptual, mental, volitional, emotional, and memory faculties as within the body. However, a number of the faculties are enhanced, apparently as a result of being freed from the physical body. Vision has enhanced acuity with an apparent ability to perceive effortlessly by zooming or from all directions at once, which may be related to the apparent ability of the will to work instantaneously in movement. Thought has an enhanced clarity, and many NDErs appear to hear others by telepathy. There are apparent interactions with some physical processes such as light and sound, and in some cases subtle interaction with solid objects, but in general the NDEr "body" appears to be nonmaterial. When the NDE OBEr returns to the body, the physical characteristics return: weight, fatigue, physical pain, and physical disabilities. The individual's in-body consciousness is restored, and he or she can operate as a physically embodied person again. The will now operates through bodily movement, and the faculties of perception, volition, and thought return to normal. There is continuity of subjective experience throughout the NDE. The individual during the NDE OBE appears to be a complete human being, the *same* human being as was present prior to the NDE, except for the physical body. The phenomenon of apparent separation of consciousness in the NDE OBE is a coherent and self-consistent

experience, which suggests a separation *in fact* of consciousness from the physical body.

The Self-Conscious Mind

The OBE component of the NDE includes three basic phenomena that strongly suggest that, during the NDE, the individual's consciousness operates completely independent of the body, with all of its normal cognitive faculties and attributes intact. First, the phenomenon of NDEs during cardiac arrest, which demonstrates a continuity of consciousness, including veridical OBEs, during periods of global cerebral isoelectricity, strongly suggests that consciousness can continue with no electrical brain function. Second, veridical perceptions during NDE OBE, which could have occurred only if consciousness had operated in a location distant from the body, strongly suggest that consciousness can separate from and operate independent of the body. Third, the coherent, self-consistent phenomenology of the NDE OBE suggests that the same human being exists *out of the body* during the NDE, freed of the constraints and limitations of the body during this time, and exists *within the body* before and after the NDE.

These three aspects of the NDE OBE, taken together, strongly suggest that human consciousness is an entity in and of itself which, in ordinary life, is united with the brain and body but which may separate from the body during the NDE. We suggest calling this entity the *self-conscious mind*, a term that Karl Popper and John Eccles (1977) also used, although with a different meaning, as we will describe later. During the NDE OBE, the self-conscious mind operates as an *independent*, nonmaterial "field of consciousness," that is, there is a particular locus of the experiencer's consciousness and a general spatial organization. "Nonmaterial" here means not consisting of material particles or atoms, and a "field" in this sense is a region of space that has specific properties.

During the NDE OBE, the self-conscious mind is an *independent* entity. However, during ordinary consciousness in the body, the self-conscious mind is united with the body and brain as an *autonomous* field of consciousness, spatially coextensive with the body, because consciousness extends throughout the body. While the self-conscious mind is in the body, the brain *mediates* cognitive faculties, because the brain's normal electrical activity is required for consciousness. The autonomous, *nonmaterial* self-conscious mind is intimately integrated

with the body and brain and must, therefore, interact with them in some *physical* way.

Neurological Phenomena Suggestive of the Self-Conscious Mind

If this view of the self-conscious mind is correct, then all neurological phenomena in principle should be explainable in terms of such an autonomous agency interacting with the brain. We consider two neurological phenomena and a current prevalent neurological theory of consciousness from this perspective.

Subjective Backward Referral of Sensory Experiences

In a series of experiments, Libet (1973; Libet, Alberts, Wright, Lewis, & Feinstein, 1975) showed that electrical activity in the brain must continue about a half second (500 milliseconds) before subjects become aware of tactile stimuli. Libet stimulated subjects' skin with a single pulse and measured the electrical brain activity in the region where the stimulated area "projects" to the sensory cortex. Within 10 to 50 milliseconds of the skin stimulus, there is an initial "evoked potential" at the sensory cortex that lasts 15 to 20 milliseconds. The initial evoked potential is followed by a number of "event-related potentials" (ERPs) that represent further neuronal responses in the cortex. The ERPs are broadly distributed across the cortex and typically last for hundreds of milliseconds as a kind of echo of the original stimulus and initial evoked potential. With a stronger skin stimulus, both the evoked potential and ERP amplitudes are larger, and the ERPs continue longer.

Libet found that subjects did not feel the skin stimulus unless it was strong enough to evoke ERPs that lasted at least 500 milliseconds. If the stimulus produced ERPs that lasted only 400 milliseconds, for example, the subjects felt nothing. This result corresponded nicely with the result for direct electrical stimulation of the cortex (Libet, 1973). When an electrode delivers pulses to the cortex, electrical activity similar to the ERPs appears in adjacent cortical regions. If the stimulation lasts at least 500 milliseconds, the subject feels a tingling sensation in the corresponding part of the body. The two phenomena appear to be equivalent.

Thus, it would appear that human tactile sensory awareness is always delayed by about a half second. But this result seems to contradict experience, because people do not feel as if there is such a relatively long delay in sensations. In a third set of experiments, Libet and colleagues combined the previous experiments, inducing simultaneously both a *skin* stimulus and direct *cortical* stimulus to compare the two effects (Libet, Wright, Feinstein, & Pearl, 1979). They had subjects identify which they felt occurred first: a *skin* stimulus on one hand or a *cortical* electrical stimulus projecting to the other hand. If the two stimuli are started precisely at the same time, there should be a 500 millisecond delay in awareness in both cases, and thus the sensations in both hands should be felt as occurring at about the same time. In fact, subjects felt the skin stimulus *earlier* than the cortical stimulus. If researchers delayed the skin stimulus for some time, even up to 400 milliseconds *after* the cortical stimulus was started, subjects still felt it to have come earlier. Only when they delayed the skin stimulus more than 500 milliseconds after the cortical stimulus did subjects perceive the skin sensation to occur later than the cortical stimulus.

Thus, subjects appeared to be referring the onset of the skin stimulus *back to the time that it actually occurred*, even though they did not become consciously aware of the skin sensation, in fact, until a half second after it occurred. Subjects apparently compensated for the built-in sensory delay by subjectively "antedating" it to when the initial evoked potential first appeared in the cortex. With electrical brain stimulation, there is no initial, primary evoked potential in the cortex, and no antedating occurs. Thus, people appear automatically to adjust the sense of when an external stimulus occurs to that moment when the first occurrence of an electrical response to the stimulus appeared, even though this initial evoked potential was subliminal to begin with. The sensation and its timing remain only subliminally "perceived" until at least 500 milliseconds after the stimulus, as if it is in the process of "coming to awareness."

How can this happen? The primary evoked potential is highly localized to the particular region of the primary sensory cortex associated with the particular part of the body that feels the sensation. The later ERPs are not confined to the primary sensory cortex but, rather, are broadly distributed in the cortex. The primary evoked potential serves to provide the signal to both *when* the sensation occurred and *where* it occurred in the body. Once the initial evoked potential pulse (lasting only about 20 milliseconds) is gone, all further

related electrical activity is distributed. There is no apparent electrical neural mechanism that can mediate the subjective backward spatial and temporal referral to the subliminal primary evoked potential (Libet, 2004, pp. 85–86). But there must be some agency to mediate the antedating process: An accurate awareness of the timing and somatic location results from the single primary evoked potential pulse. The referral backward in time is known to occur *only* when a primary evoked potential is evoked by sensory input (or other stimulation) and can serve as a "time-marker" for the referral. Direct cortical stimulations do not have such a timing signal available, and no backward referral occurs.

Thus, there appears to be an agency that "holds together" both the time and specific sensation (location on the sensory cortex) while the sensation comes to awareness during the 500 millisecond period. No subsequent neural electrical activity can help to place the awareness in the specific sensory location and establish its subjective relative time, so this agency itself cannot be electrical in nature.

Mental Force

Neural activity can be classified as sensory, motor, or endogenous (internal) mental activity. When people engage in endogenous mental processes (thoughts, imagery, memory recall, attention, and concentration), they sense that their volition is involved. Different types of purely mental thought exercises, such as numerical computation, word recall, and route-finding, were found to involve activation of characteristic, widely separated cortical regions (Roland & Friberg, 1985). For example, the posterior parietal and right inferior temporal lobes were activated only in the route-finding exercise. Sensory and motor cortical areas were not activated in any of these purely mental exercises. The energy consumption during thinking was equal to or greater than during intense voluntary movement or intense sensory processing. These findings support the subjective impression that endogenous thinking involves *mental effort* and is different for different kinds of mental activity.

"Plastic" changes in neural structures can occur rapidly when fine motor movements are practiced. In one experiment, after only five two-hour sessions, subjects practicing a piano exercise had significantly enlarged cortical areas for the finger muscles involved (Pascual-Leone, Dang, Cohen, Brasil-Neto, Cammarota, & Hallett, 1995). Enlarged cortical areas were also noted for subjects who *only visualized* the piano

exercise but had no actual muscle movement, changes that were nearly as large as with physical practice. After five sessions of *only mental* practice, subjects were as proficient in *actual playing* as subjects who had physically practiced for three sessions. These findings suggest that purely endogenous mental effort can result in neural reorganization and physical performance improvement.

Changes in neural patterns were also found in patients treated with cognitive-behavioral therapy for obsessive-compulsive disorder (OCD). Brain imaging of such patients showed a characteristic pattern of neural activity when their symptoms were "provoked," involving neural areas such as anterior cingulate, orbitofrontal, and caudate regions (Breiter, Rauch, Kwong, Baker, Weisskoff, Kennedy, Kendrick, Davis, Jiang, Cohen, Stern, Belliveau, Baer, O'Sullivan, Savage, Jenike, & Rosen, 1996). These regions appear to form a "locked" neural circuit that is involved in both the obsessive thoughts and the compulsive urges of OCD. The purely mental steps of the behavioral therapy resulted in significant long-lasting reductions in the characteristic OCD neural patterns and in OCD symptoms (Schwartz, 1998). The result of efficacious, long-lasting neural changes from the purely mental effort (attention, concentration, and volition) in OCD therapy led Jeffrey Schwartz (1999) to propose that mental effort generates a "mental force," not reducible to the material, that causes the neural changes.

Indeed, the concept of *mental force* would apply in all three of these phenomena, wherever endogenous mental effort was felt subjectively, resulting in measurably different brain patterns with different thinking tasks and in measurable neural reorganization with both mental practice and cognitive-behavioral therapy for OCD. Mental effort appears subjectively real, and its appearance corresponds to measurable metabolic energy consumption. Another possible interpretation is that a sense of mental effort is merely an illusion arising from purely neural electrical activity, which exerts "effort" or "force" on itself to produce the measurable effects and reorganization. In contrast, Schwartz's proposed "mental force" is consonant with the subjective sense of the efficacy of volition and mental effort and also suggests that some agency produces the mental force.

Global Workspace Theory

Global workspace theory is currently the dominant neural model of global brain function (Baars, 1997; Dehaene & Naccache, 2001)

accounting for numerous conscious and unconscious processes. Collections of neurons in the brain work together as "modules" to perform various automatic, subconscious functions. Subconscious processes, operating in parallel with limited communication between them, can form coalitions that cooperate to achieve certain goals. "Working memory" is a global process corresponding to what people are conscious of, including inner speech and imagery. The global workspace can be thought of as a theater, where the working memory is the stage on which the spotlight of conscious attention shines. The various actors in the spotlight on stage constitute the content of consciousness, whose information is then distributed globally through the theater to the "audience." Behind the scenes, unconscious processes set the context and "shape" the events on stage. The spotlight of attention shifts dynamically; as a result, widely separated neural modules become dynamically coordinated through long-distance interconnections to produce consciousness. The workspace includes an executive function, that is, a "spotlight controller" and a "director," both of which operate subconsciously behind the scenes to guide the spotlight and to provide the context of a person's sense of self. Volition and voluntary control operate through subconscious "selection" of a dominant goal among a number of competing goals. The dominant goal comes to consciousness and is acted upon; the action can be vetoed if contrary ideas and goals intervene.

Stanislas Dehaene and Jean-Pierre Changeux (2004) have developed computational models of consciousness that simulate the operation of different neural processors in a global neural workspace. To be mobilized in the conscious workspace, a mental object must (1) be represented as a firing pattern of neurons that is established by neural synaptic connections and weights, neurotransmitter efficiencies, receptor densities, and so on; (2) have sufficient long-distance connections with distributed workspace neurons, particularly in the prefrontal, parietal, and cingulate cortices; and (3) receive amplification from top-down signals that dynamically "mobilize" the mental object, that is, direct the spotlight onto it. Voluntary conscious control of attention results from spontaneous generation of probabilistic activity patterns in workspace neurons, from which is selected the pattern most adequate to the current context.

Although they are powerful concepts with significant explanatory and predictive ability, global workspace theory and derivative models appear to pose problems. Individual neurons and neural structures or

assemblies are essentially receptive in function: They do not spontaneously initiate action potentials but, rather, respond to electrical activity from connecting neurons or from electrical or magnetic stimulation. Activations from *external sensory stimuli* easily explain initiation of numerous neural processes resulting in consciousness, but conscious initiation of *endogenous mental activity* is more difficult to explain. The Dehaene-Changeux model, for example, requires spontaneous random generation of possible patterns from which one is selected by "adequacy" to the current "context." Such processes appear to involve "supraneural" capabilities, such as evaluation of adequacy and awareness of context, beyond those available to purely receptive neural assemblies.

Furthermore, the proposal that volition and voluntary control operate through subconscious "selection" of a dominant goal among competing goals does not fit the *deliberate selection* and *conscious mental effort* that are subjectively experienced by OCD patients undergoing cognitive-behavioral therapy. Such patients' deliberate selection of thoughts and actions in refocusing their behavior away from the OCD pattern is hardly a "subconscious selection among competing goals." Rather, it is a very conscious selection and exertion of mental effort against the operation of a dominant, nearly overwhelming "locked" neural circuit (Schwartz, 1998). How can purely receptive neural assemblies organize themselves through subconscious selection to counteract such a dominant pattern in the global workspace? Global workspace theory and the Dehaene-Changeux model do not seem to address this case adequately. Again, some sort of mental force as proposed by Schwartz (1999) appears to be a more appropriate model, with the implication of some kind of nonneural agency that exerts the force.

Phenomenology of the Self-Conscious Mind

The phenomena of backward referral of sensory experience and efficacious conscious mental effort suggest that an agency is involved with consciousness and transcends neural electrical activity. The idea of a nonneural agency also appears to be useful in overcoming apparent difficulties in the prevalent global workspace theory of consciousness, that is, in explaining volition and voluntary control. Because the phenomena connected with NDE OBEs strongly suggest that consciousness can operate as an agency completely independent of the body and brain, we propose that this nonneural agency *is* the

consciousness itself, namely, the self-conscious mind defined above. The following details of the self-conscious mind can be inferred from phenomena associated with it during NDE OBEs.

First, during an OBE, the self-conscious mind carries with it the faculties of awareness, perception, thought, volition, memory, and feelings. Consequently, these faculties must also reside with the self-conscious mind while it is united with the brain. Clearly, the brain *mediates* all of these faculties: When the brain's normal electrical activity is significantly altered, we become unconscious; damage to different cortical areas results in a loss of perception, paralysis, amnesia, and so on. However, when such physical disabilities are present, NDErs experience a resolution of them during the OBE. Thus, the self-conscious mind is an independent "field of consciousness" while out of the body. Because there is a seamless transition of consciousness in leaving the body and then returning, it is apparent that mediation by the brain does not alter the identity or unity of the self-conscious mind's field of consciousness. The mediation of the brain appears to "dampen" mental faculties that appear to have less clarity and sharpness than in the NDE OBE.

Second, the NDE OBE shows that the self-conscious mind, when it is *out of the body*, is nonmaterial, because the OBE "body" has no substantial ability to interact with physical objects (for example, easily passing through physical objects) and it is invisible to normal sight. Still, when the self-conscious mind is *in the body*, it appears to be held there strongly. Most people who experience a medical crisis in which one might expect an NDE to occur experience only loss of consciousness and do not experience an apparent separation of the self-conscious mind from the body. The nonmaterial self-conscious mind is thus ordinarily intimately united or integrated with the body and brain and must, therefore, interact in some way with the brain and body. At some level, this interaction has a physical effect in the neurons. Because people ordinarily are unaware of the operation of their brains, the self-conscious mind must operate unconsciously and automatically within the brain and through the brain; consciousness is always directed outward to the world.

Third, when out of the body, most experiencers see that their nonmaterial "bodies" have shape – with limbs, torso, and so on – much like their ordinary body shapes, whereas others experience their shapes as spherical, about the same size as their physical bodies. After the NDE, experiencers' self-conscious perspectives return to being

fully within their physical bodies. While within the body, a person feels that the physical body is one's own, and one's sense of self extends throughout all parts of the body. Thus, it appears that the self-conscious mind is integrated with the body, extending throughout the head, torso, and limbs, not just with the brain.

Fourth, from the reports of NDErs who had their NDEs as neonates or pre-linguistic infants, the self-conscious mind apparently already exists in fully developed form during infancy. During the NDE, some infant and child experiencers observed their nonmaterial form to be as large as an adult's. In a number of cases, perception, thought, and memory formation have appeared fully functional during the infant NDE. It appears, then, that the self-conscious mind is not developed during infancy as part of the physical development process but, rather, is substantially or fully developed already at birth. If this view is correct, infants go through numerous learning processes in their first several years, as they grow, not to *develop* the self-conscious mind in itself, but rather to learn to *integrate* the self-conscious mind with the brain and body. The interactions the self-conscious mind has with the brain in these learning processes in infancy and early childhood probably also influence the development of the brain structures.

Fifth, during an NDE, memories of events while out of the body are formed and integrated seamlessly with the NDEr's other memories both before and after the NDE. For many NDErs, the memories of the NDEs are more vivid than memories of ordinary events. Further, NDErs report that memories of their lives prior to the NDEs, such as memories of their parents, children, or friends, are accessible for recall during the NDEs. Thus, the processes for memory formation and recall must be equivalent both within the body and out of the body, although memory formation, consolidation, and recall are clearly mediated by a number of brain structures and pathways while in the body (Riedel, Michaeu, Lam, Roloff, Martin, Bridge, de Hoz, Poeschel, McCulloch, & Morris, 1999).

Sixth, both during an NDE and in ordinary consciousness, the experiencer has a sense of self-conscious awareness. Indeed, the experiencer feels that it is the *same self* that experiences consciousness before, during, and after the NDE. In the present view, it is the self-conscious mind that provides for this experience of continuity and unity of self-consciousness awareness. The self-conscious mind is the unitary field of an individual's consciousness and the locus of self-conscious awareness, both within the body and out of the body.

In summary, we propose that all cognitive faculties, that is, self-conscious awareness, perception, thought, volition, memory, and feelings, reside in an autonomous self-conscious mind, a nonmaterial field of consciousness that is ordinarily united intimately with the brain and body. Ordinarily, the brain mediates cognitive faculties with the self-conscious mind, which enables a person to be conscious while in the body. Although this self-conscious mind is nonmaterial, the mediation must work through some sort of physical interaction with the brain. The nonmaterial self-conscious mind has a shape or form that extends throughout the physical body. When united with the body, the self-conscious mind must conform to the physical limitations of the body, including disabilities of the body. The self-conscious mind appears to start out in infancy as a fully developed entity; the infant's and child's learning process then involves learning to integrate the self-conscious mind with the brain and body. The processes of memory formation and recall can operate in the self-conscious mind completely independent of the brain. Finally, the autonomous self-conscious mind is the seat of self-conscious awareness. Only during extraordinary events such as NDEs does it separate from the physical body and operate for a time independent of it.

Comparison with Other Theories

A number of authors have proposed mind-body theories similar to the one we are proposing. Kenneth Arnette's (1992, 1995, 1999) *theory of essence* is probably the closest. Arnette argued for the essence-mind as a body of energy from similar grounds of evidence from NDEs, including veridical OBE perceptions, nonmateriality of the OBE body, clarity of thought, telepathic communication, and attraction and interaction between the essence-mind and the physical brain and body. He also argued from cosmological theories, for example, invoking wormholes to explain the tunnel experience. Arnette proposed that mind-brain interaction occurs through a binding of electromagnetic fields, analogous to electric dipole-dipole attraction, which allows a reciprocal causal influence between essence and brain. Whereas we agree with much of Arnette's argument for the *essence*, we do not propose a particular mechanism for physical mind-brain interaction.

In the dualist interactionist model of Karl Popper and John Eccles (Eccles, 1994: Popper & Eccles, 1977), the nonmaterial *self-conscious mind* interacts with a "liaison" portion of the brain located in the

ideational and linguistic structures of the dominant hemisphere, with a specific mechanism for mind-brain interaction through unitary mental events called "psychons" that operate by means of quantum probability fields. Memory storage is accomplished by imprinting in the brain through modification of synapses, in a kind of data bank, and recall occurs through the replay of spatiotemporal patterns in the brain. Although superficially similar to our view, the Popper-Eccles model is quite different: The latter theorists hold, for example, that the self-conscious mind arises from the brain's activity and is connected with only certain regions of the brain and that memories are stored within brain structures.

Libet (2004) proposed a model of the *conscious mental field* in which conscious subjective experience is a *field* produced by the neuronal activity of the brain. The conscious mental field is the mediator between physical neural activity and the emergence of subjective experience. Libet's view was motivated by the phenomenon of the unity of subjective conscious experience and the phenomenon that conscious mental function appears to influence nerve cell activity. In our view, we also consider the self-conscious mind as a field that provides the subjective experience of unity and the agency for neural activation in volitional acts, but we consider the self-conscious mind a nonmaterial entity in itself that can operate independent of the brain.

Mind-Brain Interaction

How can a nonmaterial mind interact with the physical brain when it seemingly does not interact with other physical things while out of the body? The NDEr's "body" (that is, the self-conscious mind) indeed appears to be nonmaterial and does not appear to interact with objects because it passes easily through them. The NDEr cannot be heard when speaking and is invisible to ordinary sight. However, subtle interactions in different modalities appear to occur with physical substances and energies and with in-body people.

First, the NDEr "body" itself is a "thing" generally having a spatial form and properties. The NDEr "body" appears luminous in some way to the NDEr, that is, giving off some kind of light of its own. Although the "body" cannot be seen by ordinary people, it apparently may be sensed by animals (Corcoran, 1996, p. 81). In at least some NDErs, the "body" appears to have an intricate, luminous structure (Moody & Perry, 1988, p. 10). The NDEr can touch his "body" and feel it (Ring,

1980, p. 52). The NDEr can see other individuals who are also out-of-the-body during the NDE (Eulitt & Hoyer, 2001; Gibson, 1999, p. 128; Moody & Perry, 1988, p. 173). These fellow NDErs also appear to have a bodily form.

Second, the NDEr "body" appears to interact with physical energies. The NDEr's "sight" interacts with light to provide veridical perceptions with normal colors. For some NDErs, visual perception is dependent on the ambient light (Ritchie & Sherrill, 1978, p. 37). The NDEr's "hearing" interacts with sound vibrations from heart monitors, fluorescent lights, and human speech to provide veridical auditory perceptions.

Third, the NDEr "body" appears to have subtle interaction with solid objects. Some NDErs report a slight resistance in passing through objects, the ability to "bob" against the surface of the ceiling or feel the support of the hospital roof, and the ability to "touch" and feel an object or to have a subtle interaction with a physical object (Blackmore, 1982, p. 52; Corcoran, 1996, p. 80; Fenwick & Fenwick, 1995, p. 180; Gabbard & Twemlow, 1984, p. 158).

Fourth, some NDErs appear to have a very strong experience of their "bodies," including the senses of touch, smell, and taste. Howard Storm's NDE included many typical OBE elements (Storm, 2000, pp. 13–15): seeing his physical body in bed and experiencing mental alertness, visual and auditory acuity, the room lit with bright light, and the inability to be seen or heard by those nearby, even with vigorous shouting. Still, Storm did *not* experience floating above his body but was standing on the floor. He experienced the slickness and coolness of the floor, acutely smelled the odors of the hospital room, acutely heard his own "breathing" and the "rush" of blood in his ears, felt the air moving over his skin, and felt and tasted a stale dryness in his mouth. He could touch his "body," pinched it, and felt pain. The extreme clarity of all of his senses was overpowering and overwhelming. The unusual nature of Storm's NDE OBE may be related to its being a "hellish" NDE at the beginning.

Fifth, in some cases the NDEr "body" appears to interact with another person's physical body. When a cardiac arrest patient passed her hand through Moody's arm, she felt it had a "very rarefied gelatin" consistency, with an electric current running through it (Moody & Perry, 1988, pp. 8–9). In other cases, the interaction can be felt subtly by the other person: the NDEr playfully tickled another patient's nose until the latter sneezed (Corcoran, 1996, p. 83; see also Cook, Greyson, & Stevenson, 1998, p. 399).

Sixth, in some cases the NDEr's "body" appears to "merge" with another person's physical body. During an NDE, a 5-year-old boy who was suffering from meningitis briefly "went into" his sister's head and saw the world through her eyes (Morse & Perry, 1990, p. 177). In "merging," the NDEr apparently can see and hear and can also communicate information to the person. A 48-year-old man was despondent and attempted suicide by hanging. During his NDE OBE he desperately sought help from his wife. She could not hear his cries, so he "went into" her body and could see and hear with her eyes and ears. When he made contact with her, he heard her exclaim, "Oh, my God!" Apparently she knew what was needed, because she grabbed a knife, ran out to where the man was hanging, and cut him down (Greyson & Bush, 1992, p. 105).

Such accounts of interaction need to be compiled and analyzed in more detail. The present accounts suggest that there are subtle interactions between the NDEr's "body" and physical reality. Interaction with electromagnetic radiation is suggested by veridical visual perception, including color, which depends on ambient light. Interaction with sound vibrations is suggested by veridical auditory perception of machines beeping, lights humming, and human speech. Interaction with molecular structures is suggested by taste and olfactory perceptions, at least in one case. Interaction with solid matter is suggested by subtle interactions with objects, including feeling a slight resistance when penetrating a ceiling, feeling a rarefied consistency when penetrating a physical arm (at least in one case), and touching a surface and perceiving the qualities of smoothness and coolness (also at least in one case). Interaction with neural electrical activity is suggested by the feeling of electricity when penetrating another person's arm (again, at least in one case), and from visual and auditory perception occurring when the NDEr merged with another person's body. Interaction that *influences* neural electrical activity is suggested by the ability to tickle an in-body person and the ability to "communicate" in some way when the NDEr merged with another person's body (at least in one case).

Taken together, these accounts strongly suggest that subtle interactions with physical energies, objects, and neural activity can occur and, in particular, that *interaction with* and *influence over* neural activity in the brain is possible. The cases of "merging" with another person's body suggest that the out-of-body self-conscious mind readily joins and interacts with the brain, even one from another person.

Interaction as Interface between Mind and Brain

How does the self-conscious mind interact with the brain? Our view is that the field of the self-conscious mind merges with the brain and nervous system and works through neural activity. Mind-brain interaction occurs through a global *interface* between the self-conscious mind and the brain, with three main functions: (1) neural electrical activity of a certain duration and intensity brings sensations and thoughts to consciousness in the self-conscious mind; (2) attentional and volitional mental events originating in the self-conscious mind cause appropriate neural electrical activity to effect motor movements; and (3) neural electrical activity, primarily hippocampal, causes the formation of long-term memories in the self-conscious mind and the "re-call" of memories from the self-conscious mind back to consciousness.

One way to study mind-brain interaction is to analyze specific functions to determine what part of the function is embodied in brain structures and what part is actually "embodied" in the self-conscious mind. Memory is a good example, because memory formation, consolidation, and recall are clearly dependent on certain brain structures and pathways while in the body. Because existing long-term memories are accessible during the OBE, memory content must be "stored" somehow in the nonmaterial self-conscious mind rather than in physiological brain structures. Because new memories can be formed and existing ones recalled during the OBE, memory formation and recall are also functions of the self-conscious mind that are mediated by hippocampal structures while the mind is in the body. Thus, cerebral memory functions would be better considered as neural processes that *interface* with the self-conscious mind to support *formation* and *recall* of memories rather than the *storage* of memory content.

For example, increase in the size of the right posterior hippocampus in London taxi drivers (Maguire, Gadian, Johnsrude, Good, Ashburner, Frackowiak, & Frith, 2000) is more likely due to improved spatial *recall ability* than to storage of spatial representations. Likewise, profound retrograde amnesia (loss of long-term memory), such as in dementia, is probably due to the destruction of brain structures that mediate memory recall rather than destruction of memory content itself (see also Bergson, 1912). According to our model, acquired memories in dementia patients would not be destroyed with the deterioration of cortical structures but would

return when even a slight reversal of cortical deterioration occurred. Indeed, day-to-day fluctuation of cognitive abilities, including long-term memory recall, is characteristic of neurodegenerative disorders such as Alzheimer's disease (Palop, Chin, & Mucke, 2006). Rather than *lose* the past, people with Alzheimer's disease gradually become *blind* to it.

Another way to study mind-brain interaction is through the cytoarchitecture of different cortical areas (Brodmann, 2006/1909). Each Brodmann area has a different layered cytoarchitecture that potentially represents a different type of interface with the self-conscious mind. If the self-conscious mind interacts with and alters electrical brain processes, there must be some sort of "mental force" (Schwartz, 1999) that the self-conscious mind exerts to bring about this interaction. In attentional and volitional functions, the dendritic branching structure in lamina I, the outermost cortical layer, may provide the primary interface where the self-conscious mind can exert "force" to influence neural activity.

In this regard, we suggest that the global workspace theory be extended to include the role of the self-conscious mind in consciousness. That is, the self-conscious mind can be added as an element to global workspace models as the location of both conscious and subliminal mental content and the origin of volitional activity. In the theater model, the self-conscious mind becomes the stage, the contexts, and the director. Nevertheless, the *mechanics* of the theater operation through neural modules and long-distance interconnectivity is still essential for consciousness to occur within the self-conscious mind: In the theater analogy, without the lighting (neural activity), the stage is still dark (unconsciousness).

We would expect the processes of mind-brain interaction, having evolved over millennia, to be perfectly "tuned" for efficiency, and we would expect brain-to-mind and mind-to-brain interactions to be complementary or symmetrical to one another, perhaps similar to the way that electric and magnetic fields are mutually inductive. The specific mechanisms for mind-brain interaction are open for investigation. A number of mechanisms have already been proposed, for example: quantum mechanical neurophysical interaction (Schwartz, Stapp, & Beauregard, 2005), orchestrated objective reduction process in neuron microtubules (Hameroff, 2007; Hameroff & Penrose, 2003), binding of electromagnetic fields (Arnette, 1999), and fields of consciousness in phase space (van Lommel, 2006).

Application to Neurological Phenomena

In principle, all neurological phenomena should be explainable in terms of the autonomous self-conscious mind interacting with the brain. We present one such phenomenon in detail and suggest an avenue of further study for another.

Libet's Delayed Awareness of Willed Action

Libet conducted a series of experiments to time the relationship between the subjective sense of willing to move and the actual movement. He told subjects to flex their wrists at a time freely chosen (Libet, 1985; Libet, Gleason, Wright, & Pearl, 1983). The neural response to a subjective command to move is measured at the top of the head and is called a "readiness potential." Prior to any motor activity, the readiness potential appears as a slow rise in electrical negativity measured at the scalp at the top of the head and is thought to indicate a preparation for the movement. In these experiments, Libet found that the readiness potential neural response typically started 550 milliseconds before the actual muscle movement measured at the wrist by an electromyogram.

In one series of timings, Libet asked subjects to note the time they first became aware that they actually moved. This time was measured by reporting the position of a rotating spot of light on an oscilloscope, one rotation occurring every 2.56 seconds. Subjects noted the position of the spot on the circular "clock" when they first became aware of moving their wrists. The accuracy of these timings was confirmed by other tests to be within 50 milliseconds. The subjects reported their *first awareness of moving* (M) to be about 85 milliseconds prior to the actual muscle movement (EMG).

In a separate series of timings, subjects were asked to note the time they first became aware of *wanting* to move. Ironically, the subject's *first awareness of the intention or wish to move* (W) was about 200 milliseconds prior to the actual muscle movement – that is, on average 350 milliseconds *after* the onset of the readiness potential. This delay makes it appear that the brain has decided to move *prior to* the subject's actual conscious intention to move.

The apparent "decision" by the brain to act prior to the actual awareness of the intention to act is counterintuitive and implies that people do not act out of free will even when they subjectively feel that

they do. However, if one accepts the proposition that people's awareness of their own endogenous mental acts is delayed in the same way as awareness of tactile sensations, Libet's results become less enigmatic.

In a separate series of experiments, Libet found that a minimum duration ("time-on") of neural activity of about a half second is required to elicit conscious sensory experience (Libet, Pearl, Morledge, Gleason, Hosobuchi, & Barbaro, 1991). If the neural activity is less than that duration, the sensation is *detected subliminally* but with no awareness. Libet (2004, p. 106) concluded that awareness is a phenomenon *independent of content* and that such minimum durations are a unique requirement for awareness. People can *detect* stimuli and are thus able to react quickly in emergencies and in physical activities requiring a high degree of responsiveness and accuracy, as in the case of skilled musicians or tennis players. These reactions usually occur within 100 to 150 milliseconds; only after a somewhat longer delay do people become *aware* of the stimuli.

We propose that *all* mental events, including endogenous events such as the wish or intention to act, begin subconsciously and have a similar time-on requirement. This proposition is similar to Libet's own proposal (1993, p. 385). In the willed action experiment, the awareness of moving, M, occurs about 465 milliseconds after the onset of the readiness potential, RP. Thus, the readiness potential may also serve as the neural time-on requirement for awareness of movement. Similarly, we propose that the subconscious wish or intention to move, W, requires a time-on of about 500 milliseconds before the awareness of the wish to move and, thus, occurs some 150 milliseconds *prior* to the onset of the readiness potential. The relative times of events from Libet's experiments would thus be as follows:

- −700 msec: subconscious wish to move (proposed)
- −550 msec: readiness potential begins (RP)
- −200 msec: awareness of wish to move (W)
- −85 msec: awareness of moving (M)
- 0 msec: muscle movement (EMG)

But how can people *subconsciously* intend to do something and then a half second later become aware of the intention? In our view, a free-will decision originates in the *conscious agency* of the self-conscious mind, but the neural activity reflecting this mental act must meet the 500-millisecond time-on requirement before there can be *awareness* of

the decision. This explanation is consistent with people's subjective experience that their decisions are purely their own and arise from the conscious context they are in: They would be very surprised to find that they have decided something contrary to that context. Endogenous mental activity must work through the brain's neural activity in order to reach awareness. In contrast, when the self-conscious mind is free of the body, as in an NDE OBE, endogenous mental activity appears to have a different character. For example, will appears to work "instantly"; that is, as soon as someone wishes something, it appears to be fulfilled, unencumbered by the brain or body. The time-on delay of awareness of endogenous mental acts thus helps explain the apparent disconnect between volition and action, such as William James's (1890) introspection of the process of getting out of bed on a freezing morning and Libet's apparent contradiction that the brain "decides" before the person is aware of deciding.

Phantom Limbs

A phantom limb is the vivid subjective experience that a limb that is congenitally absent or has been amputated is still present (Ramachandran & Hirstein, 1998). In the present view, the self-conscious mind is a spatially-extended field that is coextensive with the physical body, probably interacting with the limbs by way of the peripheral afferent and efferent nerves. In the absence of a physical limb, a part of the self-conscious mind would still project beyond the stump as a kind of "mind limb" extending beyond the physical body. Some of the subjective sensations associated with the phantom could thus be due to the interaction of its "mind limb" with the physical body.

Thus, from our model, we would expect the spatial region of the phantom limb extending beyond the stump to exhibit some of the properties of the independent OBE "body." These might include, for example, (1) subtle interaction when a physical object enters the spatial region of the phantom, possibly causing physical sensations within the body; (2) subtle interaction of the phantom limb with another person's physical body, which could be felt by the other person; and (3) a faint glowing of the phantom in the dark, much like the reports by some NDErs of seeing their own out-of-body form. These properties are speculative and may not prove to be present, because unlike the independent OBE "body," the phantom "mind limb" still has a connection to and interaction with the physical body and brain.

Likewise, the possible glowing of a phantom would probably not be electromagnetic radiation and would be observable only through some extrasensory faculty. Interestingly, one phantom limb subject, a 44-year-old university-educated woman born without forearms and without legs, a condition known as congenital tetramelia, stated, "In darkness, I have noted a faint glowing of my phantom body parts" (Brugger, Kollias, Müri, Crelier, Hepp-Reymond, & Regard, 2000).

Conclusion

We have used phenomenological investigation (Zajonc, 1999) to define the self-conscious mind. We characterize the self-conscious mind as a nonmaterial "field of consciousness" that nonetheless has subtle physical interactions at some level with the brain, because the phenomena of the NDE OBE lead us to that conclusion. In order to function in the body, the self-conscious mind must be acted upon by neural electrical activity and, in turn, must exert a "mental force" on neurons, causing a physical effect. The self-conscious mind does not appear to be a subtle "substance" because it appears to be unitary and indivisible. Although it has extension and location in space, the self-conscious mind readily interpenetrates ordinary matter and, thus, is not material in any ordinary sense. Rather than a subtle substance, the self-conscious mind appears to be more the seat of the essential selfhood of the person.

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Corroboration of the Dentures Anecdote Involving Veridical Perception in a Near-Death Experience

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ABSTRACT: One of the most striking examples of near-death experience stories is the account of a clinically dead patient whose dentures were removed from his mouth prior to resuscitation, and which dentures were then lost. Days later the patient saw a nurse and told him that it was he who had removed those dentures. The patient was right, but he should not have known this information, because at the time the nurse had removed his dentures, the patient was clinically dead. Since publication of this account in a prestigious mainstream medical journal, speculations have abounded. In this article I describe the investigation I undertook to put these speculations to rest and the outcome of that investigation.

KEY WORDS: near-death experience; out-of-body experience; veridical perception; cardiopulmonary resuscitation.

One of cardiologist and near-death researcher Pim van Lommel's favorite anecdotes about a near-death experience (NDE) is the story of the comatose patient who was brought into a Dutch hospital and whose dentures were removed from his mouth and subsequently got

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lost in the chaos of the resuscitation process. Here is how van Lommel and his colleagues reported this anecdote in their 2001 *Lancet* article:

> During a night shift an ambulance brings in a 44-year-old cyanotic, comatose man into the coronary care unit. He had been found about an hour before in a meadow by passers-by. After admission, he receives artificial respiration without intubation, while heart massage and defibrillation are also applied. When we want to intubate the patient, he turns out to have dentures in his mouth. I remove these upper dentures and put them onto the 'crash cart'. Meanwhile, we continue extensive CPR. After about an hour and a half the patient has sufficient heart rhythm and blood pressure, but he is still ventilated and intubated, and he is still comatose. He is transferred to the intensive care unit to continue the necessary artificial respiration. Only after more than a week do I meet again with the patient, who is by now back on the cardiac ward. I distribute his medication. The moment he sees me he says: "Oh, that nurse knows where my dentures are". I am very surprised. Then he elucidates: "Yes, you were there when I was brought into hospital and you took my dentures out of my mouth and put them onto that cart, it had all these bottles on it and there was this sliding drawer underneath and there you put my teeth." I was especially amazed because I remembered this happening while the man was in deep coma and in the process of CPR. When I asked further, it appeared the man had seen himself lying in bed, that he had perceived from above how nurses and doctors had been busy with CPR. He was also able to describe correctly and in detail the small room in which he had been resuscitated as well as the appearance of those present like myself. At the time that he observed the situation he had been very much afraid that we would stop CPR and that he would die. And it is true that we had been very negative about the patient's prognosis due to his very poor medical condition when admitted. The patient tells me that he desperately and unsuccessfully tried to make it clear to us that he was still alive and that we should continue CPR. He is deeply impressed by his experience and says he is no longer afraid of death. Four weeks later he left hospital as a healthy man. (van Lommel, van Wees, Meyers, & Elfferich, 2001, p. 2041)

It was only a matter of time before someone would pick out this anecdote and criticize it. The first such critic was Christopher French (2001):

> An OBE can be defined as an experience in which a person seems to perceive the world from a location outside the physical body. One such anecdote was reported to van Lommel and colleagues during the pilot phase of their study by a coronary-care-unit nurse. Unfortunately, they do not report whether any attempt was made to corroborate details with the patient. On many previous occasions such attempts at corroboration have revealed that the evidence was not as impressive as it initially seemed (Blackmore, 1993). Blackmore

> (1996, p. 780) lists several alternative non-paranormal explanations as to why people may sometimes seem to accurately describe events occurring during their NDEs. These include "information available at the time, prior knowledge, fantasy or dreams, lucky guesses and information from the remaining senses. Then there is selective memory for correct details, incorporation of details learned between the NDE and giving an account of it, and the tendency to tell a good story." (p. 2010)

Given the facts that have been unearthed about this case, described below, it seems that both French and Susan Blackmore were wrong as far as this case is concerned.

Other authors published critical responses to the anecdote, but the one that struck me most was the critique that Dutch-Australian anesthesiologist Gerald Woerlee wrote in this *Journal*. Although he had not seen the original document, he explained the denture anecdote as follows, after first telling readers why he thought that all NDEs could be explained in terms of conscious observations by the patients:

> Knowledge of all these things makes it possible to explain the veridical experience cited above (van Lommel, van Wees, Meyers, and Elfferich, 2001). The patient van Lommel and colleagues described was conscious as a result of efficient cardiac resuscitation. He could see and he could hear, because when resuscitation is this efficient, the senses of hearing and sight are restored. The residual effects of extreme oxygen starvation on his brain paralyzed him, making it impossible for him to move or speak, so he was unable to tell those resuscitating him to continue. The effects of oxygen starvation meant he felt no pain, and also aroused his OBE. He felt his dentures being removed, and he heard them being placed in a metal drawer; a metal drawer opening and closing makes a very typical sound, and metal bedside cabinets are standard hospital furniture in The Netherlands. His eyes were partially open, or were opened every now and then to check pupil size as an indication of brain oxygen starvation; so he was able to see his brother [that is, the male nurse] and others in the room. This is why he was later able to recognize people, as well as to describe the room. In addition, the sounds and the movements heard and felt during resuscitation also aided him in building a composite picture of all that happened during his resuscitation. After awakening, he was able to tell a composite story of all that happened during his resuscitation. So this ostensibly supernatural experience is actually readily explained by the functioning of the body, together with conscious and unconscious observations. (2004, p. 247)

Again, as with the statement by French, quite probably Woerlee is, at least partly, wrong.

In the Summer of 2007 I received an e-mail from Ruud van Wees, one of the four authors of the *Lancet* article, and also one of the five founders of Merkawah. He told me that he still had under his care a set of folders containing documents such as NDE stories and also the original interview with the nurse who had taken care of the patient whose dentures were removed while being resuscitated. Because all these materials are part of the archives of Merkawah, they had to be returned to the Board of Directors and stored under their responsibility. So I collected all those papers from van Wees and later took the opportunity to study the denture story carefully. As a result, I was able to provide the following corroboration of the denture story.

Two Documents

The anecdote as published in *The Lancet* was based on two documents. The first document was an article dated August, 1991, and written by Vincent Meijers, the third author of the *Lancet* article (van Lommel et al. 2001) where his name appeared as Meyers. He based the article on an interview he had conducted with another nurse who was aware of the reanimation procedure of the patient whose dentures had been lost. Meijers's focus in this paper was NDEs in general, and he made only brief reference to the denture anecdote.

The second document was an interview transcript dated February 3, 1994. Ap Addink (A.A.), at the time a staff member of Merkawah Foundation who specialized in doing in-depth interviews with NDErs and other people, conducted this interview. On February 2, 1994, he spoke at length with the nurse who had removed the patient's dentures; at the nurse's request to protect his privacy, I will refer to him as T.G. The result was a densely typed document of 12 pages that contained a highly detailed account of what exactly had happened during the resuscitation of the patient, whom I will designate as B.

What follows are the most relevant parts from this interview with T.G., who stated that the experience he related was the most extraordinary one he had ever come across, so much so that he remembered every detail of it. It was also memorable because it happened during his first opportunity to act as the lead person of the first-aid cardiac arrest team. The strength of T.G.'s memory was borne out during the interview as A.A. asked him several times to repeat his account of certain parts of the entire event. There were virtually no differences, and T.G. told the story soberly, with the relevant details

only, and without embellishment. It should also be noted that prior to the dentures incident, T.G. had had some knowledge of near-death phenomena, because he had encountered patients who had told him about their NDEs during his nightly rounds as a nurse. However, he had never experienced an NDE himself nor encountered an NDE resulting from his own treatment of a patient.

Woerlee's Explanations Versus the Facts

Following is a comparison of Woerlee's explanations and the facts as T.G. stated them. I present excerpts from A.A.'s interview with the nurse T.G. as translations from the Dutch original in which A.A. conducted the interview.

Was the patient conscious?

Woerlee wrote: "The patient van Lommel and colleagues described was conscious as a result of efficient cardiac resuscitation. He could see and he could hear, because when resuscitation is this efficient, the senses of hearing and sight are restored" (2004, p. 247). Was this patient indeed conscious? Here are the facts according to T.G.:

T.G.: I was on duty during a night shift, and together with two colleagues I was waiting for a patient who had been found in a meadow late at night, and who apparently had been lying there for a very long time. When the ambulance arrived the man had no pulse, was not breathing, and seemed clinically dead. But whilst not knowing how long the man had been lying there and also looking so young, the ambulance personnel had decided to start reanimation. Within half an hour he was brought into the reanimation room of our coronary care unit where we were waiting for him. That man looked more dead than alive.

A.A.: Had he during the reanimation opened his eyes now and then, to say something?

T.G.: No, no! Truly, the man was brought in more dead than alive. He even showed post mortem lividity [pale bluish discoloration] and we all had the feeling: what for heaven's sake are we doing here? because the man was ice cold, had been outside in that meadow for no one knows how long, and he looked very bad. He also had no pupillary reflexes whatsoever, which is a clear sign that the supply of oxygen to the head had stopped. During regular checking of the pupils there was no reaction either, and beyond the moments of

checking, his eyelids were closed, so he could not see. He was in such a bad condition that he was unconscious in any case. Thus he was unable to see.

A.A.: He had not given any sign that he wanted to say something?

T.G.: No!

A.A.: Nothing, absolutely nothing?

T.G.: No. After about 15 minutes of reanimation we all were convinced that we were working on a dead man. There was no life in the body. Then one gets the feeling: what am I doing here? This patient is actually dead. But after a very long time, and we were flabbergasted, he did get a little bit of heart rhythm and also a little bit of blood pressure, and he began breathing again, a little bit, that is. But he did breathe on his own! And, at long last, we could send him to the intensive care unit.

Later in the interview, T.G. repeated this part of the story while explaining why he and his colleagues decided to continue reanimation:

T.G.: During that reanimation we often thought: this man is truly dead, so let us stop. But because it was such a young man one continues nonetheless. And then, at a given moment, when one sees just a tiny bit of heart rhythm and one sees that there is an attempt to breathe again, then of course one does continue.... Also the fact that we had a junior doctor with us who did not dare to make a decision in the sense of, "Boys, let's stop – it is done and over with!" made us continue.

A.A.: So all of you thought it was useless to go on with this, but you went on with it anyway?

T.G.: Yes, we often looked at each other, and thus communicated that this made no sense. But we did continue anyway.

Thus, in contrast to Woerlee's conjectures, the statements above clearly indicate that the patient was not "conscious" during the reanimation procedure, at least not during the first 15 minutes or so. He seemed as dead as anyone could be. When medical personnel checked for pupillary reflexes, they found none, and beyond those checks the patient's eyes were closed all the time, up to the end. He also remained unconsciousness up to the moment that he was moved to the intensive care unit (ICU). Hence Woerlee's statement that "His eyes were partially open, or were opened every now and then to check pupil size as an indication of brain oxygen starvation; so he was able to see his brother [the nurse] and others in the room" (2004, p. 247) has no basis in fact.

Did the patient feel and hear his dentures being removed and being placed in a drawer?

Woerlee wrote: "He felt his dentures being removed, and he heard them being placed in a metal drawer; a metal drawer opening and closing makes a very typical sound, and metal bedside cabinets are standard hospital furniture in The Netherlands" (2004, p. 247). This description actually was not the case: Medical personnel removed the dentures at the very beginning of the reanimation procedure, when the patient was truly clinically dead, so he could not have felt that action. The nurse removed them in the reanimation room, but he did not place them in a metal drawer that he subsequently closed. In describing what actually happened, T.G. reported:

> T.G.: The man was in his early 40s. He was found in a meadow near the village of Ooy, where he came from, as it appeared afterwards. He was heavily suffering from hypothermia; in hindsight this could have been his salvation, because people who are heavily hypothermic do not use much oxygen, and due to that they may get through very time-consuming reanimation procedures. When the three of us took over the reanimation, he was first put onto a bed. At the time when he had to be intubated so to as to apply artificial respiration, it appeared he still had his dentures in. So I took those dentures out and put them onto the crash cart, that is, a small cart that is always in that reanimation room and onto which all sorts of infusion bottles and medicines are placed. Yes, actually all you need for a reanimation can be found on that crash cart. The reanimation required, in all, more than an hour. In the end, the heart rhythm had returned, also some blood pressure, but respiration was still tiresome, but finally it was decided to send him to the intensive care unit for further artificial respiration.
>
> A.A.: What did the reanimation procedure consist of?
>
> T.G.: A very time-consuming heart massage [not only manually but also using a heart massage machine] as well as five episodes of defibrillation – in all, three quarters of an hour – and, of course, artificial respiration. So finally he began to breathe on his own, but that was not good enough, since his body had been acidified so much, due to lack of oxygen, that he had to go to the intensive care unit for further artificial respiration.

Note that the nurse put the dentures *onto* the cart. He did not put them into a drawer that he first opened and then subsequently closed. Instead, as T.G. described later in the interview, he put the dentures

onto an already extended *sliding shelf* – that is, a flat wooden plate sticking out from the cart – and he left them there, forgotten:

> A.A.: This sliding shelf, did you pull it out? Could he have heard that?
>
> T.G.: No, that sliding shelf was already pulled out. We used it for preparing syringes, bottles, that sort of thing. I distinctly remember to have smacked the upper and lower dentures upon that wooden sliding plate only to get rid of them and next continue with the intubation and reanimation. Later on the patient was transferred to the ICU, and apparently during tidying up the mess after the reanimation was done, those dentures got lost somehow. I have not seen them again.

This is important because it counters Woerlee's statement that the patient could have heard the sound of a drawer sliding open and clicking in again. Later in the interview, T.G. revealed another important detail when A.A. asked whether the patient had ever been in the resuscitation room before:

> T.G.: This was [his] first ever admittance to the hospital and the resuscitation room. As for that crash cart, it is unique in the entire hospital. Nowhere else in the hospital was such a crash cart available.

After the job was done, T.G.'s night shift was over and he stayed home for five days. When he returned to the hospital he did not see the patient for another few days, so in all he had lost sight of the patient for more than a week – and to his knowledge the patient had never seen *him* at all!

> A.A.: So you had lost him out of sight?
>
> T.G.: So I had lost him out of sight. He had been continuously artificially respirated in the ICU. I had left my night shift and took my free days afterwards. After those days I came back, but was stationed in another department of the nursing ward, so not in the department where the "fresh" heart infarcts are admitted. Then I went to the revalidation department of that ward and there I saw, oh wonder, B., the patient! And, in hindsight, what had happened was that B. had recovered slowly but surely, and at a certain moment he asked where his dentures had gone! In the ICU nobody knew; they [the dentures] had not come with him after the reanimation had been completed and B. was transferred.
>
> Now, at the beginning of my night shift I came into that department to distribute medicines, and I entered the room where B. lay in his hospital bed. He saw me and then said, in the flash of a moment: "Hey, yes you, you know where my

> dentures are!" I looked at B. in exasperation. I was already surprised to see that he looked so well, but was flabbergasted that he recognized me, because the last time I had seen him he was still comatose! And his eyes had not been open, except for the times when I checked his pupillary reflexes [those pupils had given no reaction whatsoever]. I said: "How do you know that?" He said: "You were there when I was brought into the hospital, and you removed my dentures from my mouth and put them upon that cart that was there." And he described the cart exactly as it was: "Yes, there were all sorts of bottles on it, and it did rattle a lot, and there was also a sliding plate upon which you put the dentures."

Apparently, T.G. had to disappoint B., because the dentures could not be found:

> A.A.: Those dentures no longer occupied your mind?
> T.G.: No, because the patient had been transferred elsewhere, and it happened that during that night my night shift ended. And then you no longer think about such things as dentures. They are so unimportant at the time. So I had forgotten all about them.

T.G. also told A.A. that a closer investigation in the ICU had revealed that B. had apparently had a truly massive heart infarct before he was found, more dead than alive, in the meadow. Therefore it was unthinkable to find him so well recovered. Once again he returned to the fact that B., while clinically dead, had seen the crash cart and in particular the flat sliding shelf: "It was in fact a very inauspicious, ramshackle thing, but he had seen it, and he had also seen the dentures upon it."

During T.G.'s conversation with him, B. described the resuscitation room in detail. It was a very small room. At the right side of the bed was a small niche containing a wash basin, with disinfectants and related things. Next he could also describe where a mirror was. At the left side was the cart containing various equipment. There was also a narrow metal cabinet wherein infusers and infusion pumps were stored. Apparently B. could remember everything perfectly well.

> A.A.: (repeating the question): He had never before been there?
> T.G.: He described everything in detail and also the persons who, at the time, were working on him.
> A.A.: How did he describe them?
> T.G.: Their appearance: of a [female] nurse who looked so and so, and to me: "I saw you; you were doing the heart massage on me. And I wanted to tell you all the time: 'Ouch, stop doing this because it hurts so much! I am still here; my heart does not

stand still! I am alive!' But you did not hear me." Yes, those were the things he was telling me, and truly this made my eyes roll out of my head, and my ears flap, because these were exactly the things that had happened! He himself apparently had the feeling that everything was functioning well.

A.A.: Can you tell me how he saw himself? Did he see his own body from a certain vantage point in the room?

T.G.: He described this as seeing his body lying on the bed. He found that very strange. He saw his body from the spot where that steel cabinet was, and that was in the corner of the room. He also said that he was floating above us and saw us being busy with his body. But at the same time he also saw me sitting on top of him, and he also felt that. He had truly felt the pressure on his body and the pain it caused.

A.A.: He felt you sitting upon him?

T.G.: Yes, indeed he felt me sitting upon him. I certainly did that while administering heart massage. Bu we also made use of a heart massage pump. And that is a machine that causes enormous pain. And that is what he told me. He felt the pain, and did try to tell me that. But I saw no reaction in his body; his eyes were shut and during checking the pupils they did not show any response, let alone any sign of fear.

This is quite remarkable: The patient described an out-of-body experience, floating above and seeing everything happening from a certain corner in the room. But at the same time, despite his being in a deep coma, he felt the physical pain of the heart massage.

A.A.: Did he express his astonishment about what had happened to him?

T.G.: Not at all. It was truly amazing that he told all this so matter-of-factly, so down-to-earth. He certainly was not a woolly thinking person, whose fantasy had run wild.

A.A.: What was his vocation?

T.G.: Steel bender, I believe.

A.A.: Certainly a down-to-earth vocation.

Four weeks after admission to the hospital, B. went home, and T.G. never talked to him again. In hindsight, he regretted very much that he had not tried to maintain contact with B. At the time, the Merkawah Foundation also tried to trace B., but to no avail. Apparently he had moved out of the area.

According to T.G., medical personnel made no mention of this NDE in B.'s medical record; but that is not surprising because in the years when the case of patient B. occurred, personnel never recorded such phenomena. However, T.G. did talk about the case to his colleagues, who were vaguely surprised but shrugged it off, with the apparent

exception of a colleague K.B., who was responsible for bringing the story to the attention of Meijers.

Recent Follow-Up

Although A.A.'s report was highly detailed and extremely interesting, it did not satisfy me, because there remained a few problems. Although it corroborated the dentures story in *The Lancet* rather well, it also contradicted that story in small but fairly important ways. The *Lancet* article reported that the patient desperately wanted the reanimation team to go on at all cost because he was afraid to die if they stopped the procedure. But in A.A.'s account, the patient made no mention of having felt afraid to die. Rather, he *wanted* the team to stop because he felt that he was alive and physically functioning well and because he wished the physical pain caused by the heart massage machine to cease.

In an attempt to reconcile this contradiction, I consulted Meijers's 1991 article. In it, Meijers cited K.B. as having reported that the patient had been desperately afraid that the team would stop resuscitation. Alas, Meijers told me he cannot locate the original transcript of his interview of K.B., so I'm unable to scrutinize that document for information that might further reconcile the discrepancy regarding the patient's emotions and wishes during the resuscitation.

Further seeking a resolution to this discrepancy, I decided to go back to the source. That process was easier said than done, because the dentures story had appeared for the first time 17 years prior to my investigation. In that first document, the article by Meijers (1991), the author cited K.B., a colleague of T.G., as the source. In the second document, the 1994 interview transcript, T.G. himself was the source. Thus, I searched the Internet and identified many T.G.s but not the one who was B.'s nurse during the resuscitation in question. However, I was able to locate K.B., who was still a nurse at the coronary care unit in a major hospital in the Netherlands. After some difficulty making contact, K.B. told me that he had never had anything to do with the whole event, except for having acted as a messenger between T.G., who had done the resuscitation, and Meijers. However, he was pleased to give me T.G.'s current telephone number.

So at long last, in April 2008, I was able to contact the elusive T.G. for a telephone interview. He was most forthcoming but also mightily surprised that his dentures story had not been forgotten and had been disseminated all over the world. He told me that, as a matter of fact,

over all those years the incident had never slipped away from his mind because it had made such an enormous impression on him; he stated that he could remember it as if it had happened the day before! He unhesitatingly confirmed a number of facts he had already mentioned in A.A.'s interview with him, and he was most anxious to help set the record straight, so as to remove all embellishments and misunderstandings about the dentures anecdote that might have emerged over time, including the conjectures by Woerlee in this *Journal* and allegations by other skeptics that it was nothing more than an urban legend. I arranged for a follow-up interview with T.G. by my collaborator, Titus Rivas, who subsequently had a long talk with T.G. and reported back to me the following facts.

The patient, B., from Ooy near the city of Nijmegen, had indeed been brought in on a cold night, more dead than alive, and had undergone the whole procedure as reported in A.A.'s interview with T.G., who was adamant in stating that B. had not shown any sign whatsoever of being conscious at the time. He was clinically dead, period: no heartbeat, no breathing, no blood pressure, and "cold as ice." The ambulance personnel had tried to carry out some reanimation while driving to the hospital, but without result. Most important, *immediately* after B. entered the hospital, T.G. removed the dentures from B.'s mouth and intubated him before starting up the entire reanimation procedure. Therefore, as T.G. categorically stated, *any "normal" observation by the patient of his dentures being removed from his mouth was simply unthinkable* [my italics].

In addition, the normal observation process could not have been the basis of the patient's detailed description of the crash cart as well as of the entire resuscitation room. Once again, T.G. was adamant in that regard, noting that patient B. had never before been in that hospital, let alone in this resuscitation room, and that this particular crash cart was absolutely unique, being a hand-made product of ramshackle quality that had been stationed in that resuscitation room only and nowhere else. To guess the precise nature of that cart and its contents on the basis of auditory impressions, or through briefly opened eyes characterized by fixed, dilated, unresponsive pupils, was impossible by all accounts. T.G. asserted that certainly it would have been impossible for B. to know precisely where T.G. had placed the dentures.

Rivas also asked T.G. about the fact that the patient experienced *physical* pain while simultaneously looking down from a *nonphysical* location near the ceiling. T.G. stated that at that point in time the

medical team would, indeed, have induced sufficient blood circulation to enable the patient to perceive physical pain. However, T.G. found this aspect of the situation strange, because at that point in the resuscitation procedures, the patient had shown no sign whatsoever of responding to normal sensory stimuli. T.G. surmised that, in all probability, the patient was experiencing normal physical pain sensation. Thus, B. appeared to be reporting information input from two different sources at the same time: from the physical body itself, and from an extrasensory source beyond the body, that is, the out-of-body experience.

As for the discrepancy between the two original documents regarding the way the patient responded to the external heart massage, T.G. said that this discrepancy was only seemingly the case. He described two phases of the reanimation. When patient B. suffered feelings of physical pain caused by the heart massage machine, he wanted the team to stop, because he felt he was alive and well, and thus continuing the painful treatment seemed unnecessary. However, after some time, when the team had been unsuccessful in achieving a sustained resuscitation and considered stopping procedures, patient B. was aware of that development and desperately wanted them to continue. Of course, in both phases the team was not aware of B.'s desires while in his out-of-body status near the ceiling of the room.

According to T.G., B. was a very down-to-earth steel bender who most probably did not even understand that he had had an NDE, including an OBE. Certainly at the time when his medical crisis occurred, the general public in the Netherlands was mostly unaware of near-death phenomena.

T.G. told both me and Rivas that after B.'s discharge from the hospital, T.G. had seen him only once again from a distance when B. came to report to the hospital for a check-up. At that time B. did not look healthy. On the contrary, T.G. said that B. looked like a "cardiac cripple" as a result of his massive heart attack. Indeed, a few years later T.G. saw a death notice in a newspaper stating that a B. from Ooy had died.

As a final comment, with his three decades service as a nurse in the coronary care unit and as a highly experienced paramedical staff member with respectable practical and theoretical knowledge in this field, T.G. is, in my opinion, a highly credible source. I also consider it important to note that, because B. experienced the OBE while clinically dead, his experience was an NDE even though it did not include a tunnel, light, a life review, or other features that other NDErs have sometimes reported.

Discussion

In many details, this story of veridical perception during an in-hospital NDE, as corroborated by the eyewitness testimony of nurse T.G., does not concur with the accounts given by commentators French (2001) and Woerlee (2004). However, the two authors raised an interesting point regarding the fact that the comatose patient did, at a later stage in the resuscitation process, feel intense pain from the heart massage machine. So it seems that the patient was, indeed, at least to some degree, physically consciousness during the later stages of the process. Nonetheless, the patient's eyes were closed from the time he arrived comatose at the hospital until after his transfer to the ICU except when medical personnel opened them occasionally to check for pupil response and found none, indicating that even then he could not see. Yet the patient described having had an out-of-body experience throughout the resuscitation process during which he had a clear and detailed overview of the resuscitation room. His memory of the room was so complete that, a week later, he recognized nurse T.G., a member of the resuscitation team, and described the room in detail, including the sliding wooden shelf upon which nurse T.G. had laid the patient's dentures.

As for French's (2001) remarks, let us consider them line by line. French wrote: "Unfortunately, they do not report whether any attempt was made to corroborate details with the patient" (p. 2010). Evidently some investigators did make attempts, but they could not find B., probably because he had already died.

French (2001) continued: "On many previous occasions such attempts at corroboration have revealed that the evidence was not as impressive as it initially seemed (Blackmore, 1993)" (p. 2010). That may have been the case for those previous occasions but certainly was not the case regarding this incident.

Finally, French (2001) concluded:

> Blackmore (1996) lists several alternative non-paranormal explanations as to why people may sometimes seem to accurately describe events occurring during their NDEs. These include 'information available at the time, prior knowledge, fantasy or dreams, lucky guesses, and information from the remaining senses. Then there is selective memory for correct details, incorporation of details learned between the NDE and giving an account of it, and the tendency to tell a good story.' (p. 2010)

Again, those explanations may be considered in other cases but not in this one: The patient, B., had no information available at the time; he had no prior knowledge of the hospital or the reanimation room; fantasy and dreams would be ruled out by his comatose state and would not explain the accuracy of his perceptions; lucky guesses would be highly unlikely to produce such unusual statements and identifications; selective memory cannot explain the facts of this case; and "tendency to tell a good story" was contradicted by the consistency and lack of embellishment in the interview of A.A. and the follow-up interview many years later, which reflected rather down-to-earth statements of the facts.

In conclusion, the story as related in *The Lancet* corresponds well with the account corroborated here by the eyewitness testimony of nurse T.G. The patient B. appeared to have had an NDE OBE and was not sufficiently aware of the environment he was then in to have perceived by normal means the removal and storing of his dentures. But of course the event happened too long ago to permit corroboration now of all the relevant details, and although the evidence includes the first-hand testimony of an important and reliable witness, it does not include an interview with the patient himself.

The main purpose of this article was to set the record straight as to the facts of this case, while admitting that this case cannot constitute definitive proof of continuation of consciousness, let alone survival of death. But it does provide corroborating testimony that something extraordinary happened at the time, an event that should not be dismissed out of hand as a ridiculous story made up by naïve believers.

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BOOK REVIEW

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Irreducible Mind: Toward a Psychology for the 21st Century, by Edward F. Kelly, Emily W. Kelly, Adam Crabtree, Alan Gauld, Michael Grosso, and Bruce Greyson. Lanham, MD: Rowman and Littlefield, 2007, 800 + xxxi pp., $79.95 hb, ISBN 0-7425-4792-2.

Take various combinations of the words "consciousness," "brain," "explained," "mystery," "quest," "accidental," "astonishing," "neurobiology," "evolution," "mind," and so forth, and you will have the titles of quite a few books describing current speculations about what is often called the mind-body problem: How is it that mental experiences – including thoughts, feelings, perceptions, and conscious awareness of it all – are related to the physiological activities within the body and, most specifically, the brain? Add to this list the word "irreducible," and readers can extract the title of the subject of this essay, *Irreducible Mind*, as yet another book on the mind-body problem. However, this book is different, very different, from all the rest.

The Mind-Body Problem and the Standard Model

Because a full appreciation of *Irreducible Mind* requires context, I begin with background information. I will use the term "mind" to denote the entire range of mental states and processes – thoughts, feelings, perceptions – both in and out of awareness. "Consciousness" is often also used to describe these mental phenomena collectively, although this usage can be confusing, because the same word is used

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to denote waking awareness, as in "conscious" versus "unconscious." Sometimes the terms "mind" and "consciousness" are used to denote some sort of numinous aspect of existence that may transcend the body or be beyond physical analysis. At the outset of this discussion, I will use the operational definition of mind given above. This being said, certainly one of the central issues of cognitive science, the scientific investigation of mental phenomena, is the nature of the mind-body or mind-brain connection.

Some scholars call this area of inquiry the mind-body problem. What is meant here by "problem"? Is it a problem for which there may be no solution? That is, will it ever be possible to produce a plausible explanation in terms of brain physiology for why and how it is we have internal, subjective experience and conscious awareness? Scientists have no reason to conclude that this problem is not soluble. Most students of cognitive science would probably say that this is a problem with a solution and that, at the present time, scholars just do not know exactly what form the solution will ultimately take. It may be a hard problem to solve, and that is, at least in part, because the brain is very, very complex. Indeed, the more researchers learn about the brain, the more complex they find it to be. But, it is presumed, if investigators spend enough time doing more and more work in experimental neuroscience, they will eventually discover enough about the brain that a compelling description linking brain and body physiology with mental phenomena will emerge. The solution to the mind-body problem will eventually be understood in terms of patterns of cellular activity.

For many years, scholars in the fields of elementary particle physics and cosmology have used the phrase *Standard Model*. I will import this phrase into our discussion and use it to denote the hypothesis that mind or mental experience or consciousness is completely understandable or explainable in terms of patterns of cellular activity in the brain and body. At present, researchers and theorists do not understand the nature of the connection, the higher-order interpretation of physiological activities that produces mental experience. A more complete understanding is currently not available, perhaps due to the enormous complexity of the brain. But it *will* come, eventually. The Standard Model is supported by a vast amount of data: from two centuries of observations in clinical neurology relating brain damage to changes in mental function, to the latest results from functional brain imaging demonstrating patterns of neural activity correlated

with various kinds of mental states. Nonetheless, a key question is: Will the Standard Model do?

The history of science is a story punctuated by major revolutions (Kuhn, 1970). This pattern is most vividly represented in physics, where a prevailing understanding of the world changed enormously after the work of Nicolaus Copernicus, Galileo Galilei, and Isaac Newton ... and again after the work of Albert Einstein ... and again after the advent of quantum theory. In biology, Charles Darwin formulated a way of looking at living organisms that was revolutionary. The Darwinian perspective has gained in explanatory power as the discoveries of modern biology revealed cellular and molecular mechanisms for macroscopic organismal behaviors, leading to an appreciation of how these molecular mechanisms could have resulted from evolutionary processes of variation and selection operating at microscopic levels. Inspired by the awesome successes of the present scientific trajectory, scientists have developed a dominant worldview in which they hold a kind of atomic reductionism as sufficient to provide a deep explanation for just about everything. This scientific worldview prevails despite the conceptual implications of quantum mechanics indicating a kind of fuzziness and uncertainty in the most basic properties of what Westerners call "physical reality."

In neuroscience, the molecular biology of the synapse, as scientists understand it thus far, is another evolving triumph of physical reductionism. The synapse is the contact point where cells of the nervous system exchange signals. It is a molecular universe of vast complexity, involving the interactions of nerve cells, glial cells, neurotransmitter molecules passing in both forward and backward directions, and receptor proteins having rapid effects on the electrical properties of the cell membrane and thus altering the cell's immediate excitability, or having prolonged effects on the turning on and turning off of genes, thereby changing the long-term functioning of the cell and the strengths of its connections with other cells. All this action takes place over distances of a few billionths of a meter and in time periods as short as a few microseconds. Each new discovery relating to the molecular biology of the synapse adds another piece of extraordinarily beautiful intricacy to a seemingly ever-more-complex jigsaw puzzle of events.

In the human brain, perhaps a trillion neurons and glial cells interconnect in networks containing hundreds of trillions of synapses. The Standard Model holds that from this vast complexity will

eventually emerge a perspective as to exactly how all this cellular and molecular activity is related to mental experience. It is acknowledged that despite all existing knowledge about brain physiology, humans may still be at a relatively primitive level of understanding. Comparison has been made to an understanding of chemistry, say, 200 years ago. At that time, although investigators had identified many chemical elements and molecules and theorists were giving serious attention to the atomic theory of matter, they knew little about how to describe or explain the higher-order properties of matter in terms of underlying atomic and molecular structure. Take water, for example. A molecule of water appeared to be made of atoms of hydrogen and oxygen, but how this combination of atoms gave rise to a substance that flowed, froze, vaporized, and dissolved when mixed with some substances, but did not dissolve when mixed with other substances, was a mystery. It would be many years before increasing data collection and theorizing in the field of chemistry produced a framework that explained the higher-order chemical properties of water in terms of the underlying atomic structure and distribution of electrons in the H_2O molecule. The Standard Model holds that some similar sort of emergence of understanding will eventually take place for the brain-mind connection.

In nearly all areas of scientific endeavor, the reductionistic framework of physicalism has been awesomely successful. Working with general relativistic astrophysics and relativistic quantum electrodynamics, scholars can now account for most cosmological observations. Working with quantum mechanics and atomic theory, they can account for all known observations in chemistry. Working with the principles of evolutionary biology, the laws of chemistry, and the discoveries of modern molecular biology, they are continuing to develop deepening explanations of the inner workings of living organisms and how life negotiates survival and reproduction in complex and challenging environments. Thus, many researchers and theoreticians share a great confidence that this broad paradigm can be extended to describing, explaining, and understanding the mind.

Irreducible Mind and the Standard Model

In *Irreducible Mind*, the authors argued for a perspective beyond the Standard Model. I found it to be an extraordinary book, written

with impeccable scholarship and clarity. The authors summarized a vast amount of evidence suggesting that the Standard Model, powerful though it may be, will simply not do. They drew inspiration from the work of Frederic Myers, who lived more than a century ago and whom they regard as a neglected genius of scientific psychology; from William James, contemporary of Myers and pioneer experimental psychologist, neuroscientist, and deeply insightful philosopher of mind; and, more recently, from Ian Stevenson, the University of Virginia psychiatrist who spent 50 years rigorously studying and impeccably documenting a large number of cases of phenomena that may perhaps be most easily understood in terms of the reincarnation of some aspect of an individual's personality.

The book opens with an outstanding overview of the current conceptualization of the mind-body connection within the framework of the Standard Model, followed by a superb summary of the work of Myers from more than a century ago. Throughout the book the authors described a number of phenomena, collectively called "rogue phenomena," that they suggested do not fit in any straightforward way into the Standard Model. Such phenomena include many examples of profound influences of mental state on body physiology, telepathic interactions, veridical apparitions, some of the more profound aspects of memory, some hypnotic phenomena, various genius-type abilities, and mystical experiences, to name but a few. Some of these phenomena, it might be argued, can conceivably be accounted for within the Standard Model, whereas some most definitely cannot. By considering these phenomena collectively, the authors made a compelling case that some sort of expansion of the current doctrine is necessary if more powerful approaches to addressing the mind-body problem are to be developed. If these rogue phenomena are taken seriously, some clever new experimental and theoretical directions of work may follow.

Most notable perhaps for readers of this *Journal* is the topic of unusual experiences that are reported by individuals who have come close to death and are revived. Such experiences may also occur in persons who fear they are close to death, as for example in falls or collisions, even if their bodies are not physically damaged. Under conditions of greatly impaired neuronal activity in the brain, people often report complex mental experiences and even out-of-body experiences. The authors of *Irreducible Mind* stated at the conclusion of their chapter describing these phenomena that

> the conflict between current neuroscientific orthodoxy and the occurrence of [near-death experiences] under conditions of general anesthesia and/or cardiac arrest is head-on, profound, and inescapable. In our opinion, no future scientific or philosophic discussion of the mind-brain problem can be fully responsible, intellectually, without taking these challenging data into account. (p. 421)

As an alternative to the Standard Model, the authors of *Irreducible Mind* argued for a filter or transmission theory of the brain-mind connection, ideas that James, Myers, and others first proposed more than a century ago. In such theories of the brain-mind relationship, neuronal processes remain of central importance and the Standard Model becomes a subset of a larger framework that includes processes that in some way transcend the physical body. As James (1898), quoting Schiller (1891), wrote, "matter is not that which *produces* Consciousness, but that which *limits* it, and confines its intensity within certain limits."

In the understanding of the physical force of gravity, the mathematical description Newton put forth in the 1700s was one of great predictive power. If Einstein had not lived, astronomers might not now have the general theory of relativity and might still be using Newtonian gravitational physics to understand celestial phenomena. Indeed, much of what planetary scientists and cosmologists observe could be fit into a Newtonian model. However, the general theory of relativity allows for the precise computation of observed values for things like orbital precession and gravitational red shifts. It also enables scientists to account for acceleration of the observed rate of expansion of the universe, a finding currently associated with the mysterious concept of dark energy, a notion that is at least consistent with Einstein's gravitational theory. Thus, in the absence of the explanatory framework of the theory of general relativity, it is possible that scientists would be giving little attention to some seemingly important observational data.

I like to think of the Standard Model as a kind of Newtonian theory of the mind-brain connection. It is very powerful and very beautiful. Its adherents will not relinquish center stage easily. And through its limitations, many scientists perpetuate the practice of ignoring a wide range of data that do not fit into it. I find it fascinating that scientists who would not consider the possibility of veridical out-of-body experiences – that mental awareness and perception might under some circumstances be demonstrably disembodied – find it easy to believe that the entire immense cosmological universe consisting, at

this point of knowledge, of 10 billion trillion stars, all emerged from an exploding point of nothingness. Scientists are often simply not ready to accept data that do not fit into a compelling edifice of theory. And if the explanatory framework is there, then any amount of weirdness may be acceptable. Big Bang cosmology nicely exemplifies this.

Neuroscientists interested in the mind-body problem who open their written or spoken discourse with statements like "mind is what the brain does" are immediately accepted into the fold of adherents to the prevailing worldview. The Standard Model so dominates intellectual discourse and guides the design, implementation, and interpretation of experiments that scholars who question the completeness of that Model and speculate outside of it can find they are not even heard, let alone taken seriously. The Standard Model has achieved a kind of orthodoxy akin to religious dogma. No doubt, it is a powerful model. However, rigid commitment to it, including an unwillingness even to consider data that do not readily fit into its explanatory framework, is and will continue to be a limitation in expanding the framework of cognitive science. For any scientist considering open-mindedly grappling with phenomena that do not fit easily within the Standard Model, nowhere will they find a more comprehensive source than *Irreducible Mind*.

It may be the case that cognitive science is poised for revolutionary events in the arena of the mind-body problem. Place your bets, ladies and gentlemen. Will the Standard Model do? My money is betting that it will *not* suffice. In the future history of the science of mind, *Irreducible Mind* may well prove a book of landmark significance, one that helped spark a revolution in the scientific investigation of the nature of consciousness.

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BOOK REVIEW

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The Spiritual Brain: A Neuroscientist's Case for the Existence of the Soul, by Mario Beauregard, Ph.D. and Denyse O'Leary. New York, NY, HarperOne, 2007, xvi + 368 pp.

Although the main focus of *The Spiritual Brain* is not near-death experiences (NDEs), the authors gave NDEs prominent mention. The International Association for Near Death Studies (IANDS) often uses the phrase "NDEs and related experiences" or "Spiritually Transformative Experiences" (STEs) to designate experiences in which someone is not near physical death but has some of the common features of NDEs, including similar aftereffects. In this book, the authors used the term "religious, spiritual or mystical experience" (RSME), which would include NDEs.

Lead author Mario Beauregard is a neuroscientist who has studied the neurobiology of mystical states at the University of Montreal. Co-author Denyse O'Leary is a free-lance journalist and author of several books on faith and science. The authors wrote *The Spiritual Brain* as descriptive material until the last three pages when they used the word "I," writing that the book was based not only on various scientific disciplines "but also on a series of mystical experiences that I have had since my childhood" (p. 293). They further stated, "I experienced the basic interconnectedness of all things in the cosmos, this infinite ocean of life" (p. 293). I would suspect that this was Beauregard's voice and that these experiences were what prompted him to do the research described in the book. To depict his own experiences, he used the term "cosmic consciousness" from a book of the same title written by fellow

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Canadian Richard Maurice Bucke more than a century ago (Bucke, 1961/1901). For readers familiar with the ancient Eastern term *kundalini*, the experience Beauregard described as beginning in his back could also be considered a *kundalini* experience. Canadian physician and NDEr Yvonne Kason also discussed *kundalini* and her experience in her book *Farther Shores* (1994) and at the IANDS conference in St. Louis in 1993.

One chapter in *The Spiritual Brain* is titled, "Who Has Mystical Experiences and What Triggers Them?" Another chapter deals with the Aftereffects of RSMEs, certainly a topic of interest to NDErs.

Some IANDS members are interested only in reading firsthand individual accounts of NDEs, whereas others prefer books by researchers who combine and connect the various aspects of NDEs. More recently, writers have begun to explore how NDEs relate to the broader topic of various states of human consciousness. *The Spiritual Brain* is an excellent contribution to that topic, although the mystical state is the only major altered state of consciousness the authors discussed.

One researcher whom the authors cited to support their concepts was the English scientist Sir Alister Hardy, author of *The Spiritual Nature of Man* (1979). Hardy, who was trained as a zoologist, formed a university-based group called the Religious Experiences Research Unit. This group pursued information about "religious experiences," a phrase Hardy used to mean an intrinsic or personal experience of oneness, peace, or love reminiscent of NDErs' descriptions, rather than an extrinsic religious experience involving community worship.

Although *Journal* editor Bruce Greyson has demonstrated his willingness to publish all reasonable approaches for explaining NDEs, many IANDS members, including me, prefer spiritual explanations rather than chemical or neurobiological explanations. *The Spiritual Brain* is an excellent reference for reviewing some materialistic explanations and the authors' refutation of them. The book's 368 pages includes 297 pages of text, 46 pages of notes with very good references, 10 pages of bibliography, and a glossary and index. Although the two glossary terms below are somewhat related, and the text contains much more explanation than just these two terms, the authors especially criticized the following conceptual approaches to spirituality and spiritual experiences:

> Neurotheology: An approach to RSMEs that seeks a neurological and evolutionary basis for spiritual experiences. (p. 346)

> Evolutionary psychology: The branch of psychology that maintains that human brains, including any component that involves religion or spirituality, comprise adaptations or psychological mechanisms that have evolved by natural selection to benefit the survival and reproduction of the human organism. (p. 345)

The authors did not deny that evolution has occurred or that natural selection applies to animal behavior. However, they expressed the belief that evolution cannot explain much of human behavior, especially RSMEs and altruism, the latter including the sacrifice of one's own life to save others. The authors also noted that if humanity is a product only of evolution, there is no meaning or purpose for human life. This conclusion would certainly contradict the message that many NDErs have reported they brought back with them.

Beauregard and O'Leary were also critical of artificial intelligence, that is, computers that materialists believe can simulate human thinking. A third area of materialist research that the authors criticized is the work of Michael Persinger who has received publicity for his research on a "God helmet," a helmet lined with magnets. The authors cited Persinger's claim that using this helmet to manipulate magnetic fields in the wearer's head may induce out-of-body and other unusual experiences. He thus concluded that spiritual beliefs are generated purely by brain activity. When a well-known atheist writer tried the helmet and experienced nothing, Persinger's explanation was that the atheist was not sensitive to magnetic fields. When Susan Blackmore – who, in her book *Dying to Live* (1993), attempted to explain NDEs from a materialistic viewpoint – tried the helmet, she had an intensely negative experience.

Beauregard and O'Leary reported that Swedish researchers attempted to duplicate Persinger's work in a double-blind test. Without suggesting to the helmet wearers what might happen, the Swedish researchers did not find the same result. Beauregard and O'Leary also noted that so far, journalists have generally adopted the materialistic viewpoint, although they may not use that term, readily reporting a purportedly scientific explanation for some small aspect of NDEs and often citing irreproducible research, such as Persinger's, without reporting contradictory findings. My opinion is that many science journalists may adopt a materialistic viewpoint toward NDEs, whereas popular culture journalists seek to attract readers by focusing on a possible confirmation of the philosophical or religious belief in a life beyond physical death. Beauregard and O'Leary concluded that

"materialists are compelled to go on looking for God genes, helmets, spots and modules indefinitely" (p. 99).

Beauregard's research involved using functional magnetic resonance imaging (fMRI) and quantitative electroencephalography (QEEG) to observe what was happening in the brains of Carmelite nuns while they were in a state of contemplation or meditation. Contemplation is a major part of Carmelite nuns' activity, as they often live in cloisters with little contact with the outside world. Because many of them said they previously had mystical experiences, he asked them to try to reach that state or imagine what it was like while in that state. The control or baseline for comparison was asking them to imagine an intense state of union with another human being. Previous research had shown that the brain often activates the same areas when thinking about any past experience as when going through the original experience. Beauregard found that, by comparison with controls, multiple areas of the nuns' brains were activated and that no specific spot in the brain was activated. (Some materialists have hypothesized a singular "God Spot" that supposedly is "responsible" for mystical experiences, although they have contradicted each other as to exactly where in the brain the "spot" is located.) Although these nuns were cloistered contemplatives, the authors noted that "people who have RSMEs, far from being out of touch, are typically mentally and physically healthy" (p. 278) and score high on scales of psychological well-being. They noted that Abraham Maslow spoke of mystical experiences as "perfectly natural human peak experiences" (p. 290).

Beauregard and O'Leary's conclusion was that the mind is separate from the brain. NDEs were one of three topic areas that they used to explain their nonmaterialist science of the mind. A second area was treatment of obsessive-compulsive disorder (OCD) using a psychotherapeutic technique. A number of patients underwent positron emission tomography (PET) scans before and after treatment. Those who experienced the most significant improvements showed major changes in brain activity in the areas associated with problems in OCD patients, which the authors interpreted as the mind influencing the brain. A third area was the placebo effect, which the authors interpreted to mean that if the mind thinks it has received something that is supposed to correct a medical problem, it will correct the problem itself even if the pill does nothing. As an example of an NDE, they used the case of Pam Reynolds, who had an NDE during surgery

in which the medical team used EEG to monitor her brain's electrical activity. The EEG showed no brain activity and another device showed no heart activity at what apparently was the same time she was having part of her NDE. The authors believed this case demonstrates that "mind, consciousness and self continue when the brain is no longer functional and clinical criteria of death have been reached" (p. 155). Although I find all of their arguments interesting, I think materialist believers would not accept any of them as refuting their belief system.

Although unrelated to their explanation of nonmaterialism, two of their insights into NDEs I found very informative. One was that "the life review is not an external expression of divine wrath but a requirement that [NDErs] experience the true outcomes of their choices" (p. 158). The second was that people who attempt suicide and have an NDE abandon thoughts of suicide because "losing the fear of death seems to mean losing the fear of life itself" (p. 159).

In this book, the authors raised the issue that, although brains, minds, and consciousness are related, no material mechanism accounts for that relationship. One of their main conclusions, supported by the case of Pam Reynolds, was that "such findings lead me to posit that the transformative power of RSMEs arises from an encounter with an objectively real force that exists independently from the individuals who have the experience" (p. 292). Note, however, that the subtitle of the book is, "A neuroscientist's case for the existence of the soul." So readers now have soul, mind, consciousness, brain, and an objectively real force, but the authors did not provide a conclusion as to how these entities relate. Is the soul the same as the mind, which is responsible for consciousness and then uses the brain? Though they showed that a materialistic explanation cannot account for all of the data, I believe that a soul/mind theory requires some better explanation than that given in the book. Mysticism is sometimes referred to as a higher level of consciousness. Why do some souls or minds reach this higher level while others do not? Some people seem to seek it, but for others it just seems to occur spontaneously.

For readers interested in how NDEs may relate to mind and consciousness, *The Spiritual Brain* is a good book. The perspective of these authors is closely related to that of the authors of another recent book in which they defend the premise that the mind is separate from the brain, *Irreducible Mind: Toward a Psychology for the 21st Century* (Kelly, Kelly, Crabtree, Gauld, Grosso, & Greyson, 2006). I recommend

Irreducible Mind, with its 800 pages that include many good references along with chapters on NDEs and mystical experiences, as a companion volume to *The Spiritual Brain*.

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Letters to the Editor

Apparitions of the Living Seen Shortly Before Their Deaths

To the Editor:

Whereas most of the papers published in the *Journal of Near-Death Studies* focus on near-death experiences (NDEs), there is a literature that reminds us that near-death studies include more than NDEs (for example, Wright, 2002). In a previous paper, I presented examples of phenomena such as veridical impressions corresponding to distant deaths, death-related physical phenomena, and the experiences of deathbed bystanders (Alvarado, 2006). One phenomenon I mentioned briefly (p. 147) but did not discuss in the paper was that of apparitions of a living person seen hours or days before that person's actual death. This phenomenon has led to the belief that an apparition of a person is an indication that the person seen in destined to die (for example, Crowe, 1848), something that is not always the case.

In this short note I want to call attention to this phenomenon. Rather than present an analysis of the cases, or a long discussion of research possibilities, I will limit these comments to a presentation of a few interesting cases from the past literature.

In the first case, a lady called Sophie Chapronière saw the apparition of someone who was not close to death but had been unwell for a few days:

> I was in my bedroom being undressed by my maid, Mrs. Gregory, who had been with me for 41 years, and she was unfastening my bracelet when I saw, just behind her about two feet off, her exact resemblance. She was then in perfect health. I said to her, "Why Mrs. Gregory, I see your fetch." She smiled and said, "Really, ma'am," but was not in the least alarmed. On the following Sunday, she was only poorly. I went for a doctor at once, who said she was a little out of sorts. On Wednesday evening she suddenly died. It was about the same time that her double had appeared to me just a week before. This was about 15 years ago. (Myers, 1895, p. 448)

The following two cases were reported in letters to French astronomer Camille Flammarion in 1899. Both were about apparitions of persons who died later.

> One morning, toward seven o'clock, I heard our maid go into my parents' room; I was thoroughly awake. About ten minutes afterward the door of my room opened, and I recognized my father distinctly. Frightened to see him at such an early hour, thinking that he had come to tell me that my mother was worse, I raised myself half up, and gazed at him; I wished to ask him what had happened, but hardly had I said, "What is it?" when I saw his legs, his trunk, and then his head disappear in succession. A moment afterward our maid entered in her turn. Still completely upset, I asked her if some one were ill: she reassured me absolutely. The day passed without incident; I was no longer thinking anything of the matter when, that evening, my father had a stroke of apoplexy, and *died in the night*. (Flammarion, 1921/1922, p. 122)

> In the month of November, 1850, having been invited to the marriage of one of my cousins, at Lapalisse (Allier), I had gone there in company with an uncle, Monsieur Meulien, of Chalon-sur-Saone. We were both sleeping in the same room. The morning of our departure for Lapalisse, when we had to take a carriage early, I woke up about seven o'clock, and saw my relative standing at the foot of my bed, his arms crossed over his burnoose, a cloak in the fashion of that time; he was gazing at me very sadly. I sat up and said to him, aloud: "What? Already up! But we've lots of time!"
>
> The apparition vanished. I looked behind me. My uncle was sleeping peacefully in his bed.
>
> *Two hours later*, as our carriage was bowling along the road to Donjon, my fellow-traveler and an aged woman-servant within the vehicle, I upon the seat, I felt a tug at my sleeve and heard the changed voice of the old woman: "Monsieur Jules, your uncle is ill!"
>
> I turned. The unfortunate man had his head thrown back; his eyes were white; a little foam was on his lips; he was dying in his burnoose.
>
> That morning he was just as he had been the day before. Nothing in his demeanor gave rise to any suspicion that he had afforded me the strange spectacle of his duplication, by showing himself in two forms at once; here in his traveling costume, there in bed, undressed and asleep, living and a phantom at the same time. (Flammarion, 1921/1922, pp. 56–57)

The following case, reported in the well-known Census of Hallucinations conducted by members of the Society for Psychical Research, took place in 1880 and was reported in 1892, while the experiencer lived in a farm house.

> The house being a small one, I occupied a bedroom which communicated with a sitting room on the upper storey, and, being some way from the

other sleeping rooms, it was my habit to keep a lamp burning during the entire night. On the 29th of September I retired as usual in the best possible health and spirits, quite unaware of the then critical state of my relative, and had just got into bed, with face turned towards the wall, when I became aware of another presence in the room.

Turning towards the door of communication, I there saw, as I imagined, my relative who was ill, standing looking at me and smiling. He was dressed as I had been accustomed to see him; the light was bright, and I observed every detail. I lay for a few seconds and then spoke, but getting no answer, jumped out of bed with hands outstretched towards the figure, which, on my approach, retreated to the outer room still smiling with peculiar sweetness. I followed it, and watched it vanish through the outer door, which was closed. After a moment's pause I opened the door and looked out, but saw nothing but a bare passage and narrow staircase, dimly lit from the room in which I stood. I was not afraid, only wondering, for though we had been in the habit of telling 'ghost' stories, it did not strike me at the time to associate this with anything of the kind.

On the following morning I told the other members of the family of my experience, and somebody suggested that it was just possible that the bright light at that hour might have alarmed the man who had care of the house, an old servant, and that he might have come upstairs to see that all was safe. Though personally quite sure of the identity of the apparition, I made inquiries, and found that there was no foundation for the suggestion.

My relative died the following night. (Sidgwick, Johnson, Myers, Podmore, and Sidgwick, 1894, pp. 286–287)

Years later the writer of the case found that her cousin, in a different location, also saw the apparition – but the testimony of her cousin was not presented.

I present these cases, like those of my previous paper (Alvarado, 2006), as a reminder of the type of phenomena that could be investigated in order to expand the scope of research on near-death phenomena.

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INSTRUCTIONS TO AUTHORS

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GENERAL REQUIREMENTS: Logical organization is essential. Although headings help to structure the content, titles and headings within the manuscript should be as short as possible. Do not use the generic masculine pronoun or other sexist terminology.

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