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Jerod Buchta  
*Nova Southeastern University*

Mir Saleem  
*Nova Southeastern University, [saleem@nova.edu](mailto:saleem@nova.edu)*

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# Neuropsychiatric Aspects of Near-Death Experience.

Jerod Buchta<sup>1</sup>, Mir Saleem<sup>1</sup>

<sup>1</sup>NOVA Southeastern University, Halmos College of Natural Sciences and Oceanography.

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## ABSTRACT

Throughout human history, there have been numerous reports of a baffling process when individuals have come to the brink of death. This process, referred to as near death experiences (NDEs), cause an individual to experience events that even the most advanced science can still not answer. This review serves as a reference for the factors, phenomenology, and measurement techniques for near death experiences as well as summarizing these experiences in certain conditions, such as cardiac arrest and admission of anesthetics. Discussed are the theories, effects, analyses of specific processes involved pertaining to experiences of those who walked along the edge of death.

**Keywords:** Near-death experience, NDEs, cardiac arrest

## INTRODUCTION

Near death experiences (NDEs) is a phenomenon in which a person experiences a surreal journey from an event that causes the individual to come to the edge of death. Though this phenomenon is a rare occurrence, many people who have personally had a NDE report that their lives drastically changed once regaining full consciousness after the event.<sup>[1]</sup> There are no known specific conditions that cause a NDE, but they are most often reported in individuals after successful resuscitation of cardiac arrest.<sup>[2]</sup> Furthermore, it is believed that NDEs occur without regard to gender, religious beliefs, culture, and other factors with the exception of age.<sup>[3]</sup>

### Role of Age:

When studying the age of subjects who experienced a NDE, they are most frequent in the middle and older age groups rather than in children. This could be related to the lack of world experience that children have about life and death in comparison to older age groups. The factor that raises questions is the age of the experimenter. There have been higher reports in the middle to older aged populations than in younger ages. Though they are less frequent, NDEs have still been

reported from children of all ages. It is theorized that the lower frequency in children is because they may not have fully developed brain or have an understanding of life, death, and religion. It is also plausible that they do not recognize that a NDE is something more than a very real-feeling dream. It could also be possible that they choose to not discuss their otherworldly experience because they fear that people will think of them as strange.<sup>[3]</sup>

### Association with Cardiac Arrest

Near death experiences can be triggered by any event in which a person believes they are about to die, two of the most common conditions being myocardial infarction and cardiopulmonary arrest. Clinically, cardiac arrest is the closest state a person can come to death, giving scientists a particular condition to study that may help yield better results to the understanding of the phenomena of NDEs.<sup>[4]</sup> In regard to cardiac arrest survivors, studies from various countries have shown that the incidence rate for a NDE in this group to be fairly common and observed across the entire world. Specifically, a Dutch study found that 12% of cardiac arrest survivors had a NDE, 11% of survivors had a NDE in a British study, and an American study yielded an occurrence of 23%. In comparison to other cardiac diseases and conditions, ten times more cardiac arrest survivors reported having a NDE than any other cardiac diseases. It is hypothesized that a greater percentage of cardiac arrest survivors actually have a NDE, but factors such as the amnesia that may occur with cardiac arrest and the fear that explaining the experience to a medical professional will result in a diagnosis of a psychological

### Name & Address of Corresponding Author

Mir Saleem, MD, MS  
3rd Floor, Parker Building  
Dept. of Biology, 3301 College Avenue  
Halmos College of Natural Sciences and Oceanography  
NOVA Southeastern University, Fort Lauderdale, FL 33314  
USA.

condition for the patient may limit the reported occurrence.<sup>[5]</sup> Interestingly, a study that researched the features and etiology of NDEs in cardiac arrest survivors occurred during unconsciousness, the stage when the brain is at minimal to no activity. This finding helps further support the theory that information can be processed when the body and soul are separated regardless of brain activity.<sup>[6]</sup>

### **Social Factors**

Near death experiences have been recorded in cultures from nearly every part of the world throughout all of history. It appears that the experiences accompanied by a situation of near death are independent of religion followed (including atheism), year of occurrence, gender, level of education, income, social class, culture and numerous other factors.<sup>[3]</sup>

### **Effects of Medications**

Certain drugs can produce episodes similar to those of NDEs. These drugs include Ketamine, Phencyclidine, pilocarpine, mescaline, Lysergic Acid Diethylamide (LSD), and N,N-Dimethyltryptamine (DMT).<sup>[7]</sup>

### **Other Factors**

Though they are most frequently reported in cardiac arrest, near death experiences have been reported in other events such as childbirth, suicide attempts, and accidents. Interestingly, similar symptoms of NDEs have been reported from nonlife-threatening events such as deep meditation, and during a relative's death.<sup>[2]</sup>

### **Out-of-body experience**

Near death experiences have been known to cause a range of dreamlike episodes such as the feeling of being disconnected from one's body, a sense of peace or unity throughout the universe, the elimination of pain, out-of-body experiences (OBEs), the sense of travelling through dimensions via a tunnel of darkness that leads to a light-filled dimension, seeing entities made of very bright lights, a review of significant events and one's life, communication with deceased family members, speaking with religious figures, and many more unexplained manifestations. In most OBEs, the individual described events occurring around their physical body and other areas in proximity of their body from a third person perspective described as a focused downward perspective similar to a bird's eye view, referred to as autoscapy. Though any person can claim that they had a near death experience, the key features identified of a NDE as compared to a general mystical experience, rendered by professionals, are witnessing a vivid light or figure made of light, a change in cognitive function of thought processes, heightened positive emotions such as joy or pure bliss, and the

incomprehensible enhancement of physical senses such as out-of-body experiences.<sup>[1]</sup>

### **Hallucinations**

Comparing hallucinations to near death experiences, hallucinations tend to be more generalized and vary from person to person while NDEs tend to focus more on the individual and the life they lived through seeing deceased family members and reviewing the events of their life, which are common events through the reports of different experiencers.<sup>[1]</sup>

### **Measurement Techniques**

In order to validate the claims of those who underwent a NDE, Raymond Moody, the author of a collection of over 150 case reports of NDE and the details surrounding the phenomenon titled "Life After Life," identified a recurring group of elements that classified a NDE. Included in this group was:

- I. An extravagant feeling of peace
- II. The feeling of being outside one's physical body (OBE)
- III. Venturing down a dark tunnel
- IV. Viewing an extremely bright light
- V. Communicating with entities, commonly described as being made of light
- VI. A visual review of one's life (LRE)
- VII. Communicating with spirits of deceased relatives

The Rasch Scale was developed and has been proven to be accurate in summing the parts of the NDE experienced by an individual, in order to determine if it was a true NDE. The Rasch scaling test of a NDE has a 3-point rating scale for respondents to choose from in regard to their perceived NDE. The test is composed of 16 questions with possible response scores of 0, 1, or 2, resulting in a total summed score of 32 possible points. All of these questions pertained to the components possible within a NDE. A total summed score of 7 or greater (out of a total of 32 possible) indicated that the respondent did, in fact, have a NDE. Scores less than 7 indicated that, although the respondent may have had episodes similar to a NDE, they did not have a true NDE. Once the scale was determined to be accurate, the information of the subjects that had a true NDE can be isolated. Using this condensed data, mathematicians are able to determine a hierarchy of items of a NDE using the occurrence and strength of the scores of each experience within the NDE.<sup>[8]</sup>

### **Theories of NDEs**

Though there is no proven reason as to how and why a NDE may occur, there have been several plausible theories explaining this unusual phenomenon. Each individual theory has points that are logical enough to some of the underlying processes of a NDE, but each has its flaws as well.

It is quite possible that the happening of this phantasm is either not explained by any current theories or aspects from multiple theories combined could play a role in the development of a NDE. Of numerous theories proposed for this exotic experience, some of the most persuasive ones include:

- I. The Brain Chemistry Theory. This theory explains that during an event where the brain perceives possible death, a psychological response can result in the alteration of brain chemistry. The release of neurotransmitters may assist in the easing of death to limit and prevent suffering of the host.<sup>[4]</sup>
- II. The Non-Functioning Cortex Theory. Explained in this theory is how during typical hallucinations, the brain is experiencing chemical changes leading to a false sense of reality occurring in one or more functioning cortexes of the brain. Near death experiences during cardiac arrest do not arise from these chemical changes but could take place in a non-functioning cortex of the brain that researchers have yet to discover.<sup>[4]</sup>
- III. The Temporoparietal Junction Theory. There is also a new theory that links the dysfunction of the temporoparietal junction to out-of-body experiences. Supported by events of a craniotomy on a patient with epilepsy, the right angular gyrus of the brain was manually stimulated causing the feeling of separation from the body multiple times. Though this was observed in this specific patient, this may indicate that the temporoparietal region of the brain may be involved in the process of NDEs since out-of-body experiences are a key feature.<sup>[9,10]</sup>
- IV. The Glutamate Theory. Another biological theory suggests that an abundance of glutamate, a neurotransmitter important for learning and memory, is released by the brain upon perceived death. In the releasing of this neurotransmitter, along with the hindrance of NMDA receptors, NDEs may be more easily triggered and memory function is enhanced significantly. This theory helps provide an understanding of how the brain is able to clearly remember events surrounding a NDE, even with minimal brain activity.<sup>[11]</sup>
- V. The Dying Brain Theory. It is suggested that brain cells all die in a similar fashion, which results in the release of neurotransmitters to further help end brain function, and ultimately, death. Since the cells die in a similar manner, this would provide an explanation as to why people have similar illusions and key components of NDEs.<sup>[7]</sup>
- VI. The Lack of Oxygen Theory. Cerebral Anoxia, a reduced supply of oxygen to the brain, has been known to make the brain have illusions. Combining this with neurotransmitters released at the time of perceived death could result in all of the other events that, in unison, produce a NDE.<sup>[7]</sup>
- VII. The Birth Theory. This theory describes the importance of how the light viewed at the end of the dark tunnel is a universal experience shared by

everyone regardless of having a NDE or not. This dark tunnel followed by light refers to the light witnessed for the first time at the end of the birth canal when being born. This theory explains that during stressful or traumatic situations, the brain reverts to memories of birth as a means of psychological defense. Though plausible, the argument of children born via Cesarean section (C-section) who did not experience the movement through the dark tunnel of the womb have still reported NDEs.<sup>[12]</sup>

#### **After Effects**

Subsequent to regaining consciousness after a near death experience, a variety of symptoms have been reported by individuals and by people who know and have observed the individual. These symptoms include decreased death anxiety, improved psychic abilities, a more positive outlook on life, improved intelligence, and an increased spirituality or belief in religion.<sup>[13]</sup> Specifically, in a study done on individuals who had a near death experience related to combat reported decreased sense of materialism, increased drive to improve their quality of life by going back to school or completing life goals. In this same study of combat-related NDEs, a relatively high occurrence of post-traumatic stress disorder was reported. It is important to note that this could be due to their experiences of war prior to the event that resulted in the NDE. In very rare situations, short-term negative consequences can arise including increased anxiety and depression immediately following a NDE, and some disconnect in interpersonal relationships.<sup>[14]</sup> One of the most significant negative long-term consequences associated with NDEs is a decreased sense of mourning for the individual when a relative or other close person passes away. This could be because the individual has a decreased death anxiety stemming from their positive experience, certainty of life existing after death, and what they witnessed in their own personal encounter with death.<sup>[7]</sup> The same principle can be applied to bioethical situations in which an individual who had a NDE may not be as concerned as their patients since they are certain that life continues after death of the physical body.<sup>[15]</sup>

#### **Accompanying Processes**

Near death experiences have been known to cause a variety of accompanying processes within their encounter of the world after death. Below are components of NDEs with further detail of the processes.

- I. Dissociation: Dissociation is the feeling of being disconnected from the normal consciousness and memory of the mind. Trauma has been known to cause dissociation and transcendental states similar to those in NDEs. In order to determine if there

exists a correlation between NDEs and dissociation, a voluntary sample of people who had a NDE were mailed two tests. The first test was a NDE scale test to validate their claims of their NDE and the second test was the dissociative experiences scale (DES), a method for determining dissociation in an individual. Of the sample that was measured, the data showed that those subjects who had a NDE had significantly higher scores on the DES than the subjects who had a traumatic experience but no NDE. It is important to note that the DES scores of those who had a NDE were much lower than the scores of subjects who have dissociative disorders, indicating that NDEs do not cause or share a relationship with dissociative disorders. Having said that, this study does provide further evidence that NDEs can result in a change in cognitive functions from the normal chain of thoughts.<sup>[16]</sup>

II. Life Review Experiences: The phrase in modern language of “one’s life flashing before their eyes” is a reference to this process of a life review experience (LRE). Most frequently, LREs are reported to occur in patients during a NDE. In a study that reviewed cardiac arrest survivors who had an NDE, 13% of the group had a LRE as well. There have been multiple reports of individuals witnessing a LRE combined with a third person perspective (OBE) during a near death experience, further classifying this process as its own distinct element of a NDE. These life review experiences are described by many as if a movie of their life had projected before their eyes. Many times, individuals reported this positive event because it served as a realization to improve relations with people in their lives as well as giving a more meaningful understanding of their own life.<sup>[17]</sup>

III. Psychopomps: Psychopomps, derived from the Greek language meaning “guide of souls,” is a common occurrence of near death experiences. These psychopomp figures do not intend harm nor any type of ill-doing, they merely serve to communicate and aid the experiencer in the crossing over from one dimension to the other. More often than not, this role is filled by deceased relatives; the mother, father, spouse, child, sibling, and other relatives of the individual provide them ease in the crossing over of dimensions. Commonly, the survivors of NDEs who were visited by a psychopomp report that the figure said something along the lines of, “it is not time for you (the experiencer) to make the voyage to the other world of life after death yet. Using what you learned from this experience and witnessing the heavens, you still must further understand and aid in the world of the living.” Patients who report these psychopomps after surviving a NDE explain that it was a very calming experience communicating with the figure and become insistent that life continues even after death. In

many situations, the patient will have a decreased anxiety of death due to the pure serenity of the unfamiliar world they witnessed knowing that they will one day be there. Historically, psychopomps have been noted through copious amounts of cultures over thousands of years. Examples include Charon, the ferryman in Greek mythology, Azrail, the angel of death in Islam, and the Grim Reaper as depicted across a variety of cultures, all represent psychopomps.<sup>[18]</sup>

## CONCLUSION

Upon summarizing various aspects surrounding near death experiences, it is apparent that this phenomenon is understood very little with insufficient research to provide concrete evidence. This process has been reported for years making it apparent that it is a natural process of humans, yet little is known about it. Though there are numerous theories that attempt to explain this unique experience, it is without a doubt that there are many more studies that need to be completed before reaching a sufficient understanding. It is possible that a combination of aspects from various theories could help provide insight to these near-death experiences. Having said that, the question is whether or not we are psychologically, physiologically, and technologically advanced enough to understand this process is difficult to answer at this time.

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