

NEAR-DEATH EXPERIENCES AND AYAHUASCA-INDUCED EXPERIENCES - TWO UNIQUE PATHWAYS TO A PHENOMENOLOGICALLY SIMILAR STATE OF CONSCIOUSNESS

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ABSTRACT: Individuals who survive a close brush with death often experience a profound altered state of consciousness known as a “near-death experience.” Individuals who drink a South American medicine, known as “ayahuasca,” experience an altered state of consciousness with numerous similarities to near-death experiences. These similarities, which occur on perceptual, emotional, cognitive, and transcendent levels, suggest near-death experiences and ayahuasca-induced experiences may involve a similar state of consciousness. This article compares and contrasts the phenomena of near-death experiences and ayahuasca-induced experiences. Common features of these experiences suggest ayahuasca may be useful as a research tool in the investigation of near-death experience phenomena. Further research is suggested to expand our understanding of human consciousness and near-death experiences.

KEYWORDS: near-death experience, ayahuasca, consciousness, transcendent experience.

NEAR-DEATH EXPERIENCES

Individuals who survive a close brush with death often experience a profound altered state of consciousness. This has been termed a “near-death experience” or “NDE.” Dr. Bruce Greyson at the University of Virginia defined a near-death experience as “a profound subjective event with transcendental or mystical elements that many people experience on the threshold of death” (Greyson, 1994, p. 460).

Dr. Raymond Moody first coined the term “near-death experience” in 1975 (Moody, 1975). After interviewing fifty people who had experienced a close brush with death, Moody identified fifteen recurrent “elements” he felt characterized their experiences. Later, he condensed these into nine elements (Moody, 1989). (These elements are discussed in the next section of this article.)

The first written account of a NDE predates Moody’s description by more than two thousand years. *The Republic*, published around 380 B.C.E., tells the story of a soldier named Er who was killed in battle. Twelve days later, he awoke on a funeral pyre and recounted his experiences while in the “otherworld” (Rouse, 1956).

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In the modern era, the earliest written account of a NDE came from the Swiss geologist Albert Heim. While climbing a mountain, Heim's hat was blown off by a strong gust of wind. As he reached for his hat, Heim lost his balance and fell more than 60 feet. He survived and later described his experience. He explained while falling, his thoughts were clear, time slowed down, and he saw images from his entire life. He saw a "heavenly light," but felt no anxiety, grief, or pain (as cited in Noyes & Kletti, 1972, p. 50). Heim went on to gather accounts from others who had experienced close brushes with death. These included individuals who had fallen while climbing mountains, soldiers wounded in battle, workers who fell off scaffolds, and individuals who nearly died in accidents or near-drownings. His findings were published in the *Yearbook of the Swiss Alpine Club* in 1892. Eight years later, psychiatrists Russell Noyes, Jr. and Ray Kletti published a translation of Heim's research (Noyes & Kletti, 1972).

The next major advance in our understanding of NDEs occurred when an undergraduate student at the University of Virginia named Raymond Moody attended a talk given by the university's psychiatrist, Dr. George Ritchie. During this presentation, Ritchie described an experience that happened to him during World War II. In 1943, Ritchie developed severe pneumonia while undergoing army basic training at Camp Barkeley, Texas. His condition deteriorated rapidly and while awaiting a chest x-ray, he grew weak and collapsed. After regaining awareness, Ritchie flew through the air, "traveling faster, in fact, than I had ever moved in my life" (Ritchie, 2007, p. 46). He tried talking to others, but they ignored him, as if he were not there.

After returning to the hospital, Ritchie met a being of light that emanated unconditional love. He then went on a second journey, this time with the being of light. Communication between Ritchie and the being of light occurred "by thought instead of speech" (Ritchie, 2007, p. 63). They traveled to distant cities together and witnessed people going about their daily lives. Ritchie then returned to the hospital a second time. When he opened his eyes, he discovered the bed covers had been pulled over his head. Although alive, Ritchie suffered from delirium. Several days later, when he regained clarity, he learned that after collapsing in the radiology department, he had grown increasingly ill. The ward boy had found Ritchie without a pulse. He summoned the doctor, who pronounced Ritchie dead. Nine minutes later, Ritchie was checked again and for a second time was pronounced dead. Then, following an injection of adrenaline, Ritchie's heart began beating again. Ritchie made a full recovery. He later attended medical school, became a physician, and then worked as a psychiatrist at the University of Virginia, which is where Moody heard his story.

After graduating from the University of Virginia with a doctorate in philosophy, Moody accepted a teaching position at East Carolina University. One day, a student mentioned he had been in a serious automobile accident about a year earlier. Although his doctors told him he had died, the student claimed he had remained aware during this time. The student further explained that following his accident he saw a tunnel of light. From this tunnel came a man made of light, who showed him his entire life. The student traveled high

above the wreck site and saw cities of light. After his accident, he was permanently changed. He believed life continues after death and love is extremely important. Moody heard similar stories from other students, then adults in his community too. He began collecting these stories, which he referred to as “afterlife stories” (Moody, 2012, p. 77). In 1972, Moody was accepted into the Medical College of Georgia. Just seven months later, he was invited to speak to the local medical society about his research into what he now referred to as “near-death experiences” (Moody, 2012, p. 78).

Moody’s Nine Key Elements of Near-Death Experiences

By 1974, Moody was aware of 150 reports of NDEs. He interviewed 50 of these people, then identified fifteen separate elements which recurred in their descriptions (Moody, 1975). Later, he condensed these into the following nine elements (Moody, 1989):

1. A sense of being dead - despite the label of this first element, Moody pointed out that during NDEs, many people do not realize their experience has anything to do with death. They may find themselves floating above their body, looking back at it, and feel fear or confusion. They may not recognize the body as their own. When they try talking to people, nobody hears them. They may try touching people, but discover their hand goes through them, as if nothing was there. They may experience cognitive dissonance when they recognize they are conscious, but their experiences are not characteristic of their usual “alive” state. Eventually, fear turns to bliss and understanding.

2. Peace and painlessness - while these individuals are in their bodies, they may experience intense pain associated with their illness or accident. However, once separated from their bodies, this experience changes to feelings of painlessness and peace.

3. Out-of-body experience - individuals frequently feel themselves rising up and viewing their bodies below. At this point, they describe having a body of some sort, although they are no longer in their physical body. Some describe this incorporeal body as “a cloud of colors, or an energy field” (Moody, 1989, p. 10).

4. Tunnel experience - following separation from their body, individuals realize their experience has something to do with death. They may see a tunnel or dark space before them. They travel through this dark space until they come to a bright light. Some people go up a stairway or through a doorway. Moody explained, “I have heard this space described as a cave, a well, a trough, an enclosure, a tunnel, a funnel, a vacuum, a void, a sewer, a valley, and a cylinder” (Moody, 1989, pp. 30–31).

5. People of light - after traveling through a passageway or tunnel, people meet beings of light. The light is described as different from ordinary, earthly light. This light is warm, vibrant, and alive. It is much brighter than any light ever experienced on earth, yet it does not hurt the eyes. It seems to permeate everything and fills the person with love. Once they enter this light, people

often encounter friends and family members who have already died. These deceased loved ones are filled with light. Some report scenes of landscapes filled with light or cities of light. At this point, communication occurs through thoughts rather than words.

6. The being of light - people often meet a “Being of Light” (Moody, 1989, p. 13). Depending upon their religious background, individuals may describe this being as a religious figure from their tradition. This being radiates love and understanding. Most people want to remain with this being forever. However, they are told they must return to their earthly life. First, however, they are shown a review of their life.

7. Life review - Moody described the life review as a “full color, three-dimensional, panoramic review of every single thing the NDEers have done in their lives” (Moody, 1989, p. 14). It is as if the person’s entire life is presented all at once. Not only do people see the events of their lives, they also perceive the effects of their actions upon others. The being of light is with them during this review and asks them what good they have done with their lives. People come through this experience feeling the most important thing in their life is love and the second most important thing is knowledge.

8. Rising rapidly into the heavens - some individuals describe a “floating experience” in which they rise up from the earth and into the cosmos (Moody, 1989, p. 15).

9. Reluctance to return - many individuals find their experience so pleasurable, they do not want to return to earthly life. Some express anger at those who resuscitate them. This anger is generally short-lived as the person is later glad to be back with loved ones.

Other Changes Associated with Near-Death Experiences

In addition to these nine key elements, Moody also described changes in time and space during NDEs. Time is described as being “nothing like the time we keep on our watches” (Moody, 1989, p. 17). When asked how long her NDE lasted, one woman responded, “You could say it lasted one second or that it lasted ten thousand years and it wouldn’t make any difference how you put it” (Moody, 1989, p. 18).

Physical space is altered during NDEs also. While out of their physical body, individuals need only think about a physical location and they find themselves there. Individuals also may describe events occurring in other rooms of the hospital where they are being resuscitated.

Research into NDEs Expands

As research into NDEs expanded, more physicians began viewing NDEs as a legitimate field of inquiry. Psychiatrists Bruce Greyson (1983, 1994, 1998, 2009) and Elisabeth Kubler-Ross (1999), pediatrician Michael Morse (1990),

and cardiologists Michael Sabom (1982) and Pim van Lommel (2010) each contributed important research findings regarding NDEs. One of the most important advances in the field was Greyson's development of a NDE scale, which helped identify individuals who had undergone a NDE (Greyson, 1983).

With public interest in NDEs expanding, more and more individuals began publishing accounts of their NDEs in the popular literature. Anecdotal accounts from children (e.g., Burpo, 2010) and adults (e.g., Brinkley, 2008; Piper, 2004; Storm, 2005) added to our understanding of NDEs. Several physicians offered accounts of their own NDEs including orthopedic surgeon Mary C. Neal (2012), neurosurgeon Eben Alexander III (2012), and psychiatrist Raymond Moody (2012).

AYAHUASCA

Ayahuasca is a medicinal plant mixture that has been utilized throughout the Amazon River basin for at least four thousand years (Grob, 2002). When ingested, ayahuasca produces a profound altered state of consciousness. At least 72 different indigenous groups in South America currently use ayahuasca for healing and spiritual purposes (Beyer, 2009).

In South America, ayahuasca is known by many different names including: *caapi*, *yaje*, and *hoasca* (Schultes, Hofman, & Ratsch, 2001, p. 124). The term *ayahuasca* is derived from the Quechua language. The root *aya* means "dead person, spirit, soul, or ancestor" and *huasca* means "rope or vine" (Metzner, 1999, p. 1). Translations of the term *ayahuasca* include "vine of the soul," "vine of the spirit," and "vine of the dead" (Grob, 2002, p. 185; Metzner, 1999, p. 1). These translations refer to ayahuasca's purported ability to transport individuals beyond time and space.

Ayahuasca is prepared by boiling two or more plants found in the Amazon rain forest until a concentrated liquid remains. The two plants most commonly used are *Banisteriopsis caapi* and *Psychotria viridis* (Grob, 2002; Metzner, 2006; Shanon, 2010). The tea derived from these plants is then drunk (Schultes, Hofman, & Ratsch, 2001). The plants used to prepare ayahuasca contain a combination of N,N-dimethyltryptamine (DMT) and several monoamine oxidase inhibitors (MAOIs). When ingested together, these medicines produce profound alterations in consciousness.

In indigenous cultures, both the patient and the healer ingest ayahuasca simultaneously. The patient and the healer then experience visions, which provide helpful information and guidance. The potential uses of this medicine include diagnosing health problems, determining therapeutic interventions, seeing into the future, and finding lost items (R. Yamberla, personal communication, March 27, 2012).

Europeans first became aware of ayahuasca when explorers traveled to the Amazon rain forest in the 16th century. Accompanying these explorers were

priests charged with converting the indigenous populations to Christianity. When these priests met indigenous people drinking ayahuasca, they believed the medicine had evil effects. In the seventeenth century, witch-hunts were pervasive in Europe and the Americas. Priests of this era believed ayahuasca was the work of the devil. Such beliefs contributed to the Holy Inquisition condemning ayahuasca in 1616 (Grob, 2002). Subsequently, individuals who continued utilizing ayahuasca risked accusations of heresy and witchcraft. These were serious charges that often resulted in hideous tortures and death (Grob, 2002).

The first written documentation of ayahuasca use in the modern era occurred in 1851 when the British botanist Richard Spruce encountered indigenous people drinking ayahuasca in Brazil (Schultes, 1983). In 1858, the first published report of ayahuasca use occurred when the geographer Manuel Villavicencio wrote about this medicine's use in the Rio Napo region of Ecuador (Metzner, 2006). In the 1920's, Brazilian churches began incorporating ayahuasca into their religious ceremonies. Today, three Brazilian churches use ayahuasca as their primary sacrament (Labate, de Rose, & dos Santos, 2008; Metzner, 2006). These churches have spread throughout the world. In 2005, ayahuasca churches were found in 23 countries throughout North America, South America, Central America, Europe, Asia, and Africa.

In the last two decades, numerous scientific articles examining ayahuasca's potential benefits have been published (Anderson, 2012; Bouso et al., 2012; Grob et al., 1996; Trichter, 2010). Researchers have examined a wide range of potential therapeutic applications for this medicine including treatment of mental illnesses and substance abuse. One of the earliest studies was initiated in the 1990s by a team of researchers headed by UCLA professor Charles Grob. This pioneering study examined ayahuasca's biochemical and neuropsychological effects on members of the UDV church in Brazil. Grob and colleagues found that substance abuse and mental health disorders remitted without recurrence following the regular use of ayahuasca in the church setting. Also, UDV church members scored higher than controls on neuropsychological tests (Grob et al., 1996). A more recent study, performed by researchers in Canada, found improvement in problematic substance use among an indigenous population following treatment with ayahuasca (Thomas, Lucas, Capler, Tupper, & Martin, 2013).

Phenomenology of Ayahuasca

Psychologist Benny Shanon provided one of the most extensive accounts of the phenomenology of the ayahuasca-induced experience (AIE) in his book *The Antipodes of the Mind: Charting the phenomenology of the ayahuasca experience* (Shanon, 2010). Shanon interviewed 178 people who ingested ayahuasca an estimated 2500 times. In addition, Shanon ingested ayahuasca himself more than 130 times over a span of ten years. Based upon his personal experiences as well as the experiences of the individuals he interviewed, Shanon described a variety of changes associated with the use of ayahuasca.

Perceptual Changes. Shanon described three types of perceptual changes associated with AIEs: hallucinations, heightened sensory perception, and visualizations.

1. Hallucinations - a hallucination is defined as a “False perception with a characteristically compelling sense of the reality of objects or events perceived in the absence of relevant and adequate stimuli” (Morris, 1980, p. 595). Some individuals experience hallucinations after drinking ayahuasca. Shanon experienced visual hallucinations of dead people hanging from trees, a jaguar in a tree, and a cow in a truck (Shanon, 2010).

2. Heightened sensory perception - sensory awareness may become hyperacute under the influence of ayahuasca. Shanon explained, “One is aware of perceptual variations that normally one cannot detect” (Shanon, 2010, p. 190). This may lead to “night vision” in which one is able to see more clearly in the dark or “X-ray vision” in which individuals report seeing the insides of others’ bodies (Shanon, 2010, p. 74).

3. “Visualizations” - a third type of perceptual change associated with ayahuasca is “visualizations.” Shanon applied the term “visualization” to all ayahuasca-induced visual effects. Such effects may occur with the eyes either open or closed. Shanon (2010) describes six categories of visualizations: (a) visualizations without any semantic content (e.g., grid patterns, zigzagging lines, multi-colored concentric circles), (b) primitive figurative elements (e.g., large blobs of color from which emerge shapes looking like people or animals), (c) images (e.g., fast moving kaleidoscopic images, faces, images changing shape), (d) scenes, (e) virtual reality (i.e., “the ayahuasca drinker is transposed to another realm of existence, one which he or she feels to be very real”) (p. 92), and (f) visions of light.

Content of Ayahuasca Vision. What do people see during ayahuasca visions? Shanon divided the contents of ayahuasca visions into the following categories:

1. Personal and autobiographical material - scenes from the individuals’ personal past may appear, as illustrated by the following example:

I once saw myself engaged in a conversation with an elderly English lady I met on a bus ride while travelling through the island of Malta. The event took place about ten years before I had the vision in question. During the entire intervening period, I never had any recollection of this episode nor had I thought about or reflected upon it. Yet, inspecting it in my ayahuasca induced vision, I realized that I was gaining new insights regarding my own self. (Shanon, 2010, p. 114)

2. Human beings - individuals may come in contact with other humans. These individuals are believed to be reincarnations of their past lives, or individuals who are identified as guides or teachers. Shanon explained:

A special category of human beings often reported is that of guides, guardians, teachers, and other wise men and women...The seeing of such

figures is usually associated with the reception of knowledge. Most notably, shamans have told me that they determine how to cure a patient on the basis of information presented to them by wise persons they encounter in their visions. (Shanon, 2010, pp. 115–116)

3. The natural world - animals, plants, and mythological figures may be seen. Shanon (2010) explained:

Animals are the most common category of content...the animals most frequently seen are serpents, felines, and birds. This is even though, obviously, both my own personal and cultural background and those of my non-indigenous informants is so different from that of the Amerindians studied in the anthropological literature. (p. 117)

4. Mythological and phantasmagoric beings and creatures - mythological creatures seen during ayahuasca sessions include little green men, gnomes, elves, fairies, and monsters. Hybrid creatures (i.e., half-human and half-animal) are also seen. Creatures with multiple faces, extraterrestrials with spaceships, angels, and other celestial beings are also commonly reported. Shanon (2010) explained:

The term “angels” refers to winged humanlike beings made of light. Indeed, several informants have explained to me that the wings consist precisely of this - powerful light. Other, very common, supernatural humanlike beings are transparent figures. These are usually perceived as beings made of exceedingly delicate white webs of energy. Often they are explicitly described as “beings of light.” (p. 122)

Semi-divine beings (i.e., divine beings that are not God) are often seen. These have been identified as Jesus, the Virgin Mary, Buddha, as well as various Hindu and pre-Columbian deities. One woman had a vision of a goddess she described as the Great Mother:

She was the mother of all atoms and the matrix of all forms. All the atoms were dancing and the Mother was pure joy. She looked like an Egyptian Goddess who was covering, and protecting, all of creation with her body. “Why do you look like an Egyptian?” I asked the Goddess. “Actually, I do not have any form, but I appear as Egyptian because the Egyptians were the first to comprehend my secret,” she replied. (Shanon, 2010, p. 123)

Additionally, demons, monsters, and beings of death may be experienced. Shanon (2010) described an experience of his own:

The Angel of Death presented itself in front of me. I knew that if I did not hold on to my life energy, he would take me. I also knew that as long as I sustained an unwavering will to live he could do me no harm. In other words, this angel will take me only if I manifested and/or conveyed a weakening of the will to live. “But I do wish to live!” I reflected. With this, I summoned all my vital energies and the menacing figure in front of me retreated. (p. 123)

5. The cultural world - visions of buildings, cities, works of art, vehicles of transportation, musical instruments, books, scripts, and symbols are common. Shanon (2010) describes: “The cities seen in visions are usually exotic and most fabulous...Most of the cities I have seen seemed to belong to ancient civilizations whereas others were futuristic or magical, whose identity I could not determine” (p. 124).

Music may be heard, or may be the theme of the ayahuasca session. Songs heard by healers are said to be “received” during AIEs (Shanon, 2010, p. 105). At times one is instructed to sing the song. Such songs are referred to as *icaros* (Metzner, 2006, p. 14).

6. Places and landscapes - cities, landscapes, and even places of entertainment such as amusement parks and circuses may be seen during ayahuasca visions.

7. History and evolution, religion and myth - scenes from different historical periods are common. Religious rites, scenes of biological evolution, and mythological scenes are reported.

8. Visions of the divine - ayahuasca visions often have a spiritual or divine theme. These may involve heavenly or celestial scenes, divine beings, or visions of light. Shanon (2010) explained: “The Indians say that ayahuasca allows them to see God” (p. 131). Visions of light, which are frequently the most powerful part of an ayahuasca vision, occur in a variety of forms. Objects may appear to shine and radiate energy both with eyes open and closed. Colors seen during ayahuasca sessions are different than colors ever seen before. Part of the visual field may be illuminated, as if a flashlight were shining on it. Also, objects may appear as if covered with glitter or gems. Halos around people’s heads, auras and rays of light radiating from bodies, and cones or clouds of light hovering above people may be seen. The experience of light is not solely a visual experience. The light may also be felt emotionally, intellectually, and spiritually. Individuals may be enveloped by light or radiate light. Such experiences are frequently accompanied by feelings of bliss.

Beings of light may be seen as well. These beings are translucent and transparent. They are made of light. Typically, they have human features. Some may be viewed as angels.

Individuals may experience lines of light connecting objects in the physical world. These lines are typically viewed as “manifestations of cosmic energy” (Shanon, 2010, p. 280).

It may be possible to interact with the light experienced in visions. Individuals may even transform themselves into light. Shanon (2010) reported that some individuals encounter a “supreme light,” which is described as a powerful, ineffable spiritual experience (p. 281–282). Shanon (2010) described his own personal experience with this light:

And then I encountered the primordial point of light. The point from which all has been created. The point which is the guarding flame of all of

creation, of life, of intelligence whatever form intelligence takes. In religious traditions this point of light has been called “God.” (p. 282)

9. Other categories of special import - several other types of experiences are reported to occur during ayahuasca experiences. These include traveling high above the Earth, interplanetary voyages, or journeys to the sun. Individuals may describe the ability to see the inside of their bodies, as well as others’ bodies. Visions involving archetypes or mathematical formulae are reported. Scenes involving themes of birth and death are described. Visions of disembodied eyes, detached faces, open mouths of animals, and scenes of people dancing are also reported (Shanon, 2010).

Emotional Changes. Ayahuasca tends to heighten or intensify emotions. A wide variety of emotions may be experienced, ranging from ecstasy to terror (Shanon, 2010).

1. Fear - a belief that the individual is about to lose his/her mind or go insane may create fear. Alternatively, the person may believe he/she is about to die. The belief in one’s imminent demise is quite common, according to Shanon.

2. Ecstasy - a wide range of positive emotions including joy, wonder, marvel, bliss, or exhilaration may be experienced. These emotions may be associated with deep feelings of gratitude.

3. Peace - feelings of profound contentment, serenity, or well-being are reported. People also describe feeling cleansed and healed.

4. Love - increased empathy, compassion, affection, and love for others are described. These feelings are not limited to human beings, but may extend to animals, plants, and all existence.

Cognitive Changes. Cognitive changes may occur during ayahuasca sessions. These include changes in the content and process of thoughts. Improved cognitive functioning is commonly noted. Shanon (2010) explained:

Many individuals with whom I conversed said that under the effect of ayahuasca they find themselves thinking faster than normal and that they become more insightful. Many further say that the brew makes them more intelligent and that it bestows upon them special lucidity and mental clarity. (p. 63)

Cognitive changes during ayahuasca sessions include:

1. Personal concerns and self-understanding - people tend to reflect upon their lives and develop an enhanced psychological understanding of themselves. Many individuals say they learn more in a single ayahuasca session than in years of psychoanalysis. Also, individuals may feel they gain a deeper understanding of other people.

2. Cosmic Consciousness - individuals tend to view reality as made up of a non-material substance identified as “Cosmic Consciousness” (Shanon, 2010,

p. 164). Associated with this view is a belief that all of reality is interconnected and has a deep meaningfulness. Shanon pointed out that this view is consistent with Aldous Huxley's "perennial philosophy" (Huxley, 1945). Ayahuasca also induces individuals to believe in the existence of a force that is the basis of everything. Shanon (2010) explained:

Often, this force is characterized as embodying love and its permeation as cosmic joy. Typically, it is interpreted to be the Godhead or the *anima mundi* and is characterized as being the source and fountain of everything good - life, wisdom, health, as well as intellectual and artistic creation. (p. 164)

The view that all physical reality is permeated by a force or intelligence is sometimes referred to as "animism" (Shanon, 2010, p. 167). Under the influence of ayahuasca, individuals frequently experience an animistic worldview.

3. Intuitive knowledge - knowledge gained during ayahuasca sessions is obtained through direct experience rather than deductive reasoning. Shanon referred to this direct form of knowledge as "clairvoyance" or "noetic feelings" (Shanon, 2010, p. 113, 205).

4. Expanded knowledge - ayahuasca often leads to a feeling that one has become all-knowing:

Under the effect of ayahuasca...drinkers feel...that they gain special privileged access to knowledge. Indeed, many informants have reported to me that under the ayahuasca intoxication they felt that their level of intelligence increased considerably and that they gained "comprehension of everything." (Shanon, 2010, p. 64)

5. Synchronicity and syntony - individuals experience a special, meaningful relationship between events described as "synchronicity" (Shanon, 2010, p. 245). Syntony is defined as "the co-ordinated occurrence of two seemingly unrelated events" (p. 245). An example from Shanon involved seeing large butterflies whose wings flapped in coordination with music that was playing during an ayahuasca session (p. 245).

Transcendent Experiences. Ayahuasca may trigger transcendent or mystical experiences. Characteristics of such experiences during AIEs include:

1. Unity - a sense of unity may occur in two distinct forms. First, individuals feel that a oneness exists behind the multiplicity in the world. Second, individuals feel their individual boundaries dissolve, and they become one with everything.

2. Transcendence of space and time - individuals may experience themselves existing outside of space and time.

3. Noesis - this refers to the experience of gaining direct or intuitive knowledge.

4. Positive feelings of blessedness, joy, peace, and happiness - these feelings are common.

5. A sense of sacredness - this refers to experiences of the divine.
6. Paradoxicality - seemingly contradictory experiences may be resolved into a transcendent unity.
7. Ineffability - individuals frequently state their experiences are beyond verbal description.

SIMILARITIES BETWEEN NDEs AND AIEs

Many of the phenomena reported to occur during NDEs also occur during AIEs. Eight of Moody's nine key elements of NDEs are found in Shanon's descriptions of AIEs. These are:

1. Sense of being dead - Moody reported that many people do not realize their experience has anything to do with death (Moody, 1989). He described the NDE as a state in which people, "find themselves floating above their body, looking at it from a distance, and suddenly feel fear and/or confusion" (Moody, 1989, p. 7). Individuals who have ingested ayahuasca may similarly feel separated from their body, which may trigger fear or confusion. This is particularly true for novice drinkers (Shanon, 2010).
2. A feeling of peace - feelings of profound contentment, peace, or serenity are reported during both NDEs (Moody, 1989) and AIEs (Shanon, 2010).
3. Out-of-body experience - individuals frequently describe leaving their body during NDEs (Moody, 1989). Ayahuasca similarly induces "flights of the soul" during which individuals experience their consciousness leaving their body (Shanon, 2010, p. 113). The sensation is described as one of floating or flying (Shanon, 2010).
4. Tunnel or void - passage through a tunnel, portal, or void is common during NDEs (Moody, 1989). Individuals who ingest ayahuasca may similarly experience a darkness or void (Shanon, 2010).
5. People of light - during NDEs, individuals frequently come in contact with deceased loved ones. An unearthly light may be encountered that permeates everything. Beautiful cities of light may be encountered. Communication occurs via thought transfer rather than words (Moody, 1989). Ayahuasca is said to "enable one to meet with the spirits of the dead" (Shanon, 2010, p. 218). A very bright light may be encountered during ayahuasca sessions. Cities may be seen during ayahuasca sessions. Communication via thought transfer is reported to occur with ayahuasca as well (Shanon, 2010).
6. Being of light - during NDEs, individuals often meet a "being of light" who radiates love and understanding (Moody, 1989, p. 13). During AIEs, individuals may come in contact with others who are identified as guides or teachers (Shanon, 2010). They may experience "visions of the Divine," which are described as visions with a spiritual or divine theme (Shanon, 2010, p. 154).

7. Life review - during NDEs, people often describe seeing a review of their life (Moody, 1989). During AIEs, individuals may similarly experience a life review. Shanon (2010) explained, “one can see one’s own life” with ayahuasca (p. 114).

8. Rising rapidly into the heavens - during NDEs, some individuals float above their bodies and rise above the earth. They may observe the universe from the perspective of an astronaut or satellite (Moody, 1989). With ayahuasca, individuals may leave their body and float above their bodies. Furthermore, they may rise high above the earth into the cosmos (Shanon, 2010).

9. A reluctance to return to life - during NDEs, people often reach a border or limit beyond which they cannot return. They often describe a reluctance to return to their physical life (Moody, 1989). Shanon’s description of AIEs includes no similar reports involving a reluctance to return to everyday consciousness following the AIE.

One can now examine Shanon’s description of AIE phenomena and compare these with NDE phenomena. Although Moody’s initial description of NDE phenomena was groundbreaking, it was not intended to be an exhaustive examination of all NDE phenomena. Rather, Moody (1975) attempted to provide a “preliminary, general idea of what a person who is dying may experience” (p. 23). Much additional information has been gleaned about NDEs in the 38 years since Moody published his initial research. Thus, the following discussion includes accounts of NDEs from other authors as well.

The phenomena associated with AIEs can be grouped into 4 categories: (a) perceptual changes, (b) emotional changes, (c) cognitive changes, and (d) transcendent features.

Perceptual Changes During AIEs and NDEs

1. Hallucinations - perceptual changes during AIEs may include hallucinations (Shanon, 2010). Moody did not list hallucinations as a common feature of NDEs. However, hallucinations have been reported in close association with NDEs (e.g., Alexander, 2012).

2. Heightened sensory perception - individuals frequently describe heightened sensory perception during AIEs (Shanon, 2010). This phenomenon is also reported to occur during NDEs. Howard Storm, for example, reported that during his NDE: “All my senses were extremely vivid...How bizarre to feel all of my senses heightened and alert, as if I had just been born” (Storm, 2005, p. 10).

Anita Moorjani (2012) explained that during her NDE:

Although I was no longer using my five physical senses, I had unlimited perception, as if a new sense had become available, one that was more heightened than any of our usual faculties. I had 360-degree peripheral vision with total awareness of my surroundings. (p. 67)

3. Visualizations - visions are frequent during AIEs and NDEs. Although Moody did not separate out visions as a distinct phenomenon of NDEs, he did describe visions as an aspect of NDEs (Moody, 1975). Moody also made an important distinction between visions and the hallucinations that may occur during delirium. He explained from his own NDE: “Delirium is patch and confused, and the imagery is surrealistically distorted. This was not like that. The imagery was more real and coherent than the ordinary physical reality we live in” (Moody, 2012, p. 218).

The contents of the visionary experiences that occur during NDEs are often similar to the contents of the visionary experiences that occur during AIEs. These include:

- a. Scenes from the person’s past - Moody termed this characteristic “The Review” and described it as a “panoramic review” of one’s life (Moody, 1975, p. 64). Brinkley (2008) described his life review as follows:

The Being of Light engulfed me, and as it did I began to experience my whole life, feeling and seeing everything that had ever happened to me. It was as though a dam had burst and every memory stored in my brain flowed out. (p. 9)

- b. Mythological creatures - Moody’s account of NDEs does not include descriptions of little green men, gnomes, elves, fairies, or other mythological creatures. However, as many as 70 percent of children and 50 percent of adult NDErs encounter beings they refer to as “angels” during their NDEs (Atwater 2011, p. 22).
- c. Monsters - although Moody did not describe monsters in his depiction of NDEs, others have encountered monsters during their NDEs. Storm (2005) wrote about humanoid creatures with long, sharp fingernails and teeth that were longer than normal who bit and scratched him, tearing off pieces of his flesh and eating it.
- d. Landscapes - Moody made only a slight reference to landscapes in his description of NDEs. He said NDErs may encounter a field with a fence across it or a body of water (Moody, 1975). However, others offer more detailed descriptions of landscapes. Alexander (2012) experienced a “countryside” that was “green, lush, and earthlike” (p. 38–39). He explained:

I was flying, passing over trees and fields, streams and waterfalls, and here and there, people. There were children, too, laughing and playing. The people sang and danced around in circles, and sometimes I’d see a dog, running and jumping among them, as full of joy as the people were. (Alexander, 2012, p. 39)
- e. Divine beings - Moody (1975) described a “being of light” as one of the key elements of an NDE (p. 58–64). Other luminous beings

were described as well including “guardian spirits” and “spiritual helpers” (Moody, 1975, p. 57). Brinkley (2008) met 13 “Beings of Light” and Alexander encountered “flocks of transparent orbs” (Alexander, 2012, p. 45).

- f. Extraterrestrial travel - Moody did not describe extraterrestrial travel during NDEs. But, many NDErs report leaving the earth. Consider Jung (1989):

It seemed to me that I was high up in space. Far below I saw the globe of the earth, bathed in a gloriously blue light. I saw the deep blue sea and the continents...My field of vision did not include the whole earth, but its global shape was plainly distinguishable and its outlines shone with a silvery gleam through that wonderful blue light. (pp. 289–290)

- g. Archetypes or mathematical formulae - Moody did not report the experience of archetypes or mathematical formulae as typical of NDEs. However, other NDErs have reported such experiences. For example, while floating above the earth during his NDE, Carl Jung saw an image approaching. He realized this image was his doctor in the form of a “basileus of Kos” (i.e., king of a Greek island). Jung (1989) described:

Aha, this is my doctor, of course, the one who has been treating me. But now he is coming in his primal form, as a basileus of Kos. In life he was an avatar of this basileus, the temporal embodiment of the primal form, which has existed from the beginning. Now he is appearing in that primal form. (p. 292)

Ring (1985) described a man named Tom Sawyer who experienced mathematical formulae following his NDE:

He was beginning to be aware during the day of what seemed to be fragments of equations and mathematical symbols. One of them...was the Greek letter psi (Ψ), a symbol widely used in psychology, parapsychology, and physics and that often denotes “the unknown.” (p. 116)

4. Meeting teachers or guides - just as individuals frequently encounter teachers or guides during AIEs, individuals often meet teachers or guides during NDEs as well. Moody (1975) explained:

Quite a few have told me that at some point while they were dying...they became aware of the presence of other spiritual beings in their vicinity, beings who apparently were there to ease them through their transition into death, or, in two cases, to tell them that their time to die had not yet come and that they must return to their physical bodies. (p. 55)

5. Visions of cities - during AIEs, individuals may experience visions of cities. Moody made no mention of such visions in his initial description of NDEs.

However, in subsequent writings, he described “cities of lights” as an additional element of NDEs (Moody, 1983, p. 15). Numerous NDErs describe visions of cities. Ritchie (2007) visited a “glowing, seemingly endless city...the city and everything in it seemed to be made of light” (pp. 84–85). Brinkley (2008) visited a luminous city while traveling with a Being of Light during his NDE: “We swept into a city of cathedrals. These cathedrals were made entirely of a crystalline substance that glowed with a light that shone powerfully within.” (p. 27)

6. Visions of the divine - a common experience during AIEs are visions of divine beings. Moody (1975) reported that NDErs frequently describe meeting a being of light. Storm (2005) encountered a “luminous being” during his NDE (p. 25). Ritchie (2007) met “a Man made out of light” (p. 58).

7. Hearing music - another common feature of AIEs is music. According to Moody (1975), some NDErs hear music. Alexander (2012) described hearing: “A living sound, like the richest, most complex, most beautiful piece of music you’ve ever heard” (p. 39). Don Piper (2004) heard music during his NDE:

It was the most beautiful and pleasant sound I’ve ever heard, and it didn’t stop. It was like a song that goes on forever. I felt awestruck, wanting only to listen. I didn’t just hear music. It seemed as if I were part of the music - and it played in and through my body. I stood still, and yet I felt embraced by the sounds...melodies and tones I’d never experienced before...Every sound blended, and each voice or instrument enhanced the others. (pp. 29–30)

Emotional changes during AIEs and NDEs

Four types of emotions are reported to occur during AIEs (Shanon, 2010): Fear, ecstasy, peace, and love. These emotions are also experienced during NDEs.

1. Fear - Moody made only a slight reference to fear occurring during NDEs. However, Nancy Evans Bush (2009) reviewed studies of NDEs looking for reports of frightening or distressing NDEs. She found 12 studies involving 1,369 NDErs in which 23% described frightening or distressing NDEs.

2. Ecstasy - Moody (1975) reported NDErs experience “intense feelings of joy, love, and peace” (p. 22). Similarly, he wrote: “Many people describe extremely pleasant feelings and sensations during the early stages of their experiences” (Moody, 1975, p. 28). Individual accounts from NDErs include: “My heart filled with the deepest joy I’ve ever experienced” (Piper, 2004, p. 31) and “Love, joy, ecstasy, and awe poured into me, through me, and engulfed me” (Moorjani, 2012, p. 65).

3. Peace - people describe feeling cleansed, healed, calm, or serene during AIEs (Shanon, 2010). Moody (1975) reported similar feelings of healing, tranquility, or peace during NDEs. Storm (2005) explained, “I became whole and well in the light” (p. 25). Heim described feeling a “divine calm” after falling off a mountain (quoted in Noyes & Kletti, 1972, p. 50). Brinkley (2008) wrote that his experience changed after being struck by lightning, “From immense pain I

found myself engulfed by peace and tranquility...It was like bathing in a glorious calmness” (p. 3).

4. Love - Moody (1975) described that individuals undergoing NDEs commonly describe strong feelings of love, particularly when they meet a “being of light” (p. 59). Ritchie (2007) felt love from the “Man made out of light” he encountered: “I knew that this Man loved me. Far more even than power, what emanated from this Presence was unconditional love. An astonishing love. A love beyond my wildest imagining” (p. 58). Brinkley (2008) wrote that the being of light he encountered was “like a bagful of diamonds emitting a soothing light of love” (p. 25).

Cognitive changes during AIEs and NDEs

Cognitive changes during AIEs are similar to those reported during NDEs. These include:

1. Personal concerns and self-understanding - Shanon (2010) described enhanced psychological understanding, a deeper understanding of other people, and cognitive enhancement during AIEs. Moody did not specifically mention these characteristics. However, he did make passing reference to them. In his description of the experience of being out of the body, he wrote that some NDErs “begin to think more lucidly and rapidly than in physical existence” (Moody, 1975, p. 50). Also, some NDErs can “see other people and understand their thoughts completely” (Moody, 1975, p. 53). Anecdotal reports of enhanced cognition during NDEs include Alexander’s (2012) description:

To experience thinking outside the brain is to enter a world of instantaneous connections that make ordinary thinking (i.e., those aspects limited by the physical brain and the speed of light) seem like some hopelessly sleepy and plodding event. (p. 85)

Moorjani (2012) described how her thinking changed during her NDE:

I seemed to just know and understand everything - not only what was going on around me, but also what everyone was feeling, as though I were able to see and feel through each person. I was able to sense their fears, their hopelessness, and their resignation to my situation (pp. 61–62).

2. Cosmic consciousness - Shanon (2010) described “Cosmic Consciousness” as a special state of consciousness in which all reality is experienced as interconnected. A deep meaningfulness is perceived along with a belief in the existence of a force that is the basis of everything. The closest Moody came to describing a similar experience was when he wrote that some NDErs feel they are “pure consciousness” once they depart their physical body (Moody, 1975, p. 42). Alexander’s (2012) description of “Cosmic Consciousness” is more expanded:

Consciousness is the basis of all that exists. I was so totally connected to it that there was often no real differentiation between “me” and the world I was moving through. If I had to summarize all this, I would say first, that the universe is much larger than it appears to be if we only look at its immediately visible parts...Second: We - each of us - are intricately, irremovable connected to the larger universe. (pp. 154–155)

Moorjani (2012) described a similar experience during her NDE, “I started to notice how I was continuing to expand to fill every space, until there was no separation between me and everything else. I encompassed - no, became - everything and everyone” (p. 64).

3. Intuitive knowledge - Shanon (2010) reported that individuals obtain knowledge through direct experience rather than deductive reasoning during AIEs. Although Moody did not describe intuitive knowledge as an aspect of NDEs, many NDErs report obtaining intuitive knowledge. Alexander (2012) explained:

The knowledge given to me was not “taught” in the way that a history lesson or math theorem would be. Insights happened directly, rather than needing to be coaxed and absorbed. Knowledge was stored without memorization, instantly and for good. (p. 49)

During his NDE, Jung (1989) obtained intuitive knowledge regarding his personal physician:

Suddenly the terrifying thought came to me that Dr. H. would have to die in my stead. I tried my best to talk to him about it, but he did not understand...I was firmly convinced that his life was in jeopardy. In actual fact I was his last patient. On April 4, 1944 - I still remember the exact date - I was allowed to sit up on the edge of my bed for the first time since the beginning of my illness, and on this same day Dr. H. took to his bed and did not leave it again. I heard that he was having intermittent attacks of fever. Soon afterward he died of septicemia. (p. 293)

4. Expanded knowledge - a feeling that one has become all knowing may occur during AIEs (Shanon, 2010). Moody did not describe this as an aspect of NDEs in his first book, but later he related:

Several people have told me that during their encounters with “death,” they got brief glimpses of an entire separate realm of existence in which all knowledge - whether of past, present, or future - seemed to co-exist in a sort of timeless state. Alternatively, this has been described as a moment of enlightenment in which the subject seemed to have complete knowledge. (Moody, 1983, pp. 9–10)

Individual accounts of expanded knowledge include Alexander’s (2012) who explained: “It will take me the rest of my life, and then some, to unpack what I learned up there” (p. 49). Brinkley (2008) related that during his NDE:

In the presence of these Beings of Light, I would become knowledge and know everything that was important to know. I could ask any question and know the answer. It was like being a drop of water bathed in the knowledge of the ocean, or a beam of light knowing what all light knows. (pp. 29–30)

5. Synchronicity and syntony - the perception of a special, non-accidental, meaningful relationship between events, known as synchronicity, is reported by Shanon (2010) to occur during AIEs. Syntony, or “the co-ordinated occurrence of two seemingly unrelated events,” is also reported (Shanon, 2010). Moody did not discuss synchronicity or syntony as characteristics of NDEs.

Transcendent features of AIEs and NDEs

Shanon (2010) described seven transcendent features of AIEs. Each of these has been reported in association with NDEs.

1. Unitive consciousness - two forms of interconnectedness that may occur during AIEs: First, a oneness may be experienced behind the multiplicity in the world; second, the boundaries of the self may dissolve so that the person becomes one with everything.

Moody did not describe unitive consciousness in his discussion of NDEs. However, many NDErs have described experiencing unitive consciousness. Alexander (2012) explained, “What I discovered out beyond is the indescribable immensity and complexity of the universe, and that consciousness is the basis of all that exists...We - each of us - are intricately, irremovably connected to the larger universe” (pp. 154–155).

2. Transcendence of space and time

Transcendence of space and time occurs during both AIEs and NDEs. Moody (1975) described this as a sense of “timelessness” (p. 47). Alexander (2012) explained: “Time in this place was different from the simple linear time we experience on earth” (pp. 39–40). Jung (1989) related: “I can describe the experience only as the ecstasy of a non-temporal state in which present, past, and future are one” (pp. 295–296).

3. Noesis - the direct experience of knowledge is reported during AIEs.

Moody did not describe noesis, but Alexander (2012) did:

The knowledge given me was not “taught” in the way that a history lesson or math theorem would be. Insights happened directly, rather than needing to be coaxed and absorbed. Knowledge was stored without memorization, instantly and for good. It didn’t fade, like ordinary information does, and to this day I still possess all of it, much more clearly than I possess the information that I gained over all of my years in school. (p. 49)

4. Positive feelings of blessedness, joy, peace, and happiness - these emotions are reported to occur during AIEs.

Moody did not list these emotions as a feature of NDEs, but did offer examples of these emotions from NDErs accounts. From an individual who was hospitalized with a severe kidney infection, “the most wonderful feelings came over me - feelings of peace, tranquility, a vanishing of all worries” (Moody, 1975, p. 75). Another individual who had a heart attack described, “It was such a wonderful, joyous feeling; there are just no words in human language to describe it” (Moody, 1975, p. 76).

5. A sense of sacredness - Shanon described experiences of the divine as being common during AIEs.

Moody mentioned experiences of the divine only in reference to encounters with a being of light. He pointed out that while descriptions of a being of light are invariable during NDEs, the interpretation of the identity of that being varies depending upon one’s religious background, training, or beliefs. For example, Christian individuals tend to identify the being of light as Christ whereas Jewish individuals identify the being as an angel (Moody, 1975). Similarly, Hindus describe meeting Yamraj, the god of death (Masumian, 2009). When Ritchie, who was a Christian, encountered a being of light, he thought, “You are in the presence of the Son of God” (Moody, 2007, p. 58). Alexander (2012), who was raised Christian, experienced a spinning melody of light that transported him to another reality and a “divine wind” that immediately answered any question he posed (p. 38, 46). He described an “orb” of light, which translated between himself and an “extraordinary presence.” He identified this orb as “God, the Creator, the Source who is responsible for making the universe and all in it” (Alexander, 2012, p. 47). Some individuals ascribe an identity to the being of light that is inconsistent with their belief system. For example, Storm (2005), who was a self-avowed atheist prior to his NDE, identified the being of light he encountered as “King of Kings, Lord of Lords, Christ Jesus the Savior” (p. 26).

6. Paradoxicality

The resolution of seemingly contradictory experiences into a transcendent unity is reported during AIEs and NDEs. With NDEs, this may take the form of resolving contradictory beliefs into a new, transcendent belief. For example, Ritchie experienced cognitive dissonance during his NDE. After traveling out of his body, he returned to find a dead man in his bed:

It was the first time in this entire experience that the word death occurred to me in connection with what was happening. But I was not dead! How could I be dead and still be awake? Thinking. Experiencing. Death was different. (Ritchie, 2007, p. 56)

Eventually, Ritchie came to view death as the separation of consciousness from the physical body rather than a cessation of consciousness.

7. Ineffability

Experiences that occur during AIEs and NDEs are difficult to put into words (Holden, Greyson, & James, 2009; Moody, 1975; Ring, 1985; Shanon, 2010). Moody (1975) explained:

The events which those who have come near death have lived through lie outside our community of experience, so one might well expect that they would have some linguistic difficulties in expressing what happened to them. In fact, that is precisely the case. The persons involved uniformly characterize their experiences as ineffable, that is “inexpressible.” (pp. 25–26)

Alexander (2012) experienced difficulty describing the spinning melody made of light he encountered during his NDE, “If I tried for the rest of my life, I would never be able to do justice to this entity that now approached me...to come anywhere close to describing how beautiful it was” (p. 32). Jung (1989) said of his NDE, “This cannot be described; it is far too wonderful!” (p. 293).

Differences between NDEs and AIEs

Despite the numerous similarities between NDE and AIE phenomena, differences exist as well. For example, individuals do not typically look down upon their physical bodies during AIEs as NDErs do. Also during AIEs, individuals do not find that others cannot hear them or that their hand goes right through others when they try to touch them.

Geometric patterns and other unformed visualizations are common during AIEs, but not NDEs. Mythological creatures such as little green men, gnomes, elves, or fairies are reported during AIEs, but not NDEs. The experience of a tunnel, which is reported during NDEs, is not reported during AIEs. A preponderance of visions with a jungle theme is common during AIEs, but not NDEs.

During AIEs, individuals report seeing the insides of bodies, disembodied eyes, faces, and open mouths of animals. Such visions are not reported during NDEs. Experiences of synchronicity and syntony are described during AIEs, but not NDEs.

During NDEs, individuals frequently encounter deceased loved ones. This is not common during AIEs. A reluctance to return to earthly life is another characteristic of NDEs that is not common with AIEs.

SUMMARY

During the last half-century, improvements in life saving technologies such as cardio-pulmonary resuscitation (CPR) and advanced cardiac life support (ACLS) have resulted in increasing number of individuals surviving a close brush with death (Sasson, Rogers, Dahl, & Kellerman, 2010; Sodhi, Singla, &

Shrivastava, 2011). Paralleling this increased survival rate is a growing number of individuals reporting near-death experiences. Studies examining the frequency of NDEs have reported incidence rates between 9–18% (Greyson, 1998) and 17–35% (Zingrone & Alvarado, 2009). One factor contributing to the variability in incidence rates is differences in study design, with higher incidence rates reported in retrospective studies than in prospective studies. Despite the large number of individuals experiencing NDEs, many questions remain about the etiology and neurophysiological correlates of NDEs.

A wide range of hypotheses has been proposed to explain NDEs (Blackmore, 1996; Greyson, 2009; Mobbs & Watt, 2012). Greyson et al. (2009) published a comprehensive review which examined the following hypotheses regarding the etiology of NDEs: (a) psychological hypotheses, such as expectation (i.e., NDEs are the products of the imagination to defend against the fear of death) and depersonalization (i.e., feelings of detachment and unreality protect one in the face of death), (b) physiological hypotheses including hypoxia and hypercarbia, (c) neurochemical hypotheses including the release of endorphins or endogenous NMDA receptor agonists, (d) neuroanatomical hypotheses, which suggest abnormal activity in the limbic system or temporal lobe is responsible for NDEs, and (e) REM intrusion.

Each of these hypotheses has proponents and detractors, yet none has been able to muster a consensus within the scientific community. This lack of consensus is indicative of both the wide range of belief systems that exists regarding altered states of consciousness as well as the dearth of replicable studies in this area.

More than a decade ago, Strassman (2001) postulated another hypothesis regarding the etiology of NDEs. He suggested N,N-Dimethyltryptamine (DMT) is released from the pineal gland when individuals die or come close to death. This release of DMT, he suggested, “mediates naturally occurring NDEs” (p. 221). Strassman subsequently abandoned this idea when he observed that themes of death and dying were infrequent during DMT sessions. However, many individuals who experience NDEs do not initially associate their experience with death or dying either (e.g., see Ritchie, 2007). Furthermore, as this article demonstrates, NDEs and ayahuasca-induced experiences share numerous phenomenological similarities. These similarities suggest several areas of potential future scientific inquiry.

Previous research exploring NDEs has been hampered by the spontaneous nature of these experiences, which makes it difficult to carry out studies in real time (i.e., at the time the NDE is occurring). Furthermore, technological problems (i.e., imperfect resuscitation methods) and ethical considerations (i.e., the dangers of inducing near-death states) have further impeded the study of NDEs (Holden, Greyson, & James, 2009). Most published studies of NDEs are therefore retrospective, which introduces the possibility of sampling bias (Greyson, 1998) and memory modification.

Because they are inducible and may be reproducible, ayahuasca-induced experiences provide unique opportunities to study biochemical, neurophysiological, psychological, and neuroanatomical changes in real time. Increased understanding of these changes and the state of consciousness in which they occur, may shed new light onto the phenomena that occur both during ayahuasca-induced experiences as well as during NDEs. Based upon the unique effects of ayahuasca, further research with this medicine is suggested.

Possible areas of future inquiry include (a) qualitative and quantitative studies examining the phenomena associated with NDEs and ayahuasca-induced experiences - such studies could further clarify the phenomenological similarities and differences between NDEs and ayahuasca-induced experiences, (b) psychological studies comparing the after-effects of NDEs and ayahuasca-induced experiences, (c) neuroimaging studies such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and single-photon emission computed tomography (SPECT) have the potential to not only increase our understanding of the mechanisms of action of ayahuasca, but also increase our understanding of the neurophysiological correlates of NDE phenomena such as out-of-body experiences, visions of light, transcendence of space and time, etc., and (d) electrophysiological studies such as electroencephalogram (EEG) and magnetoencephalography (MEG) could be used to examine electromagnetic changes induced by ayahuasca and search for similar changes during NDEs.

It is hoped that future research will lead to a greater understanding of the numerous similarities between NDEs and ayahuasca-induced experiences, as well as help clarify the biological, physiological, psychological, and transpersonal underpinnings of other transcendent states of consciousness.

NOTES

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