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Review Article

The Near-death Experience

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Since earliest times it has been known that people who are dying or have a near brush with death may report profound and unusual experiences. Interest in these phenomena was largely in the province of religion and parapsychology until 1975, when the medical philosopher Raymond Moody's collection of people's experiences was published. His book, *Life After Life*, initiated an explosion of popular interest and has since been translated into more than 30 languages. He labelled this complex cluster of subjective changes the Near-Death Experience (NDE). In 1977 The Association for the Scientific Study of Near-Death Phenomena was founded, which became The International Association of Near-Death Studies (IANDS) in 1981 and publishes a bi-annual journal, *Anabiosis*.

Moody anticipated that the NDE would be a multidisciplinary area of research, and contributions have come from psychology, neurology, medicine and psychiatry, as well as anthropology, theology, parapsychology and philosophy.

Some have taken the NDE to offer insight into the psychology of dying, whereas others have taken it as evidence of post mortem survival. Many elements of the experience correspond to central features of religious beliefs of an after-life. A grand hope has been expressed that, through NDE research, new insights can be gained into the ageless mystery of human mortality and its ultimate significance, and that, for the first time, empirical perspectives on the nature of death may be achieved. Twemlow & Gabbard (1984) have claimed that NDE reports are as old "as Western Philosophy itself", and cite the example of Er from Plato's *Republic*. An ordinary soldier suffers a near-fatal injury on the battlefield, revives on the funeral pyre and describes a journey from dark to light in the company of guides, a moment of judgement, feelings of peace and joy, and visions of extraordinary beauty and happiness. Other comparisons have been made between contemporary accounts and those found in the Tibetan Book of the Dead, The Dream of Scipio and the later works of the philosopher Swedenbourg (Moody, 1975; Vicchio, 1981).

Autobiographical accounts have been provided by Somerset Maugham and the Antarctic explorer Admiral Byrd (Audette, 1982), Admiral Sir Francis Beaufort (Noyes & Kletti, 1977) and C. G. Jung (1961).

Although NDE accounts are highly individual in content, there appear to be recurrent motifs, composite imagery and a series of sequential events which generally characterise those studied to date.

Description

The first systematic series of accounts was reported by the Swiss geologist and climber, Albert Heim (1892). He collected 30 first-hand accounts of fellow climbers who had survived near-fatal falls. Bozzano (1906), Hyslop (1908) and Barrett (1926) also provided early attempts at systematic investigation, although they were principally interested in 'death-bed visions'. Heim's (1892) autobiographical account is typical of those he collected:

> no grief was felt nor was there any paralysing fright. There was no anxiety, no trace of despair or pain, but rather calm seriousness, profound acceptance and a dominant mental quickness. The relationship of events and their probable outcomes were viewed with objective clarity, no confusion entered at all. Time became greatly expanded.

He found that in many cases there then followed a sudden review of the individual's entire past, and finally the person falling often heard 'beautiful music' and fell in what they visualised as, 'a superbly blue heaven containing roseate cloudlets'. Consciousness was painlessly extinguished, usually at the moment of impact, which was at the most heard but never painfully felt.

Moody (1975) constructed a model, or 'prototype', experience from his series of 150 NDE accounts:

> The individual may hear doctors or spectators pronounce him dead and experience a sensation of peace and quietness. There may be a loud ringing or buzzing noise, and the individual simultaneously experiences himself moving rapidly down a long dark tunnel [a tunnel experience]. Thereafter he finds himself outside his own physical body and often suspended above it. He realises that he still has a body, though of a different nature and observes resuscitation attempts as an onlooker [an out-of-body experience]. He may be met by dead relatives, friends or guides who assist him and he feels the presence of a warm loving spirit. He enters a bright light or meets a being of light with whom he communicates non-verbally. This whole experience is accompanied by a sense of joy, love and peace.

He has a panoramic instantaneous playback of the major events in his life [either as a sequence of visual images or as a montage of memories and images occurring simultaneously although not confused; panoramic memory]. Eventually he approaches some kind of border, indicating a dividing line between earthly life and the next life, and realises that he must return to his earthly existence because the time for his death has not yet come.

Moody emphasised that this represents a compound picture. In each case there are similarities, yet no two NDEs are identical, nor are all these elements necessarily present, and the sequence may vary.

Audette's (1982) series of descriptive accounts spanning 200 years illustrates the diversity of content but similarity of form of NDEs.

Ring (1980*a*) devised a structured interview and measurement scale (The Weighted Core Experience Index) to investigate 102 people who had come 'near to death' and found 48% to have had an NDE. He concluded that there is a 'core experience' which unfolds in a characteristic pattern, the earlier stages being more frequent. The stages are

(a) an experience of peace, well-being and absence of pain

(b) a sense of detachment from the physical body, progressing to an out-of-body experience

(c) entering darkness, a tunnel experience with panoramic memory and predominantly positive affect

(d) an experience of light which is bright, warm, and attractive

(e) entering the light, meeting persons or figures.

Comparatively few authors have focused on individual NDE components in order to clarify their characteristics and draw parallels with equivalent phenomena arising in different circumstances.

Drab (1981*a*) describes the features of 71 tunnel experiences, a typical example being that of a 27-year-old English woman during a cardiac arrest:

I became less and less able to see and feel. Presently I was going down a long black tunnel with a tremendous alive sort of light bursting in at the end. I shot out of the tunnel into this light.

He found them generally simple and consistent in their descriptions and concluded that they are complex hallucinations.

Noyes & Kletti (1977) presented a review of 60 accounts of panoramic memory and found they typically followed the description of Admiral Beaufort, who narrowly escaped drowning in Portsmouth Harbour in 1795:

Though the senses were . . . deadened, not so the mind; its activity seemed to be invigorated in a ratio which defies all description, for thought rose above thought in rapid succession. The event just occurred . . . the awkwardness producing it . . . the bustle it must have occasioned . . . the effect on my most affectionate father . . . the moment in which it would be disclosed to the family, and a thousand other circumstances minutely associated with home, were the first reflections. Then they took a wider range, our last cruise . . . a former voyage and shipwreck, my school and boyish pursuits and adventures. Thus, travelling backwards, every past incident of my life seemed to glance across my recollection in retrograde succession; not however in mere outline, as here stated, but the picture filled up with every minute and collateral feature. In short, the whole period of my existence seemed to be placed before me in a kind of panoramic review, and each act of it seemed to be accompanied by a consciousness of right or wrong, or by some reflection on its cause or consequences; indeed many trifling events which had been long forgotten then crowded into my imagination, and with the character of recent familiarity.

The experience was therefore accelerated, and unusually vivid. It consisted of predominantly coloured visual images which approach perceptions in their intensity, seeming almost real but accompanied by an awareness that they are recollections which are value-laden and significant.

The out-of-body experience has an established literature (Blackmore, 1982), and, although compared to the *doppelgänger* phenomenon and autoscopy, it is distinguished by the belief of having left the body, visualising the whole body left behind and the absence of an unpleasant affect.

Typically, people find themselves in a room detached from and often suspended above their physical body. The environment seems normal but brilliantly illuminated; hearing may seem more acute and mental processes sharp but detached. There is a sense that the self is no longer occupying the physical body, but not that a second body is around the person. In many instances observers would believe the person to be unconscious, with eyes closed. Parallels have been drawn with the phenomenon of lucid dreams (Green, 1968).

Heim (1892) concluded from his investigation that death was universally pleasant, and the majority of subsequent accounts have agreed with him. However, there are a small number of unpleasant NDEs reported. Rawlings (1980) describes cases of persons with terrifying NDEs accompanied by extreme fearfulness. Osis & Haraldsson (1977) found that some patients reacted with screams for help and intense anxiety to 'hallucinated guides' who wished to take them away.

Definition

The investigation of the NDE is at an early descriptive stage and there is no generally agreed definition, nor is there agreement on whether it is best considered as one complex and polymorphic state or as a number of distinct entities.

The cardiologist Sabom (1982) made a classification into three types. His series of 100 hospital patients who had survived a 'near fatal crisis with unconsciousness', 67 of whom had survived cardiac arrest, contained 42 who reported a 'core experience'. These he divided into those with a predominant out-of-body experience (autoscopic type, 30%), those with 'an apparent passage of consciousness into a foreign region or dimension' (transcendental type, 54%), and those who showed features of both (combined type, 17%).

Noyes & Kletti (1976) have reported on more than 200 NDEs in persons who 'survived a near-death event', and isolated three independent symptom clusters by factor analysis: hyperalertness, depersonalisation and 'mystic consciousness', which includes panoramic memory. Greyson (1983*a*) criticised Ring's scale as based on ten arbitrarily weighted items, and the typology of Sabom as impressionistic, and considered that Noyes & Kletti's material is skewed by their assumptive bias towards eliciting depersonalisation, which he considered a comparatively rare component in the accumulated accounts of NDE. He constructed the Near-Death Experience Scale by recording the frequency of occurrence of an extensive list of NDE components in 74 members of IANDS. The most frequent then became the basis of his 16-item scale, which superseded Ring's (1980*a*) and has been reported as valid and reliable.

Greyson (1985) later produced a typology based on cluster analysis of 89 NDEs from IANDS and found 45% highest on the 'transcendental component' (encountering guides, seeing decreased persons or religious figures, coming to a border of no return); 41% clustered around the affective component (feeling of peace, joy, harmony and surrounded by a brilliant warm light), and 16% clustered around the cognitive component (accelerated time awareness and thoughts, panoramic memory and sudden understanding). Although 53% of his original series reported an out-of-body experience and 32% a tunnel experience, neither appears in his typology.

How common is the near-death experience?

Jaspers (1963) has stated 'that the experiences occurring seconds before an apparently certain death are rarely reported but often discussed'. It may be that the interest initiated by Moody coincides with an increased incidence of NDE reports in recent decades due to technological advances making survival near death more common.

Royce (1985) found that 70% of clergymen had been given NDE accounts by parishioners. Gallup & Proctor (1982) found 5% of Americans to have had some degree of NDE – an estimated eight million persons.

Sabom (1982) found 42% and Ring (1980*a*) 48% of their series of persons who had come close to death to have had an NDE. Locke & Shontz (1983) in their undergraduate sample found that 22% of those who had been 'near to death' had had an NDE, and all of Rosen's (1975) small ($n=6$) but very significant group of failed suicides had had extensive NDEs. Ring & Franklin (1981) found 47% of 36 persons who had come close to death as a result of serious attempted suicide to have had a 'Moody type NDE'; and 24 of 100 Vietnam combat veterans who responded to advertisements for those who had 'been close to death' had elements of the 'prototypical NDE' (Sullivan, 1984). Noyes & Kletti's (1977) series of 205 persons who had survived life-threatening danger contained 60 who described panoramic memory as part of an NDE.

Vicchio (1981) estimated that at least 40% of people in life-threatening situations experience some of the NDE components. However, as the great majority of reports consist of self-selected samples who may have had a theoretical understanding and interest in the NDE, this is almost certainly an overestimate.

Relationship between death and the NDE

Many people who have had a NDE believe that they died and that their experience results from having been dead. Early series were largely of those who had been pronounced clinically dead by their doctors. However, there is a long and well established history of the misdiagnosis of death leading in earlier days to premature internment, with recovery of consciousness while being buried, dissected or embalmed (Audette, 1982). Moody's (1975) concept of being near death is, 'being in a situation where the person could very easily have died or been killed and may be so close as to be believed or pronounced clinically dead, but nevertheless survives and continues physical life'. Popular accounts of NDEs often relate to someone who has died and is brought back to life, with death defined as an event typified by the cardiac arrest.

However, the process of dying takes a finite time, and if the arrested heart is restarted, the dying

process is reversed. If death is characterised by irreversible loss of organ functions and is a one-way permanent state, then no one reporting an NDE has died, and therefore all NDE reports refer to experiences of people who have remained alive. Jaspers (1963) stated that 'death cannot be an experience, for whoever has an experience is still alive . . . the psychic manifestations of dying persons are phenomena preceding death and belong to the psychology of meaningful phenomena.'

Near-death experiences also occur in situations where being near death is only an expectation or metaphor and there is no physical proximity to death (Gabbard *et al*, 1981). Furthermore, there is little difference in the content or sequence of NDEs occurring in the dying compared with those who only believe themselves about to die (Greyson, 1983*b*).

Also none of the NDE components are unique to near-death situations (Drab, 1981*b*). The out-of-body experience is found in psychogenic crises, trance, coma and anaesthetic use, and some practised individuals can induce it voluntarily, when it is sometimes called astral projection (Sheils, 1978). Meeting with hallucinated persons and guides is recorded in circumstances of extreme stress (Bennet, 1983); panoramic memory occurs in temporal lobe epilepsy and direct stimulation of the temporal lobe (Noyes & Kletti, 1977); and complex experiences with many NDE elements have been reported in the recreational and medical use of the dissociative anaesthetic ketamine (Rogo, 1984), and heavy intoxication with hashish by some Muslim Indians, who use it to induce a state which they regard as 'allowing the soul to explore the spirit world', and call it 'heavenly guide or poor man's heaven' (Siegel & Hirschman, 1984). There are also parallels between the NDE and intoxication with LSD producing time distortion and hallucinations, with a predominantly positive but sometimes profoundly negative affect.

So it would seem that no-one reporting an NDE can properly be considered to have died, that all the separate elements can occur in non-life-threatening situations and that typical NDEs can be chemically induced.

Factors which determine the occurrence and quality of the experience

The majority of people who come near to death do not have an NDE. Much attention has focused on attempting to establish factors distinguishing those who do, and factors influencing the form and content.

Personal factors

Demographic

Moody (1975) found no sex difference in the content or type of experience, but that males were much more reluctant to disclose it, fearing ridicule. There is broad agreement that there is little or no relationship between the occurrence of an NDE in a near-death circumstance and age, sex, educational achievement, marital status, occupation, socio-economic group or religious background (Osis & Haraldsson, 1977; Greyson & Stevenson, 1980; Sabom, 1982; Kohr, 1983), although marked changes in religious affiliation may occur as a consequence of the experience.

Personality

Lock & Shontz (1983) compared those who had come near death with and without an NDE on scales of IQ, extroversion, neuroticism and anxiety, with no significant differences. Twemlow & Gabbard (1984) compared 34 persons with an NDE and 380 persons not near death on measures of attention-absorption, hysterical tendencies, death anxiety, danger-seeking and psychoticism. They found no specific psychopathology, and the only significant difference was a higher attention-absorption score, suggesting an increased tendency to direct attention inwardly.

Greyson & Stevenson (1980) found a higher incidence of 'prior mystical and paranormal experiences' in their samples compared with the general population, and that 25% of their series had read of the experience prior to having it themselves. They do not compare this with data from controls, but there was no correlation between prior knowledge and the content or form of the NDE.

Kohr (1983) reported a greater incidence of prior 'paranormal experiences' and a greater openness to dreams and meditative practices. He linked this with Maslow's assertion that an individual's capacity to experience transcendent states depends on a quality of openness that permits them to occur, and that 'constricted personalities' tend to block such peak experiences. This all suggests an association between the occurrence or recall of an NDE and a cognitive style characterised by interest in paranormal experiences, dreams and meditation; previous intense spiritual experiences; a quality of openness; and an ability to direct attention inwards. However, as NDEs are powerful mediators of attitudinal change and all this work is retrospective, it is unknown whether observed differences represent predisposing factors or the consequence of the experience.

The near-death event

Near-death experiences have been reported in every near-death situation and also childbirth (Greyson & Stevenson, 1980). Grosso (1981) considered that there were two different types occurring in different circumstances: 'euphoria and apparitions' in the bedridden and ill, and the acute onset of a 'prototypical' or 'core experience' in those experiencing sudden life-threatening events.

Noyes & Kletti (1977) and Dlin (1980) found that 'mystical aspects' (i.e. visual hallucinations and meeting figures) were more likely in drowning and terminal illness, but not in falls, or accidents without head injury. They also found panoramic memory more common in drowning victims. Ring & Franklin (1981) reported NDEs in serious suicide attempts to be of short duration and seldom progressing beyond the early stages of peace and detachment, but Rosen (1975) contradicts this, as all his suicide survivors describe vidid 'transcendental' experiences; but he agrees with Ring on the absence of life review (panoramic memory) in failed suicide.

Despite the above observations, Ring (1980*a*), Siegel (1980), and Twemlow & Gabbard (1984) considered that the physical circumstances of the NDE did not appear to have a major effect on its phenomenological consistency. However, the likelihood of an NDE occurring seems reduced by brain damage, and there is a low correlation with the use of sedative drugs (Osis & Haraldsson, 1977; Tremlow & Gabbard, 1984).

Influence of cultural factors and specific beliefs

The central features of the NDE have been recorded throughout history and across numerous cultures and religious groups. Holk (1978) has found descriptions closely resembling the NDE in the beliefs of Bolivian, Argentinian and North American Indians, Buddhist and Islamic texts, and accounts from China, Siberia and Finland. The commonest features are

(a) an out-of-body experience with awareness of a detached (spiritual) body

(b) a reunion with ancestors and departed friends

(c) an experience of light accompanied by joy and peace

(d) a border or dividing line between the living and the dead.

Schorer (1985) presented two historical accounts of core NDEs in American Indians where the dominant imagery is of moccasins, snakes, eagles, bows and arrows. Pasricha & Stevenson (1986) give a series of anecdotal reports of contemporary NDEs in 16 Asian Indians, and compare their accounts with those of Americans. They describe how Indians have NDEs in which they are characteristically sent back to live because of a seeming bureaucratic mistake having been made in the after-life, and many encounter Yamraj, the Hindu king of the dead, and the Yamdoots, his messengers. They also describe people born of one culture and thoroughly immersed in a second having NDE imagery consistent with the latter.

Osis & Haraldsson (1977) have conducted the largest and most systematic cross-cultural study so far. They confined their interest to 'death bed visions or apparitions' in terminally ill patients as described to their attending doctors and nurses, and collected 442 American and 435 Indian accounts. They interviewed each respondent with the same semi-structured questionnaire, and found that 91% of all identified apparitions of a person were relatives, but, whereas 60% of Americans visualised their mother, female figures were extremely rare in the Indian sample, especially in males. There was a total of 140 reports of religious figures (33 American and 107 Indian, usually described as an angel or God), and, where these were specifically identified, they were always named according to the person's religious beliefs: no Hindu reported seeing Jesus, and no Christian a Hindu deity. This supports the view of many authors that, whereas the central features of the NDE process are universally present, the specific imagery and interpretation is determined by the cultural expectations and beliefs of the individual (Stevenson & Greyson, 1979; Rodin, 1980).

Ring (1980*b*) has criticised this on the basis that many persons who have an NDE are non-religious, but he fails to distinguish between persons committed to a specific world view and the general cultural inheritance of symbol, myth and ritual in any locality. Many accounts mention the great difficulty people have in finding words to describe their NDE. Dlin (1980) considers that deeply religious persons are more likely to interpret the sense of detachment to mean that their spirit has left their body, that the peaceful, timeless state is eternity, and that the encounter with a surrounding warm bright light is Jesus – 'the light of the World' (John I:1:18). Widdison (1982) cautions against considering the NDE as 'nothing but a cultural reflection', as it may represent an attempt to communicate a novel and unique experience which is inevitably cast in the images, concepts and symbols available to the individual. He suggests that it is not the experience but the individual that is culture-bound.

Audette (1982) has described Hallowell's anthropological survey of Canadian Indian convictions of life beyond death, and demonstrated that these beliefs

were derived from the accounts of those who had been considered dead and recovered to describe the after-life. It seems reasonable to assume that in ancient times those who suffered a near-fatal injury or became seriously ill and appeared dead, but later revived bearing spectacular accounts, would have been regarded uncritically as revealing something of the hidden mysteries of death. This raises the intriguing possibility that some and perhaps much of the folk law imagery of the after-life could be derived from NDEs, and that cultural expectations not only determine NDE imagery but are themselves also derived from it.

Causal theories

Many authors have attempted to provide an all-encompassing model to explain the near-death phenomenon, whereas others have focused on individual components, seeking to establish parallels with equivalent phenomena of known pathogenosis. There is little or no evidence to support any of these theories and so they stand at present as a rich source of speculative and unproven hypotheses. They can be divided into those considering the NDE as an experience of an usually inaccessible facet of reality (spiritual theories), those focusing on physical factors (organic theories), and those based on psychological processes. A few authors have sought to build a combined model with components of each.

Spiritual theories

Near-death experiences are remarkable, often being of brief duration and yet promoting a re-evaluation of personal meaning, values and beliefs, leading to enduring changes. Ring (1984*a*) describes the NDE as essentially a spiritual awakening, an encounter with some universal source of being or consciousness. Grosso (1983) describes a transpersonal paradigm and recalls the ancient Orphic formula: 'somo sena – the body is a tomb, that true life calls for going out of the body, and dying is therefore being born, transcendence over enclosure'. Noyes (1982) draws the parallel between NDEs and the psychological process of religious conversion often occurring in states of existential crisis, and he considers that being near death is therefore a classic example. Sabom (1982) has attempted to establish the veracity of reports of out-of-body experiences during cardiac arrest by checking the details against the descriptions of witnesses. However, these data are flawed by the use of inappropriate controls and the possible continued awareness of NDE subjects during resuscitation (Blackmore, 1982).

Many studies are based implicitly on the notion that the existence of an after-life is the most economic way to explain the NDE, and much of the popular interest is based on a hope that it represents empirical evidence for what has until now been a matter of faith.

Rawlings (1980) not only presents his material as evidence for an after-life but was himself converted to Christianity while conducting his studies.

Belief in the after-life is as old as man and preparations for it can be found in neolithic graves 100 000 years old. Sixty-nine percent of contemporary Americans and 43% of Britons declare a belief in it (Gallup & Proctor, 1982). Elizabeth Kübler-Ross (1975) states that Moody's work 'confirms what we have been taught for two thousand years, that there is life after death'. However, this argument is flawed in several ways.

Non-psychiatric authors have confused phenomenological reality with ontological reality and equated vivid sincere reports with veridicality (Siegel, 1980). Many seem unfamiliar with the defining characteristics of hallucinations; consequently, the common features of NDEs are viewed as indicative of a common objective reality and not a common subjective reality. Aggernaes (1972) has investigated and described the experience of reality in hallucinations. He considers that the experience is characterised by a quality of sensation rather than ideation and is regarded as public rather than private, the attitude being that anyone with healthy sensory faculties would perceive the same. The experience has the quality of objectivity and existence, rather than subjectivity and non-existence. There is no voluntary control over the perception, which is regarded by the person as independent and separate from any awareness of being in an unusual mental state.

Despite the claims of those who have had an NDE – and their witnesses – that they have been dead and returned to report on their experience of the after-life, they can at most only be considered to have entered the early and reversible phase of the process of dying.

The religious imagery of Western accounts has been taken by some as confirmation of the Christian faith, despite the fact that the Bible says very little concerning the experiences people may expect at the point of death. This is effectively dismissed by cross-cultural studies, which record the Navajo seeing a great chief in a beautiful field, a Hindu seeing a death messenger coming to take him away, and the Catholic meeting with the Virgin Mary in a great cathedral: the imagery corresponds to the concept of the after-life in the mind and cultural setting of the individual.

However, finding a psychological cause for a belief does not establish that the belief is true or false, but merely the mechanism by which it has been acquired. Both Moody (1975) and Ring & Franklin (1981), while believing personally in an after-life, reject NDE research as evidence for it or a credible way to study it. Siegel (1980), after reviewing many of these criticisms, concludes that, "the after-life remains an elusive but fetching possibility", which the NDE neither proves nor disproves. Alcock (1981) considers that even if we do not survive death, dying itself may not be such an unpleasant experience, and that we may be misled by the last conscious activity of our dying brain. Rodin (1980), commenting on his own NDE, considered that 'despite my current awareness that these visions and beliefs will be utterly false, I know I shall accept them as full truth when the time comes'.

Organic theories

The neurologist Rodin (1980) has pointed out that the final common pathway of death is cerebral anoxia: this has been demonstrated experimentally to produce a characteristic pattern of perceptual and attitudinal changes, and commonly these include a sense of well-being and power, with a loss of critical judgement, and hallucinations and delusions containing themes of dying and the after-life. He concluded that the NDE is the product of an anoxic brain dwelling on death.

However, NDEs are not limited to physical proximity to death or circumstances in which cerebral anoxia is a probability. Heim's (1892) series of Alpine climbers could reasonably be presumed to have been in above-average physical health and were close to death only in expectation or anticipation. Osis & Haraldsson (1977) reported that 50% of their series had full consciousness, and that 'possible medical hallucinogenic factors [i.e. drugs, fever, functional illness with hallucinations] were clearly absent in 60% of cases'. They concluded that medical factors did not modify the phenomenology and are unrelated to death-bed visions.

Sabom & Kreutziger (1982) considered the possibility of temporal lobe epilepsy in a hypoxic brain, but noted phenomenological difference with the NDE. Similarly, autoscopic hallucinations of the double are associated with brain damage but are not typical of NDEs.

Noyes & Kletti (1977) considered that both panoramic memory and the changes in affect (which they labelled depersonalisation) occur in both temporal lobe epilepsy and experimental temporal lobe electro-stimulation, and so formulated the NDE as a temporal lobe excitation syndrome, an adaptive neural response to extreme anxiety.

Carr (1982) takes this model a step further by describing the NDE as 'a stress induced limbic lobe syndrome'. He considers NDEs to be phenomenologically equivalent to complex hallucinatory states associated with limbic lobe dysfunction. He demonstrates that the central nervous system secretion of behaviourally active peptide hormones during stress is well documented, and he proposes that these hormones may have a role as endogenous hallucinogens. In the extreme stress of being near death, limbic lobe hyperactivity may be provoked, resulting in the NDE. The model is supported by decreased incidence of NDEs in brain damage due to tumour or stroke, which argues for the need of an intact limbic lobe and cortex to generate and elaborate the experience. Similarly, the association of ketamine with NDEs supports the role of some neuropharmacological mediation. Timothy Leary stated that recreational use of ketamine was a way to explore death while staying alive (Rogo, 1984). It may, however, be a way of exploring the NDE without venturing near death.

Psychological theories

Freud (1915) wrote that 'our own death is unimaginable', that 'no one believes in his own death', and that belief in immortality was a 'denial of death and a refusal to face annihilation'. Similarly, Butler (1963) believed that the significance of death is minimised by psychiatric writers, reflecting a universal tendency to deny its reality, and Becker (1973) has suggested that death has been, and still is, avoided by almost all facets of our existence: 'in both conscious and mainly subconscious ways, we silence, camouflage, isolate, ignore and deny death.' Many psychological theorists have drawn on mechanisms of denial, dissociation, splitting and projection to construct explanatory models.

Pfister (1930) corresponded with Heim and gave possibly the earliest psychodynamic interpretation of the NDE. He proposed that 'persons faced with potentially inescapable danger attempt to exclude this unpleasant reality from consciousness and replace it with pleasurable fantasies which protect them from being paralysed by emotional shock'.

Noyes (1972) thought that the perception of imminent death was the chief prerequisite for the NDE, defining it as a depersonalisation syndrome which enabled a split into an observing and participating self. The person removes himself from the endangered participant, watching as though a disinterested third party. He described the NDE as a

succession of defensive manoeuvres with phases of resistance, life review and transcendence. Recognition of imminent death precipitates a brief though violent struggle between an urge for active mastery and passive resignation. He and others (Heim, 1892; Rosen, 1975) observed that where there was even a slight possibility of survival, physical and mental alertness are greatly increased and focused on self-rescue. When the person surrenders to the inevitability of death, fear subsides and feelings of peace and tranquility develop. The review phase is characterised by dissociation of the self from awareness of impending death, and the out-of-body experience effectively negates death by 'rising in awareness above it'. Transcendence is marked by relinquishing a hold on worldly reality, and, drawing on both Freud and William James, Noyes sees 'mystic consciousness' as the end point of an adaptative process with visions of parental figures, especially mother, as a 'regressive return to the ultimate rescuer'. Noyes & Kletti (1977) later elaborated the concept of panoramic memory, noting that the contents of memories are significant and meaningful, often accompanied by sadness and an attitude of evaluation. They described this as a form of grief anticipating the loss of one's own life. As the bereaved person clings to symbolic representations of the departed, so the dying individual develops attachments to memories and symbols of his own existence. This strongly resembles the reminiscent life review in older persons considered by Butler (1963) as a process of reassessment and integration of life at its end. The accelerated process of reminiscence in the NDE may be seen as an attempt at psychological completion of life in the face of death.

Grof & Halifax (1977) have presented an alternative model based on their work giving LSD to terminally ill patients. They believed the NDE to be a reactivation of birth memories, and, drawing on Fischer & Landon's (1972) concept of state-dependent learning, proposed that in the hyper-aroused state near death a powerful regression is provoked, producing a recovery of birth experience. Sagan (1979) popularised this notion in his concept of the 'amniotic universe'. However, although it serves as a powerful metaphor, its credibility has been convincingly criticised by Becker (1962), who demonstrated that the NDE bears little relationship to actual birth experience, and claims that the neonate is physiologically incapable of encoding memories of birth in sufficient detail to account for near-death imagery.

Combined models

No single theory is able to account for all the NDE components or their occurrence in all situations.

Drab (1981*a*) has drawn on Gregory's (1966) work to provide a psychophysiological model. Perception is a continuing process of information-gathering and processing and decision-making which is highly reliant on the reliability of incoming stimuli, and the brain's discriminating and organising abilities. The brain is constructed to make sense of whatever information it is presented with, and perception can be considered its 'best guess' as to what the various stimuli mean. When information sources are limited or ambiguous or supply unusual patterns, the perceptual process persists in its attempts at interpretation and the results are errors in perception such as illusions and hallucinations. This disorganisation of perceptual functioning is present in many situations, including intoxication and physical and psychological near-death situations. The specific imagery varies with stored memories and the cultural expectations and setting of the individual.

Siegel (1980) similarly sees the NDE as a 'complex dissociative hallucinatory state' resulting from excitation and arousal of the central nervous system, coupled with functional disorganisation of that part of the brain regulating incoming stimuli, 'and a preoccupation with internal imagery'. This could be induced by a number of agents, including psychedelic drugs, anaesthetics, fever, exhausting disease, some injuries and accidents, and the emotional and psychological process involved in dying. Then it could serve the adaptive purpose of providing comfort, security and integration in the face of disintegration.

Consequences

A frequent, consistent and apparently enduring pattern of changes in attitudes, values, beliefs and conduct have been observed in people who have an NDE. The degree of change is greatest if the individuals believed they were about to die (Greyson & Stevenson, 1980). Ring (1980*a*) found a greater degree of change in those who had a more extensive experience.

Noyes (1980) gathered 138 reports of changed attitudes from 215 persons who had 'survived life-threatening danger'. He found 41% experienced a reduced fear of death, 21% a feeling of invulnerability, and 17% a sense of special destiny or purpose and being favoured by God. Flynn's (1982) survey of 21 NDEs demonstrated a reduced fear of death, increased concern for others and increased belief in

God and meaning in life. Bauer (1985) gave the Life Attitude Profile to 28 people who had had NDEs and found a clear change towards finding greater meaning, purpose and fulfilment, together with an increased acceptance of death. Suicide survivors who have had a NDE report a reduced suicidal inclination (Rosen, 1975; Ring & Franklin, 1981).

Many authors found a shift from materialistic goals towards caring for and helping others, becoming more accepting and less prejudicial (e.g. Clark, 1984).

Raft & Andresen (1986) also found a reduced interest in acquiring worldly possessions, and presented two detailed case histories typical of 19 NDEs they studied. They found enduring personality changes towards greater tolerance of uncertainty, interest in self-knowledge and understanding, and a greater openness to both learn by and take pleasure in experience. They considered these changes, apparently resulting from a brief single experience, bore a striking resemblance to the favourable changes induced by lengthy psychoanalysis.

Religious changes are commonly reported. Sabom & Kreutziger (1982) found 69% of their NDE sample ($n=29$) had increased belief in an after-life as against none of a matched sample ($n=39$) who had also come near to death but without an NDE. Many believe they have seen something of the after-life, which may be the most significant experience of their life. Twemlow & Gabbard (1984) confirmed the trend towards greater religious conviction, but found that this was coupled with greater tolerance of religious difference and a marked decrease in denominational allegiance.

Clinical implications

The occurrence of the NDE may be a common and neglected consequence of survival near death. It has implications for both physical and psychological recovery as well as affecting relationships of the survivor with spouse and family. Emotional problems are common following survival after having been near death, and are perhaps best documented in cardiac arrest. Diln *et al* (1974) described the 'I am dead syndrome', in which cardiac arrest survivors believed themselves to be dead for days or weeks following resuscitation. He reported on the stress and confusion in their families and underlined the need for therapeutic involvement (Dlin, 1980).

It is common for those who have an NDE to keep their experiences secret for fear of being regarded insane (Moody, 1975; Sabom & Kreutziger, 1982; Sullivan, 1984). This is consistent with Rees's (1971) finding among widows and widowers: 47% of 300 reported hallucinations of the dead spouse. None had discussed this with their doctors and only one with a clergyman. The main reason for non-disclosure was fear of ridicule. There are many accounts in the NDE literature of individuals keeping their experiences to themselves for many years, and of their considerable relief on relating them to researchers. So staff working in areas of practice related to patients near death (i.e. accident and emergency departments, cardiac and intensive care units, suicide assessment, terminal care and others) need to be informed about the NDE and the psychological complications of survival near death.

Some patients are angry to have been resuscitated and may be disappointed to have to re-enter what may be perceived as a mundane reality (Jung, 1961; Clark, 1984; Ring, 1984*b*). Others have personality and attitude changes which, although regarded as favourable and welcome by the people who have had the experience, may be alarming and disruptive to their family.

There has been concern that knowledge of NDEs may make suicide more attractive. However, it seems clear that NDEs often promote a strongly anti-suicide motivation, in particular if panoramic memory occurs (Greyson, 1981). Rosen (1975) found that an NDE in the context of failed suicide greatly reduced the likelihood of subsequent serious attempts.

Clark (1984) has suggested a clinical approach to those who have had an NDE, based on her experience of working with more than 100 patients and their families:

(a) maintain reality orientation with unconscious patients, talk to them as though fully conscious

(b) educate patients to the possibility of NDEs as soon as they are lucid

(c) initiate open discussions of NDEs when the patient is ready to talk

(d) assist the patient to find a way of sharing the experience with spouse and family, seeking to overcome fears of rejection or being regarded as crazy

(e) educate relatives to enable acceptance of the experience and facilitate family discussion.

Some clinicians and clergy have used NDE literature not only for specific educational purposes but also to provide comfort and reassurance in counselling the bereaved and dying (Kübler-Ross, 1975; Ring, 1984*b*; Royse, 1985).

Conclusions

The NDE was initially embraced as evidence for post mortem survival and as such aroused considerable popular interest and controversy. It has since been

shown to be unrelated to physical proximity to death, and the assumption that the experiences of the nearly dead are contiguous with experiences of the truly dead presents insurmountable methodological problems for research.

The NDE may best be regarded as a complex hallucinatory phenomenon occurring in persons who perceive themselves to be facing imminent death, and is associated with the psychology of dying.

It is established as a common and authentic experience but has received little attention in British literature. It seems universally present in those cultures so far studied and shows remarkable cross-cultural similarities of form, despite considerable diversity of imagery and content, which appear to be determined by personal belief and cultural circumstances. It would be of great of interest to have comparable studies from Eastern bloc and atheistic cultures.

Systematic study has been hampered by lack of definition and confusion of terms; e.g. apparitions, visions and hallucinations are used interchangeably, as are panoramic memory and life review, and out-of-body experience, autoscopy and astral projection. This may be inevitable in a multidisciplinary body of literature. However, the trend towards using the language of descriptive phenomenology free of causal attribution may enable classification and acceptance of a common nomenclature and facilitate interdisciplinary comparisons; but attempts such as provided by Greyson (1983*a*) to establish an operational definition may promote a premature closure of the concept and a neglect of the richness and diversity of its phenomenology. Also, the use by several researchers of a standard collection of cases, such as provided by the International Association of Near-Death Studies, attracts the criticism that they may have been pre-clustered as members of a self-selected group with a conformity of experience. It remains to be demonstrated that Greyson's typology is valid for the broad range of NDEs.

Although sample bias has undoubtedly led to overestimation of incidence, the secrecy and significance of the experience underline the importance of recognition and possible intervention. If the impressive changes resulting from it are confirmed by prospective longitudinal studies, these patients may provide an important model of therapeutic change achieved during a brief experience. Studies of the mechanisms involved may provide insights of great theoretical interest and practical importance.

The numerous causal theories do not stand in any clear hierarchy of plausibility or established credibility, and it may be that NDEs are common end points of a number of aetiological pathways. Alternatively, a multidimensional model, which acknowledges psychodynamic and stress processes with attendant neurochemical changes and attributed meanings, may be appropriate. Any theory will need to account for individual and situational factors as well as the process and content of the experience.

It remains to be explained why some return from a close brush with death with a vivid, extensive and profound experience, and others report nothing. This review has attempted to describe the work done so far; a great deal remains to be explored, described, quantified, tested, understood and applied.

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