

# Summary of our research

Robert G. Mays, B.Sc., and Suzanne B. Mays

A primary characteristic of many near-death experiences (NDEs) is a shift in the experiencer's self-conscious awareness from within the body to outside the body, with the individual hovering several feet above his physical body, watching the efforts to revive him. The NDE typically begins with the transition outside of the body, followed by experiences of the immediate physical environs, then further experiences such as a dark tunnel and a light, and ends with a return to the body. While outside the body, the experiencer retains nearly all of the ordinary conscious faculties including perception, thought, volition, memory, feelings and self-awareness. 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, and yet the patient still had rich cognitive experiences during the period of complete loss of cortical and brain stem activity, including *veridical* (accurate, real) perceptions of the immediate physical environs that were later verified (van Lommel, van Wees, Meyers, and Elfferich, 2001).

The prevalent view of neuroscience is that consciousness requires physical brain activity. Yet the patient in an NDE experiences a continuity of self-conscious awareness from being within the body, through the transition outside the body, frequently with veridical experiences of the world during periods of unconsciousness and complete cessation of brain function, and finally transitioning back into the body. The NDE appears to be a continuous, seamless experience of the *same self*, a self who retains a continuity of memory from before the beginning of the NDE to after the return to the body. The NDE is integrated into the person's memory much like any other significant life experience.

If our consciousness can separate from and operate independently of our body for a time, albeit during an NDE, consciousness most likely operates as an independent, autonomous entity *as well* while we are in the body. In the latter case, however, our consciousness is intimately united with the body and brain, and requires electrical brain activity to function. The phenomena associated with the out-of-body experience (OBE) component of the NDE, where the experiencer feels separated from the body but still has veridical experiences of the ordinary physical environs, thus can give us indications of what aspects of consciousness are in fact independent of the brain. Conversely, the phenomena of consciousness which are associated with physiological brain activity can give us indications how our autonomous consciousness operates when united with the brain.

The problem of consciousness can thus be addressed by studying the phenomenology of these two aspects of conscious experience, namely, the OBE associated with NDEs and the neural correlates of consciousness. In our first paper (Mays and Mays, 2007a), we examined the first of these aspects, focusing on the relevant phenomena of the NDE OBE. These phenomena strongly suggest that consciousness is an entity in and of itself, which we call the *independent self-conscious mind*. A subsequent paper (Mays and Mays, 2007b) examined the second aspect, that is, neurological phenomena which indicate that there is a non-electrical agency that induces consciousness, and other mind-brain phenomena that can be explained in terms of the self-conscious mind. A third paper (Mays and Mays, 2007c) described additional neurological phenomena which also tend to confirm the view that consciousness arises within the autonomous self-conscious mind operating within the brain and body.

The phenomenological method we use in this research is based on Goethean phenomenology, recently described by Arthur Zajonc (1999), a method of inquiry based on the three stages of inquiry proposed by J. W. von Goethe: (1) "empirical phenomena" which are the ordinary observations an attentive observer would make, (2) "scientific phenomena" which are examined through systematic experimentation, and (3) "pure or archetypal phenomena" which permit a direct intuition of or perceptual encounter with the laws of nature. The last step occurs not through abstraction and construction of models but rather by refining the phenomena themselves to arrive at the essence or core of the phenomena. In his work, Goethe was very reluctant to proceed immediately to define the causes of observational patterns in terms of underlying mechanisms, but allowed for this when it was sensible to do so. It is possible to remain at every stage of explanation within the phenomenal and still rise to the level of theory (Zajonc, 1999). For Goethe, the phenomenal facts themselves *are* the theory.

In order to explain consciousness, we need to look foremost at consciousness itself and every way in which consciousness manifests as phenomena. This would include the phenomena of the near-death experience but equally as well brain phenomena and neurological experimental results.

## The Near-Death Experience

The near-death experience typically occurs when a person has a medical crisis which brings the person close to death (Greyson, 2000). Raymond Moody (1975) described 15 common elements which recurred in NDE reports, including ineffability, hearing oneself pronounced dead, having feelings of peace, having unusual auditory experiences such as ringing or buzzing, passing through a dark region or tunnel, feeling oneself separated from the physical body – usually with perception of the physical environs including seeing one’s own body, encountering deceased relatives or friends, meeting a “being of light”, experiencing a panoramic review of the events of one’s life, experiencing coming back into the body, and telling others of the experience including corroborating events witnessed while out of the body. Moody reported that very many individual near-death experiences included 8 or more of these common elements but it was rare that any two experiences had exactly the same elements and only a few experiences included as many as 12 of the 15 elements.

NDEs are reported by about 30% of people who come close to death (cf. Greyson, 2000) or about 4-5% of the total population (Gallup and Proctor, 1982). A number of both psychological and physiological explanatory hypotheses have been proposed to explain NDEs (Greyson, 1998). One psychological hypothesis is that the NDE is a form of *depersonalization*, that is, a feeling of being separated from both the world and one’s own identity, or feeling that life is unreal and dreamlike. However, the characteristics of NDEs, such as a clear sense of personal identity, clarity of thought, increased alertness, and an out-of-body component, are very different from depersonalization. Another psychological hypothesis is that the NDE is a form of *dissociation*, that is, some degree of separation of thoughts, emotions, sensations or memories from one’s ordinary consciousness. While many NDEs include features that are consistent with dissociation such as the disconnection from the body in an OBE, the level of dissociative symptoms exhibited by NDErs is considerably lower than the levels of distress or impairment, for example, associated with pathological dissociative disorders.

Physiological explanatory hypotheses for the NDE include hypoxia (insufficient oxygen), hypercarbia (excessive carbon dioxide levels), the release of endorphins or various neurotransmitters, neural electrical activity in the right temporal lobe or the limbic system, the presence of various drugs or as yet unidentified endogenous equivalents, and so on. In general these explanations suffer from the fact that these conditions are not present in all cases of NDE. No physiological theory has yet been proposed that can satisfactorily explain all of the common elements of NDEs (Greyson, 1998).

### *The OBE component of the NDE*

Our first paper (Mays and Mays, 2007a) focused on the OBE component of the NDE, that is, when the NDEr experiences a separation from the physical body and has awareness of the immediate physical environs. The phenomenology of the OBE occurring during NDE should help in understanding the nature of consciousness, since the NDEr’s consciousness appears to separate from the physical body at the start of the OBE and later appears to reunite with the body. Furthermore, during the OBE component, perceptions of the NDEr’s physical environs are made which appear to be veridical, and their veridicality can potentially be corroborated.

Our view is that the self-conscious mind (SCM) is an independent entity that is united with the brain and body in ordinary life and may separate from the body in the unusual circumstance of the near-death experience. The out-of-body component of the NDE provides evidence to support this view in four ways:

- Consciousness continues in the NDE out-of-body experience during cardiac arrest, even during periods of global cerebral isoelectricity (flatline EEG). Veridical perceptions during this time establish that lucid consciousness still functions. There is a continuity of self-conscious experience, which spans the time the patient was in the body, then separated from it, and then reunited with the body. The experience is integrated by the patient in memory as a single, continuous experience, even though it occurred during periods of complete demonstrable cerebral incapacity.
- The NDEr experiences her consciousness as separate from the body, typically hovering near the ceiling, while the body is unconscious. Veridical perceptions during the NDE OBE, which could only have occurred if consciousness had operated in a location distant from the body, confirm this subjective experience. The details of purely visual veridical perceptions and their timing show that these perceptions could not have been constructed by the imagination from subliminal impressions received by the brain.
- Comparison of the NDE OBE with other types of OBEs (spontaneous, willed, induced by hypnosis, electrical brain stimulation or drugs, etc.) suggests that there is a relationship between the degree of apparent separation from the

body in the NDE OBE and the veridical perceptions that are experienced, as compared with other types of OBEs. The NDE has both a greater apparent separation and a greater incidence of accurate, verified perceptions.

- The phenomenology of the NDE OBE shows that the NDEr's consciousness operates with the same cognitive faculties of perception, thought, will, memory, and feelings as were present while in the body, but many of them are enhanced, having greater acuity and agility. There is a continuity of the NDEr's memory and the sense of self, which continue from being in the body, to being out of the body, and then back to the body. During the NDE OBE, the NDEr feels she is the same person as before, but is now freed of the constraints and limitations of the body. The return to the body brings back all of the characteristics of the body: weight, fatigue, physical pain and any pre-existing disabilities. The NDE OBE is thus a coherent, self-consistent experience, implying that separation of consciousness from the body in fact occurs.

During the NDE OBE, the individual appears to be a complete human being, the *same* human being who 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 implies a separation *in fact* of consciousness from the physical body.

## **The Independent Self-Conscious Mind**

The NDE OBE strongly suggests that consciousness can operate completely independently of the body and still possess all of the faculties and attributes of ordinary consciousness in the body, namely, perception, volition, feelings, thought and memory. With cases of cardiac arrest especially, it can be demonstrated that there is no physiological functioning of the brain or brain stem during significant portions of the OBE. Furthermore, the quality of awareness is not diminished during the OBE as in a dream-like state, but rather is the same as, or even more intense than, ordinary waking consciousness.

The transitions out of the body and back to the body occur seamlessly, that is, there is a continuous sense of selfhood and memory through both transitions. The experiencer feels herself to be the same self in transitioning out of body, as well as returning to it, having the same memories. The memories of events experienced while out of the body are integrated seamlessly with the experiencer's memories, both before and after the NDE. In short, the experiencer's self-conscious awareness, or sense of self, is felt to be entirely the *same self* before, during, and after the NDE. The experience is that one's unified conscious self has gone through the near-death experience, much like going through any other significant life experience.

### *Neurological evidence of the independent self-conscious mind*

If consciousness can separate from and operate completely independently of the body in the NDE OBE, then neurological phenomena should be evident that show there is a unified conscious self which operates *in the body* in ordinary consciousness. In our second paper (Mays and Mays, 2007b), three neurological phenomena were presented that suggest there is an agency that induces conscious experience and self-consciousness, but which itself is not a form of neural electrical activity. *Electrical brain stimulation* shows that electrical brain activity in itself is not sufficient to produce actual conscious awareness or intentional movements; some agency other than electrical activity must be involved that brings about our actual consciousness. *Subjective backward referral of sensory experiences* shows that there is no neural mechanism that can mediate the subjective backward spatial and temporal referral of sensations; some agency other than electrical activity must "hold together" both the time and location of the sensation while the sensation comes to awareness over a period of 500 msec. *Large-scale neural synchrony* shows that specific endogenous volitional tasks (recognition, decision, and movement preparation) give rise to phase-locked synchronized neural activity across widely separated cortical regions; some agency must interface in some way with the electrical activity of the brain to bring this about. The agency cannot itself be electrical activity because electrical brain stimulation, which should disrupt the agency, thereby causing widespread disruptions to consciousness, does not have that effect.

We propose that the non-electrical agency that induces conscious experiences and self-consciousness in these three neurological phenomena is the consciousness itself, which can operate independently of the brain during the NDE OBE, namely the *independent self-conscious mind*. During the NDE OBE, the self-conscious mind (SCM) appears as an independent "field of consciousness". However, during ordinary consciousness in the body, the SCM is united with the body and brain. Consciousness within the body results from a form of induction between the brain and the SCM. The phenomena of the NDE OBE are consistent with this view and provide many details related to the SCM. The SCM carries all of our cognitive faculties during the NDE but these are restored to the body upon return to the body. The SCM is non-material, is invisible to ordinary sight, cannot interact significantly with physical objects, and so on. In ordinary life, the SCM is strongly

and intimately integrated with the body and brain; people will ordinarily lose consciousness when the brain ceases to function. In only about 30% of people who are near to death does the SCM separate from the body.

Because the SCM is perceived frequently in the NDE OBE with a bodily form, this form is likely extended and integrated throughout the body when the SCM is united with the body. Since some NDErs who had their NDE as infants experienced themselves as fully developed adults with fully developed perception, memory and thought, the SCM apparently already exists in fully developed form during infancy, rather than developing during infancy as the body does. During early childhood, the child's development is a process of learning how to integrate the SCM with the brain and body. Long-term memory resides with the SCM, since memories during the NDE are formed and retained prior to the return to the body. Thus memories themselves cannot be destroyed by the destruction of brain structures. However, it is clear that memory formation and recall while within the body are mediated by brain structures and pathways. The SCM is the unitary field of our consciousness and the seat of our self-conscious awareness, both within the body and out of the body, which gives us the sense of the continuity of our self throughout our life.

Our view of the non-material self-conscious mind is very similar in a number of respects to the dualist interactionist model of Karl Popper and John Eccles (1977). However, there are several differences. Likewise, our view has similarities but also significant differences with Benjamin Libet's conscious mental field (2004).

### *Mind-brain interactions*

The strongest objection to our view is that there is no reasonable explanation how the non-material mind can interact with the brain. The interaction must therefore be inaccessible to scientific study. In response, we note that the phenomena of the mind, taken as a whole, including the phenomena of the NDE OBE, *do* indicate that the mind is non-material, and we contend that the interactions of the SCM with the brain and body can be studied scientifically through their associated phenomena. One general approach is to investigate the neural correlates of consciousness. The problem of correlating internal mental experiences with observable neural events has been successfully addressed by a number of researchers using techniques including cortical stimulation, forced choice protocols, and brain imaging technologies. Another general approach to scientific study is to investigate conscious functions in patients with brain damage.

By looking at existing, well-known neural phenomena, the nature of the interaction between the mind and the brain can begin to be deduced. Evidence from electrical brain stimulation shows that *brain-to-mind induction* of conscious experience very likely results from neural electrical activity where in some way "we" have been involved. Evidence from large-scale neural synchrony shows that our conscious mental activities induce electrical neuronal effects through *mind-to-brain induction* over widely distant points in the brain. One such effect is observed where the subjective level of mental intensity results in an overall higher-level energy of electrical activity.

Benjamin Libet's (2004) phenomenon of the delayed awareness of willed action, the famous paradox that brain activity appears to start before the subject's awareness of his decision to move, can be explained by assuming that there is a delay between making the decision within the SCM and that decision coming to our awareness, much the same as the delay that occurs in tactile sensations coming to awareness. Indeed, if the delay in awareness of the *endogenous* mental activity (deciding to "act now") is the same 500 msec as the delay in tactile sensations, then the paradox is removed: the decision to move is made some 150 msec prior to the brain's first response. Libet's paradox is now replaced by another paradox: we subconsciously decide to move before we are aware of the decision. This is not as difficult a contradiction, because we always decide to act out of a conscious context. When the SCM is united with the brain, all conscious awareness, including awareness of our own decisions and thoughts, must come through neural electrical activity in brain-to-mind induction.

### *Other mind-brain phenomena*

A number of other brain phenomena are relevant in understanding how the self-conscious mind interacts with the brain. Popper and Eccles (1977, ch. E5-E6) cite investigations of global lesions of the cerebrum, including commissurotomy (cutting the nerves joining the two brain hemispheres, resulting in a "split brain") and hemispherectomy (removal of one of the brain hemispheres), as well as circumscribed cerebral lesions in the temporal, parietal, occipital and frontal lobes. In each case, the lesions give us an opportunity to discover the functions of the missing brain regions as well as provide insight into how the mind as a whole operates when united with the brain. For example, our awareness and sense of self appear to remain intact through very drastic damage to brain structures and function.

Our third paper (Mays and Mays, 2007c) presented several different cases of reduced or altered neural function and how they relate to the SCM, namely, split-brain patients, hemispherectomy patients, hydrocephalus patients, decorticate patients, and patients with phantom limb phenomena.

*Split-brain patients* are those who have had the connections between their two hemispheres severed in order to control advanced intractable epilepsy. Despite the evident severity of such an operation, the split-brain patient experiences no apparent serious effect from the operation in terms of ordinary everyday behavior. However, with appropriate testing procedures, a wide variety of distinct impairments can be demonstrated in the cross-integration of cerebral functions. Postoperatively, these patients exhibit an apparent splitting of conscious awareness where the patient does not become aware of perceptions which are received only by the non-dominant hemisphere. Still, the patients claim that they do not experience any “dual consciousness” that appears to be present (Gazzaniga, 2000). These phenomena indicate a situation where the normal neural activity across the hemispheres has been blocked. The lack of neural activity in the dominant hemisphere prevents the perceptions from coming to consciousness, consistent with the prior observations that a certain duration of electrical brain activity is needed to bring both sensations and endogenous mental activity to consciousness. The severed corpus callosum prevents the neural activity from reaching the level of conscious awareness. Nevertheless, the effects of subliminal experiences are still present in the SCM and show themselves to be present subliminally, such as with a patient’s emotional reaction to an embarrassing image which is shown only to the non-dominant hemisphere. Split-brain phenomena thus suggest that conscious awareness requires neural activity in the dominant hemisphere as the last stage of “coming to awareness”. If this neural activity is blocked, the awareness remains subliminal, but the fact that the awareness is subliminal implies that the unity of consciousness is preserved, even when significant neural damage has occurred, consistent with our view.

*Hemispherectomy, hydrocephalus and decorticate patients* all exhibit brain structures which have been severely compromised and yet all exhibit remarkable motor, language and cognitive abilities given the degree of cerebral loss. In hemispherectomy, one cortical hemisphere is removed, usually to treat intractable unihemispheric epilepsy. In hydrocephalus, an abnormal increase in cerebrospinal fluid causes an increase in the cerebral cavities and a distortion of brain structures. Decorticate patients are born without cerebral hemispheres. In all three cases, the SCM is able to adapt to severely compromised neural pathways to achieve a high level of function. The SCM operates within whatever brain structures are present. The SCM is thus shown to be whole and complete in itself and not the *product* of neural function. Evidently, the SCM can adapt most easily to gradual changes in neural structures, for example due to slow disease processes rather than sudden brain trauma or stroke. Sudden changes appear to overwhelm or “isolate” the SCM and inhibit adaptation. Even so, adaptation appears to be facilitated by bodily movement in conjunction with relearning cognitive skills. Also, there appears to be a certain level of “neural capacity” below which cognitive functions appear to become crowded, implying that the SCM requires a minimum neural capacity to support particular functions.

*The phantom limb* is the vivid experience of a limb that has been amputated but subjectively is still present. Phantom limb patients frequently experience pain in the non-existent limb and can sometimes feel delayed tactile sensations when another part of the body, for example near the point of amputation or on the face, is gently rubbed. There are electrical anomalies, called “reorganizations”, in the sensory and motor cortex which appear when there is phantom limb pain. Our view is that the non-material SCM has a spatial shape similar to the physical body. The spatial shape includes “mind-limbs” which are visible to many NDErs during their OBE. The phantom limb is the continued conscious experience of the mind-limb when the body limb is not present. A number of phenomena related to phantom limbs can thereby be explained which give insight into mind-to-brain and brain-to-mind induction. In particular, the experience of pain is the result of the mind still attempting to project the mind-arm into a non-existent physical arm. The mind-arm seeks its normal bodily neural pathways but they now reach only to the stump and the mind-arm becomes “diffuse” and disorganized. If the disorganization is too great, certain cortical reorganization appears and pain is experienced. However, when the patient uses a functional prosthesis, the mind-arm can now project into the prosthesis and becomes focused again into a physical “arm”. The cortical electrical reorganization is reduced and the pain stops. Researchers have found that the active use of a functional prosthesis is positively correlated with reduced cortical reorganization and reduced phantom pain. Our view of the SCM thus provides a comprehensive explanation of phantom limb phenomena.

Our view of the self-conscious mind is that it is whole and complete in itself. When the SCM separates from the body in the NDE OBE, it recovers sensory functions such as sight, which may have been impaired, and it is no longer constrained by physical disabilities. But when united with the body, the autonomous SCM must operate *through* the physical brain for us to be conscious and to have cognitive function. When the brain is dysfunctional or damaged in some way, the operation of the SCM is impaired and difficulties with cognitive functions result. Nevertheless, while in the body, the SCM appears to be able to overcome significant neural damage by transference of function to other brain regions. The appropriate perspective in these cases is not the *plasticity of neural function*, but rather the *adaptability of the SCM* to relearn cognitive functions, in the face of reduced or altered neural function.

## *Mechanism for mind-brain interactions*

The question remains regarding the nature of mind-brain interactions: how can the non-material mind interact with the physical brain? In particular, how can the non-material mind interact with the physical brain when it doesn't seemingly interact with other physical things while out of the body (e.g., passing through physical objects)?

*Brain-to-mind induction* can be demonstrated with external electrical stimulation of the sensory cortical areas or the temporal lobes, which *simulates* natural neural electrical activity and produces conscious experiences (sensations, percepts, feelings and memory sequences). This phenomenon implies that naturally-occurring neural electrical activity from sensory brain processes induces conscious experience of actual percepts. *Mind-to-brain induction* can be demonstrated with particular endogenous mental states, such as a willed movement, concentrated attention or the recognition of an image, which cause identifiable electrical brain activity such as the readiness potential (RP) and characteristic patterns of large-scale neural synchrony.

In both cases of induction, brain-to-mind and mind-to-brain, it is reasonable to propose that the two kinds of induction are equivalent, perhaps symmetrical or complementary. The phenomena indicate that the induction operates from one aspect of reality (physical brain functions) to another aspect of reality (mind) and vice versa. The actual process of mutual induction between the two aspects of reality must be identified by considering agencies beyond ordinary physical processes, because the mind is non-material and not yet well understood.

The really "hard problem" of consciousness (Chalmers, 1995) is the problem of *experience*, that is, how physical brain processes give rise to subjective experience, and why the performance of specific brain functions is accompanied by experience. In order to develop a theory of consciousness and experience from the phenomena, we propose considering the problem from two aspects: how the self-conscious mind, when *united* with the body, interacts with physical brain processes to give rise to experience, and how the self-conscious mind, when *independent* of the body, interacts with physical processes (and other mind processes) to give rise to experience. There are thus two classes of phenomena to be studied: (1) the neural correlates of conscious experiences, from the perspective of the autonomous mind operating *through* the brain, and (2) the experiences of the mind within physical environs, when it is independent of the body in a veridical NDE OBE.

In the first class of phenomena, certain electrical brain activity interacts or interfaces with the self-conscious mind in a certain way to give rise to a specific subjective experience. Indeed, the SCM unites with the brain as a whole in particular ways which can be described, mapped out and explained. Exactly how the mind-brain interface works can be studied via neural correlates of consciousness: a particular set of evoked and event related potentials give rise to the experience of a sensation; a particular volitional or attentional state in the mind gives rise to particular synchronous electrical brain activity. Thus, the physiological and electromagnetic aspects of mind-brain induction can probably be found and described in detail and the existence and properties of the non-material SCM can be inferred *indirectly* from the interaction of the mind with the brain and body.

The second class of phenomena, namely the experiences of the SCM when it is out of the body but still within physical environs, needs to be studied from a number of perspectives, for example, the nature of the interaction of the out-of-body mind with physical phenomena such as light, sound, heat and physical surfaces, the shape and structure of the mind's "body", the relationship of thought and volition, the nature of memory in the out-of-body state, the interaction of the out-of-body mind with other minds both embodied and out-of-body, and so on. This class of phenomena requires much more attention than it has hitherto been afforded. A detailed study of the veridical NDE OBE is needed, but to date it appears we have only tantalizing hints of the detailed OBE phenomenology. For example, the mind's "body" appears to have an intricate, luminous structure, at least in some NDErs (Moody and Perry, 1988); the NDEr's sight appears to be more complex than normal vision, having at times such qualities as enhanced clarity and focus, omnidirectional awareness and synesthesia, that is, sensations with more than one sensory quality such as tones and colors (Ring and Cooper, 1999).

How the out-of-body SCM interacts with physical processes is of particular interest because it can elucidate the aspects of the interface of the SCM with the brain. While the phenomena of the NDEr's interactions with physical reality have not yet been systematically studied, various NDE OBE accounts indicate in general that the NDEr's "body" is non-material and does not interact significantly with objects, because it appears to pass easily through them. However, interactions with physical substances and energies do appear to occur, and include subtle interactions in different modalities. Some NDErs report a slight resistance in passing through objects and the ability to lightly touch the surface of a ceiling. Sight for at least some NDErs is dependent on actual illumination by light. Some NDErs report that they can hear, for example, heart monitors or fluorescent lights, implying an interaction with vibrations in the air. There are a few accounts of ordinary people feeling

subtle interactions with the NDEr, for example, when the NDEr has playfully touched their face. Finally, the NDEr “body” appears luminous in some way to the NDEr, that is, giving off light of its own, although that light can’t be seen by ordinary people.

While these accounts are fragmentary, they suggest that there is a subtle interaction between the NDEr “body” (i.e., the SCM) and physical objects, electromagnetic radiation, and vibrations in the air, and that the interactions are subtly perceptible by another person’s nervous system. If the SCM can interact in subtle ways with physical objects and air vibrations, and can directly “perceive” electromagnetic radiation (light) when out of the body, then the SCM likely can interface in some way the electrical activity of the brain when it is united with the body, in brain-to-mind induction. Similarly, if the out-of-body SCM can be luminous in some way, it may similarly be able to induce electrical brain activity. If the accounts of an NDEr’s touch being felt by an in-body person prove accurate in multiple cases, this would provide further support for the ability of the SCM to interact with the nervous system in mind-to-brain induction.

We would expect such mind-brain induction processes to be perfectly “tuned” for efficient interactions between mind and brain and we would expect brain-to-mind and mind-to-brain induction to be complementary or symmetrical to one another, perhaps similar to the way that electric and magnetic fields are mutually inductive.

### *Mind is a fundamental entity, a new dimension of reality*

Another basic objection to the view that the non-material mind interacts with the brain is that such mind-body interactions would violate the laws of physics, in particular the law of conservation of energy (that the total amount of kinetic and potential energy in an isolated system remains constant). Thus, our view will ultimately need to explain not only how the non-material mind interacts with the brain, but also how a non-material consciousness occupies a particular location in space with a particular cohesive “body” form, and how memories are formed, “stored” and recalled in a non-material field of consciousness.

In Goethean phenomenology, the phenomena *are* the theory, and in this case, the fundamental phenomena are clear: the veridical OBE component of the NDE suggests that consciousness can operate completely independently of the body, and a number of neural electrical phenomena suggest that a non-material agency induces conscious experiences and self-consciousness while in the body. If the phenomena of the mind can’t be explained by our known physical laws, then the mind must be a fundamental entity, a new, non-material dimension of reality, one that involves mental and consciousness phenomena. If there are *non-material* aspects of reality, it is entirely possible, and even to be expected, that the current laws of material physics need to be extended, in much the same way as they have been in the past.

The fact that a non-material mind interacts with electrical brain processes means that there must be some sort of mind “force” which brings about this interaction, the effects of which appear objectively as the electrical brain activity that we observe and introspectively as the changes in our consciousness that we experience. The effects of these mind interactions are almost certainly small, because the observed interactions in the brain are physically small, on the order of milliamperes.

Thus, the law of conservation of energy is not, in fact, violated, because there is a new fundamental entity, mind, and a new “force” which describes the nature of its interaction in the world. The law of conservation of physical energy becomes the law of conservation of *energy-mind*. “All” that has been done here is to introduce a new concept which extends our conception of reality. The precise nature of mind and its interactions still need to be investigated, and whether mind interactions with physical processes are amenable to mathematical description still needs to be determined.

In summary, reality includes “mind” which interacts with the physical brain, so mind operates in the same “sphere of interaction” as matter and energy. The basic conservation law is thus the conservation of energy-mind. The effect of the self-conscious mind on electrical brain activity does not appear to be relatively very large, so the mind component of the conservation law is probably also very small and manifests only in subtle ways in ordinary physical reality.

## **Conclusions**

The phenomenon of the near-death experiencer’s veridical perceptions during the out-of-body experience demonstrates the existence of the self-conscious mind (SCM), separate from the physical body. In the out-of-body state, the mind is completely independent of the body and is non-material as far as can be ascertained. Ordinarily, though, the SCM is intimately united with the brain and body, and in this united state, the SCM operates *through* the brain. This view is also supported by evidence from neurological phenomena which suggest that a non-material agency induces conscious experience

and self-conscious awareness. These phenomena include electrical brain stimulation, subjective backward referral or antedating of sensory experiences, large-scale neural synchrony, Libet's delayed awareness of willed action, split-brain phenomena, hemispherectomy patients, hydrocephalus patients, decorticate patients, and phantom limbs. The non-material self-conscious mind and the brain interact in some way by mutual induction. Various phenomena of neurological processes can be reconsidered in detail in light of this view, and we believe such efforts will prove very useful, for example in explaining phantom limb phenomena.

In our conception of mind and body, the highest cognitive functions of thought, memory, perception, feelings, and volition operate in the non-material mind. The brain has a supportive role, supporting all aspects of our consciousness so that we are conscious of our outer environs, our selves, and our inner mental activities of thought, feeling and volition. The necessity of understanding the function of the brain is not diminished by this view. The brain is the instrument and the mind is the operator.

Several neurological phenomena suggest that there is a process of "coming to awareness" wherein consciousness of sensory and mental events dawns in our awareness after a certain duration of neural electrical activity in the brain. Prior to coming to awareness, these events are subliminal in our consciousness. This subliminal quality can be demonstrated through tests where the subject is forced to guess what was perceived. The phenomena that show the process of coming to awareness include the 500 msec delay in tactile sensory awareness and the delayed awareness of willed action. The latter implies that even endogenous mental activity, such as the internal decision to "act now", must have a certain duration of electrical activity to come to our awareness. Split-brain patients also demonstrate this phenomenon: in the split-brain patient, perceptions can be restricted to the non-dominant hemisphere and thus remain subliminal, because consciousness requires neural activity in the dominant hemisphere as the last stage in coming to awareness.

The split-brain patient also demonstrates that the unity of consciousness is preserved even when significant neural damage has occurred, in this case that the corpus callosum has been severed. Other neurological phenomena also suggest that the integrity of selfhood continues even when the cortical structures are severely altered or damaged. These phenomena include hemispherectomy patients, hydrocephalus patients with extreme cortical distortion and decorticate patients. In each case there appears to be significant transference of cognitive function to other cortical structures and successful adaptation to changes in neural function. Cognitive functions continue and, at least in the first two cases, near normal intellectual and motor functions are possible even with extremely reduced or compromised cortical structures.

These phenomena are consistent with our view of the autonomous agency of the SCM. The SCM accounts for the presence of a whole person even in the case of a decorticate child, and for the continuity of selfhood during severe damage to brain structures. The same principle of the integrity of selfhood applies to numerous other instances of disability and physiological degeneration: despite the sometimes extremely severe physical limitations, there is a whole individual present. The SCM adapts to the altered cortical environment and gradually learns new mappings of neural pathways to accomplish its functions. The process of adaptation appears to be particularly successful when the change in the neural environment occurs gradually over time. A sudden change in neural structure such as with brain trauma or stroke appears to leave the SCM overwhelmed and "isolated" from adaptive neural pathways. The learning of new neural pathways by the SCM appears to be facilitated by bodily movements in conjunction with reacquiring cognitive skills.

Our research papers have endeavored to show that the non-material self-conscious mind is amenable to scientific investigation. In particular, we expect that phantom limb phenomena will provide a good ground for such investigation of the SCM. The phantom limb is probably the clearest demonstration of the mind's interaction with the body and the brain. The phantom mind-limb is a non-material reality that interacts semi-independently of the body and brain in unusual, counterintuitive ways which can be explored experimentally.

### *General principles of the self-conscious mind*

From our research, we can summarize some general principles of the self-conscious mind (SCM):

1. *Autonomous field of consciousness*: In ordinary consciousness, the SCM is an autonomous "field of consciousness" which is united with the brain and body and is spatially coincident with the physical body. (A "field" in this sense is an area or region of space having specific properties.) The SCM interfaces with the body through the electrical activity of the brain and nervous system. The SCM is generally united strongly with the brain and body but can, in some individuals, separate in the NDE and operate for a time independently of the brain and body.



2. *Interaction even though non-material*: The SCM is non-material and seemingly has little interaction with physical objects. Nevertheless during the NDE OBE, the SCM appears to have subtle interactions with solid objects with a slight feeling of resistance in passing through them, with solid surfaces through “touch”, with electromagnetic radiation through “visual perception”, and with sound vibrations through “hearing”. The out-of-body SCM apparently can sometimes be felt by ordinary people. Therefore, the possibility of a subtle form of interaction of the SCM with the brain through the nerves is reasonable. We would expect such interactions to be very small in magnitude. Such interactions would constitute a form of complementary mutual induction, brain-to-mind and mind-to-brain, which would likely be specifically “tuned” for efficient interaction between the brain and the mind.
3. *Integration and interaction throughout the brain and body*: The interaction of the SCM with the brain appears to be via large-scale, brain-wide interactions. Furthermore, the SCM appears to have a bodily structure that projects throughout the physical body and interacts through the body neurons as well as the cortical neurons. Both exogenous sensations and endogenous mental states in the SCM are reflected in the electrical activity of the brain and their effects can be seen in various forms of brain imaging such as electroencephalography (EEG) and functional magnetic resonance imaging (fMRI).
4. *Operation through the brain, coming to awareness*: In ordinary consciousness, the SCM operates *through* the brain. All cognitive events, both exogenous and endogenous, are first subliminal and “come to awareness” once there has been sufficient electrical brain activity. The electrical brain activity apparently must include activity in the dominant hemisphere in order to achieve consciousness. The process of coming to awareness results in various delays in consciousness with characteristic timings (e.g., visual versus tactile perceptions), and in the phenomenon of subjective “antedating” of sensory perceptions to the actual time of the stimulus. Subliminal perceptions are still evident even when the stimuli are not sufficient to come to conscious awareness, for example, in forced choice protocols.
5. *Cognitive functions reside in the SCM*: Since the SCM retains full cognitive function when it is separated from the body in the NDE OBE, most cognitive functions reside in the SCM, including perception, volition, feeling, thought, and memory. The brain is the supportive instrument for consciousness. In particular, memories are “stored” in the SCM although the brain mediates the *formation* and *recall* of memories while we are in the body. Memories thus resist destruction even with severe brain damage or disease. Loss of long-term memory, for example in dementia, is probably due to the destruction of brain structures that assist with memory recall, rather than destruction of the memories themselves.
6. *Early childhood development integrates the pre-existing SCM*: From NDEr accounts during infancy, the SCM appears to be already fully developed and complete at the time of birth. Thus, learning during infancy and early childhood is a process of integrating the fully-developed mind with the developing body. The process of integration of the SCM with the brain is facilitated by bodily movements and this process influences the development of brain structures. The process of integration occurs most strongly from birth through at least age 7 or 8.
7. *Adaptation to changes in neural structures*: The SCM can adapt to changes in neural structures such as may occur with disease or trauma, by transference of cognitive function to other cortical structures, such that near normal intellectual and motor functions are possible even with extremely reduced or compromised cortical structures. Successful adaptation is most likely to occur when the changes in cerebral structures have occurred gradually over time. Adaptation appears to be facilitated by bodily movements in conjunction with reacquiring cognitive skill.
8. *The seat of our selfhood*: Since the individual experiences a continuity of the sense of self during the separation of the SCM from the body in the NDE, the SCM is the locus of our self-conscious awareness both within the body and out of the body. The SCM is thus our sense of self or selfhood. Even when an individual has significant physical or cognitive disabilities or impairments, the SCM, and therefore the person *per se*, remains whole and complete.

Our view of the mind and body offers a number of perspectives different from those currently taken by most neuroscience researchers:

- The self-conscious mind is an *entity* in its own right that *interfaces* with the brain, rather than an *effect* that *emerges* from the brain’s operation.
- When neurological functions become impaired, the mind exhibits *adaptability* in operating within the brain, rather than the brain exhibits *neural plasticity*.
- The mind is the *person per se*, rather than brain processes *determine the person*.

- Significant brain impairment may *impede* the mind from operating but the mind and the person *remain whole*, rather than brain impairment *diminishes mental function* and thereby *diminishes the person*.
- Memory resides *within the mind* and uses the brain for memory formation and recall, rather than memory is *encoded in the brain*.

Our view of the self-conscious mind can also inform various practical realms, of which we present four possibilities:

- For education, the insight that early childhood development is a process of integrating the fully developed mind with the infant's quickly developing body and brain, can direct educators to focus on the early stages of development of the senses, thinking, motor function, walking, and speech. Early childhood education can then work with these processes to assist the integration of the mind with the brain and body. In later years, the child's education can focus on drawing out and enhancing the innate capabilities of the child's mind.
- For problem areas involving memory, for example memory loss, the insight that memory does not reside in the brain may be helpful in developing treatment strategies. The processes of laying down long term memories and recovering them are mediated by specific physical brain structures and processes. Understanding that these processes are really *interface* processes with the non-material mind may help focus research on the memory acquisition and recall processes as *interfaces* rather than on memory storage.
- For the broad problem of autistic spectrum disorders, observed differences in the autistic child's brain development may be due to differences in how the mind of the autistic child interacts differently with the brain. This insight could give clues for understanding how autism manifests and for developing strategies for treatment.
- For the problem of rehabilitation from stroke and brain trauma, the insight that the mind always seeks to work through the brain and will try to adapt when there are neurological impairments, may be helpful for treatment. Rehabilitation strategies to help transfer of mental, motor and speech functions can be developed that will shift cognitive functions to unaffected areas of the brain. Such strategies might include sensorimotor activities that gradually redirect the mind to use areas that are contralateral to the lesion.

In seeking the factors that influence individual human development, we generally look at two areas: *nature*, that is, heredity and genetics which bring about the structure of the body including the brain and nerve structures, and *nurture*, that is, the environmental and experiential influences during a person's life. Our view posits a third factor besides these two: *mind* or more specifically the autonomous self-conscious mind, that is, the individual non-material aspects of the person that are also operant in human development from birth. Where there is confusion over which factor has been determinative in a particular situation, nature or nurture, as in cases, for example, of genetically identical twins raised in the same environment but who are not identical in all respects, the factor of the individual self-conscious mind is probably the operant determinative factor. We suspect that *mind* plays a significant determinative role in human development.

In this view, our *sense of self* is the self-conscious mind itself, rather than a conceptual self that emerges from the operation of the brain's neural circuits. To be sure, our *awareness* of our self and of much of the rest of our experience of the world is dependent on the operation of neural circuits while we are in our body. But because the self-conscious mind is fundamentally *independent* of our brain, our sense that our self is in charge of our destiny is, in fact, true.

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