

Congruence Between Near-Death and Mystical Experience

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Near-death experiences, altered states during a brush with death, may include mystical features like a sense of sacredness and divine union, timelessness/spacelessness, positive mood, noetic quality, and ineffability. We quantified mystical elements in near-death experience by comparing responses on the Mysticism Scale of 292 near-death experiencers and 34 persons who had come close to death without near-death experiences. Two thirds of near-death experiencers reported mystical experiences during their brush with death, compared to none of the comparison survivors. Near-death experiencers scored higher on the Mysticism Scale than did nonexperiencers; they endorsed noetic quality, positive affect, and unity most often and ego loss, timelessness/spacelessness, and ineffability least often. Depth of near-death experience was correlated highly with scores on the Mysticism Scale, but factor analysis of features during the brush with death yielded two distinct factors representing mystical and near-death elements, suggesting that near-death experiences have commonalities with, but can be differentiated from, mystical experience.

Mystical experiences are generally perceived to include certain positive values, attitudes, perspectives, beliefs, and emotions and are considered to be human experiences at least potentially available to everyone (Stace, 1960). They are often characterized by the conscious recognition of, and experiential union with, ultimate reality or divinity (Stace, 1960), although that experience may be not as prominent in every spiritual tradition. Granqvist, Hagekull, and Ivarsson (2012) argued that the mystical sense of unity need not be interpreted in religious terms as union with God but may be experienced alternatively as unity with “nature,” with “cosmos,” or with “ultimate reality.” James (1902) defined mystical experiences as characterized essentially by their noetic quality and ineffability, adding that they are often transient and passive experiences. Persons who report mystical experience show signs of more adequate adjustment than comparison groups, and mystical experience can serve positive functions even in distressed individuals (Wulff, 2000).

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Pahnke (1966, 1969), building on the work of James (1902) and Stace (1960), derived a model incorporating nine common traits of mystical consciousness: unity, transcendence of time and space, deeply felt positive mood, sense of sacredness, noetic quality, paradoxicality, alleged ineffability, transiency, and persisting positive changes in attitudes and behaviors. This model was subsequently operationalized by Hood's (1975) Mysticism Scale, which has become the most widely used measure of mystical experience (Lukoff & Lu, 1988).

Noyes (1971, 1972) noted that altered states of consciousness in people as they approach death often go through three sequential stages: resistance to dying, surrender and life review, and finally transcendence. This culminating phase includes features typical of mystical experience, such as ineffability, transcendence of time and space, sense of truth, loss of control, intensified emotion, and disordered perception. He later characterized the mystical factor in the response to acute life-threatening danger as including a sense of great understanding, sense of harmony or unity, feeling of joy, revelation, enhanced visual imagery, life review, and a sense of being controlled by an outside force (Noyes & Slymen, 1979).

Accounts of these vivid experiences with mystical or transcendental features occurring to people when they have come close to death can be found in the folklore and writings of European, Middle Eastern, African, Indian, East Asian, Pacific, and Native American cultures (Belanti, Perera, & Jagadheesan, 2008; Holck, 1978; Kellehear, 2009; McClenon, 1994). However, it was not until 1975 that Moody coined the term "near-death experience" and the acronym NDE for these altered states of consciousness on the threshold of death, and only for the past 30 years that they have been studied more systematically (Holden, Greyson, & James, 2009).

Narrative reports of these NDEs typically include a sense of leaving the physical body and encountering mystical entities and environments, a sense of cosmic unity, transcendence of time and space, deeply felt positive mood, sense of sacredness, noetic quality or intuitive illumination, paradoxicality, ineffability, transiency, and persistent positive aftereffects (Greyson, 2006). There has been speculation concerning factors that may contribute to mystical experience in people coming close to death. Hood (1977) suggested that awareness of limits in a life-threatening situation facilitates transcendence and that any situation that suddenly illuminates the limits of everyday reality can trigger a mystical state, at least in mild form. This suggestion may bear on a mechanism by which NDEs may lead to transcendence.

Recent research suggests that NDEs are reported by 12% to 18% of cardiac arrest survivors (Greyson, 2003; Parnia, Waller, Yeates, & Fenwick, 2001; van Lommel, van Wees, Meyers, & Elfferich, 2001). A recent review of 30 years of research concluded that demographic variables such as age, gender, ethnicity, education, occupation, socioeconomic status, and religion have no consistent association with the incidence of NDEs in general or of specific NDE features and that NDEs can occur following close brushes with death from any cause, including accidents in which the individuals believed they faced imminent death but were not in fact injured (Holden, Long, & MacLurg, 2009; Zingrone & Alvarado, 2009). Studies have found either no association or variable associations between certain features of NDEs and proximity to death; this inconsistency may reflect differences in documentation of and criteria for closeness to death (Zingrone & Alvarado, 2009). NDEs are associated with pervasive changes in attitudes, beliefs, values, and behaviors, including enhanced self-esteem, concern and compassion toward others, appreciation for life and sense of meaning in life, interest in spiritual matters, and decreased fear of death and interest in personal wealth and prestige (Noyes, Fenwick, Holden, & Christian, 2009).

Some authors have observed resemblances between mystical experiences occurring in near-death and other situations. Cressy (1994) compared NDE phenomenology and aftereffects to the lifelong mystical experiences of medieval Roman Catholic mystics St. Teresa of Avila and St. John of the Cross, noting particularly the convergence of ecstatic out-of-body travel, visions of God, clairvoyance, loss of fear of death, and healing transformations. Badham (1997) concurred that NDEs share many of the characteristics of deep mystical experience, adding that modern resuscitation techniques have made available to ordinary people profound noetic experiences that formerly were available to people only on rare occasions. Pennachio (1986) found in NDE narratives examples of all nine features of mystical experience delineated by Stace (1960).

Wulff (2000) suggested that NDEs differ from classic mystical experiences in their accent on individual identity such as in the form of a life review and encounters with deceased relatives, the relative clarity of events, and the lower frequency of a sense of unity. However, Hufford (1985) argued that the lower rate of oceanic feelings in NDEs does not disqualify them from being considered true mystical experiences and that NDEs generally fit the definition of mystical experience. Marshall (2005) noted that, given their phenomenological overlap, NDE and mystical experience are not mutually exclusive categories, as the former is identified by its circumstances and the latter by its contents. These controversies in the literature suggest the need for an objective analysis of mystical elements in NDEs that goes beyond the reporting of selected descriptions taken from narrative accounts.

OBJECTIVE OF THE STUDY AND HYPOTHESES

Despite abundant narrative reports of mystical phenomena in NDEs, the question of how these experiences are similar to, and different from, mystical experiences remains. This study was designed to answer that question by comparing responses on Hood's Mysticism Scale from a sample of individuals who had NDEs and from a comparable sample of individuals who had come close to death but did not have NDEs.

The primary hypothesis to be tested in this study is that survivors of a close brush with death who have NDEs will have higher scores on the Mysticism Scale than will survivors who do not have NDEs. A corollary hypothesis to be tested is that depth of the NDE, as measured by scores on the NDE Scale, will be positively correlated with scores on the Mysticism Scale.

METHOD

Participants

Participants were 326 individuals who had spontaneously contacted the author, after reading or hearing about his research, to share their accounts of their experiences when they had come close to death. No effort was made to advertise for or recruit participants. The inclusion criterion was self-report of an experience associated with a situation in which one's life was seriously threatened. Of the 326 participants who reported life-threatening events, 117 (36%) reported a crisis during surgery, 88 (27%) reported an illness, 42 (13%) an accident, and 79 (24%) some

other life-threatening event (e.g., childbirth complication, suicide attempt, homicide attempt, allergic reaction). Of those 326 participants, 292 (90%) reported experiences that qualified as NDEs by scoring 7 or higher on the NDE Scale (1 standard deviation below the mean; see next), whereas 34 (10%) reported experiences that did not.

Measures

Participants were mailed (293 participants, 90%) or e-mailed (33 participants, 10%) a brief questionnaire about their demographic background and details of their close brush with death, and two standardized, self-rated questionnaires: the NDE Scale and the Mysticism Scale. Participants were asked their gender, ethnic identification, religious identification, years elapsed since their close brush with death, and how close they had come to dying (lost vital signs or declared dead, life seriously threatened without loss of vital signs, or life not seriously threatened). Participants' self-reported answers were not verified by review of medical records or other external source. Participants completed these questionnaires at a time and place of their choosing and returned them by mail or e-mail.

NDE Scale. The NDE Scale is a self-rated, 16-item, multiple-choice questionnaire developed to assess NDEs (Greyson, 1983). It has been shown to differentiate NDEs from other close brushes with death (Greyson, 1990); to correlate highly with Ring's (1984) Weighted Core Experience Index, an earlier measure of NDEs ($r = .90, p < .001$); and to have high internal consistency (Cronbach's $\alpha = .88$), split-half reliability ($r = .84, p < .001$), and test-retest reliability over a short-term period of 6 months ($r = .92, p < .001$; Greyson, 1983) and over a long-term period of 20 years ($r = .83, p < .001$; Greyson, 2007). A Rasch rating-scale analysis established that the NDE Scale yields a unidimensional measure, invariant across gender, age, intensity of experience, or time elapsed since the experience (Lange, Greyson, & Houran, 2004). Although the NDE Scale was developed as an ordinal scale without quantified anchor points, the fact that it satisfactorily fits the Rasch model suggests that, for all practical purposes, there do appear to be equal distances between the points of measurement that give the scale interval-level measurement properties (Wright & Masters, 1982).

The 16 items on the NDE Scale explore cognitive changes during the experience, such as accelerated thought processes; affective changes, such as feelings of peace; purportedly paranormal experiences, such as a sense of separation from the physical body; and purportedly transcendental experiences, such as an apparent encounter with a mystical being or presence. Scores on the NDE Scale can range from 0 to 32; the mean score of near-death experiencers (NDErs) is 15; and a score of 7, 1 standard deviation below the mean, is generally used as a criterion for considering an experience to be an NDE (Greyson, 1983).

Mysticism Scale. The Mysticism Scale is a self-rated Likert-type questionnaire containing 16 positively worded and 16 negatively worded items, developed to assess mystical experience (Hood, 1975). The Mysticism Scale has been studied extensively and shows cross-cultural reliability (Hood et al., 2001; Hood, Hill, & Spilka, 2009); among an American sample, item-to-total correlations were high ($\alpha = .91$; Hood et al., 2001).

Using a 5-point Likert rating protocol, the total score on the Mysticism Scale can range from 32 to 160, derived by summing the scores on four items for each of eight distinct

conceptual categories: Ego Loss (losing oneself into a greater unity), Unity (perception of the unity of all things), Inner Subjectivity (perception of an inner awareness in all things), Timelessness/Spacelessness (transcending spatiotemporal limits), Noetic Quality (sensation of the experience as a source of valid direct knowledge), Ineffability (impossibility of expressing the experience in words), Positive Affect (joy or bliss), and Sacredness (intrinsic holiness of the experience; Hood, 1975).

Publications describing the Mysticism Scale have not established a specific criterion for scores to be categorized as mystical. However, Hood suggested using an average score per item of 4 or 5 on the 5-point Likert scale as a criterion for a mystical experience and a score of 1 or 2 as a criterion for not being a mystical experience (R. Hood, personal communication, April 2, 2012).

Analysis

T tests were used to assess the associations between Mysticism Scale scores and gender, ethnicity, and presence of an NDE. Pearson correlation coefficients were used to assess the associations between Mysticism Scale scores and time elapsed since the close brush with death and depth of NDE. Analyses of variance were used to assess the associations between Mysticism Scale scores and religious identification and closeness to death. All data analyses were performed using SPSS 20 (IBM, Armonk, NY).

RESULTS

NDE Scale and Potentially Confounding Variables

Scores on the NDE Scale in this study ranged from 0 to 32, with a mean of 15.35 ($SD = 7.20$); the median and mode were both 15. Cronbach's alpha for the NDE Scale in this sample was .83, and the distribution of scores followed a unimodal, bell-shaped curve that approximated a normal distribution (Kolmogorov-Smirnov $Z = 1.22$), with acceptable measures of skewness and kurtosis. NDErs (those who scored 7 or higher) and nonexperiencers (those who scored less than 7) were statistically indistinguishable in gender, $\chi^2(1) = 1.60$; ethnicity, $\chi^2(1) = 3.19$; religious identification, $\chi^2(3) = 7.54$; years elapsed since the close brush with death, $t(311) = 0.31$; and self-reported closeness to death, $\chi^2(2) = 4.81$.

Mysticism Scale and Potentially Confounding Variables

Scores on the Mysticism Scale ranged from 32 to 158, with a mean of 113.39 ($SD = 25.45$); the median was 117 and the mode was 128. Cronbach's alpha was .93, and the distribution of Mysticism Scale scores followed a unimodal, bell-shaped curve that approximated a normal distribution (Kolmogorov-Smirnov $Z = 1.26$), with normal kurtosis but negatively skewed (skewness = $-.594$, $SE = .136$).

Mysticism Scale scores in this sample were significantly higher among women than men, $t(324) = 2.72$, $p = .007$, marginally higher among self-identified non-Caucasians (African American, Native American, Hispanic, Asian, other, and mixed) than among Caucasians,

$t(324) = 2.14, p = .033$, and marginally higher among those who reported having come closer to death, $F(2, 276) = 3.36, p = .036$. Participants who identified themselves as atheists or agnostics had significantly lower mysticism scores than those who identified with any religion, $F(3, 297) = 7.43, p < .001$. Mysticism Scale scores declined with increasing years elapsed since the close brush with death ($r = .16, p = .006$).

Mysticism Scale Scores and NDE

As shown in Table 1, the 292 participants who had NDEs had significantly higher scores than the 34 participants who did not on the Mysticism Scale and on each of the eight conceptual categories of the scale.

Using Hood's criterion of an average score of 4 to 5 points per item as a criterion for an event being a mystical experience and an average score of 1 to 2 points per item as a criterion for an event not being a mystical experience, 193 (66%) of the participants who had NDEs scored within the range for a mystical experience, 20 (7%) scored within the range for an event that was not a mystical experience, and 79 (27%) fell within the range for an event that was not clearly in either category. In contrast, none of the participants who did not have NDEs scored within the range for a mystical experience, 17 (50%) scored within the range for an event that was not a mystical experience, and 17 (50%) fell within the range for an event that was not clearly in either category. That difference between the two groups was statistically significant, $\chi^2(2) = 77.88, p < .001$.

To test the association between Mysticism Scale score and depth of NDE as measured by score on the NDE Scale, we eliminated nonexperiencers and included only those who scored 7 or higher on the NDE Scale. Among the 292 NDErs, the depth of the experience was strongly associated with scores on the Mysticism Scale and on all eight conceptual categories, at $p < .001$. The conceptual categories with the highest association to depth of NDEs were Noetic Quality ($r = .51$), Positive Affect ($r = .49$), and Unity ($r = .49$), whereas those with the lowest association were Ego Loss ($r = .38$), Timelessness/Spacelessness ($r = .27$), and Ineffability ($r = .25$).

TABLE 1
Mysticism Scale Scores in Near-Death Experiencers and Nonexperiencers

	<i>Near-death experiencers^a</i>	<i>Nonexperiencers^b</i>	<i>t(324)</i>	<i>p</i>
Mysticism Scale	117.95 (<i>SD</i> = 22.17)	75.13 (<i>SD</i> = 20.45)	10.74	<.001
Ego Loss	13.18 (<i>SD</i> = 4.00)	8.47 (<i>SD</i> = 3.96)	6.50	<.001
Unity	14.64 (<i>SD</i> = 4.80)	7.74 (<i>SD</i> = 3.72)	8.11	<.001
Inner Subjectivity	15.18 (<i>SD</i> = 4.13)	10.41 (<i>SD</i> = 4.42)	6.33	<.001
Timelessness/Spacelessness	14.70 (<i>SD</i> = 3.99)	11.03 (<i>SD</i> = 4.32)	5.03	<.001
Noetic Quality	15.51 (<i>SD</i> = 4.12)	9.21 (<i>SD</i> = 4.50)	8.37	<.001
Ineffability	11.25 (<i>SD</i> = 3.97)	9.37 (<i>SD</i> = 3.84)	2.62	<.010
Positive Affect	16.85 (<i>SD</i> = 3.82)	10.06 (<i>SD</i> = 3.37)	9.90	<.001
Sacredness	16.64 (<i>SD</i> = 4.07)	8.79 (<i>SD</i> = 3.84)	10.70	<.001

^a $N = 292$. ^b $N = 34$.

Five of the 16 items on the NDE Scale address elements characteristic of mystical experience: One relates to a sense of cosmic unity, one to a sense of timelessness, one to a sudden noetic understanding, and two to strong positive affect (peace and joy). Because that overlap between items on the NDE Scale and the Mysticism Scale may have inflated the correlation between scores on the two scales, correlation coefficients were also calculated with those five items eliminated. The remaining 11-item NDE Scale had a slightly lower but still significant correlation with the Mysticism Scale ($r = .54, p < .001$).

Because of the overlap between the NDE Scale and the Mysticism Scale, a factor analysis was performed combining the two scales to determine whether distinct factors might emerge. To reduce tautological correlations, only the positively worded items from the Mysticism Scale were used, and the five items on the NDE Scale that duplicated Mysticism Scale items were omitted. A principal components analysis with a varimax rotation of the remaining 27 scale items (11 from the NDE Scale and 16 from the Mysticism Scale) on data gathered from the 326 participants yielded a subject to item ratio of 12:1. An examination of the Kaiser-Meyer-Olkin measure of sampling adequacy suggested that the sample was factorable ($KMO = .863$); and Bartlett's test of sphericity indicated that the factor model was appropriate, $\chi^2(352) = 3218.17, p < .001$ (Tabachnick & Fidell, 2007).

A scree test, regarded as the best criterion for factor retention for research purposes, showed a natural break in the eigenvalue curve after two factors, with eigenvalues greater than 2. A cut-off level of 0.40 for loading values was used, which equates to approximately 25% overlapping variance with the other items in that factor, as recommended by Comrey and Lee (1992) as an appropriate criterion for discriminating factor loadings.

The resultant two-factor solution explained 36% of the variance. Factor 1 included 15 of the 16 items from the Mysticism Scale and one from the NDE Scale. Factor 2 included 10 of the 11 items from the NDE Scale and none from the Mysticism Scale. The items composing each factor, with its source scale and factor loading, are presented in Table 2 and are readily interpretable as reflecting correlated but distinct mystical and NDE factors.

Potential Confusion Due to Double Negatives

Some of the negatively worded items on the Mysticism Scale included double negatives. The original Mysticism Scale was developed to inquire whether the respondent had ever had certain experiences *over the course of a lifetime*, and in that context, the double negatives generally are not problematic. However, applying the scale to *a single event* requires a slight rewording of the items (Hood, 1977), after which the meaning of those double negatives could be confusing. For example, one item as used in this study read, "In my NDE, I never had an experience that was incapable of being expressed in words." In this example, if the NDE was ineffable, the correct response would be "not true," which may be confusing.

To assess whether confusion about double negatives in the present study affected responses, responses on the entire Mysticism Scale were compared with responses on the positively worded items alone. The Pearson correlation coefficient between positively worded items and all items for the entire Mysticism Scale score was .96 ($N = 323, p < .001$), suggesting that any confusion did not significantly bias their responses. This was also true for all eight conceptual categories (with $r > .77$ and $p < .001$ for each one).

TABLE 2
Factor Matrix of Combined Positively Worded Mysticism Scale and Nonoverlapping NDE Scale Items

	<i>Factor 1</i>	<i>Factor 2</i>
Mysticism Scale Positively Worded Items		
1. an experience that was both timeless and spaceless	.59*	.12
3. something greater than myself seemed to absorb me	.61*	.18
4. everything seemed to disappear from my mind until I was conscious only of a void	.31	-.07
5. profound joy	.60*	.34
11. no sense of time or space	.49*	-.05
12. oneness of myself with other things	.72*	.26
13. a new view of reality was revealed to me	.53*	.37
17. ultimate reality was revealed to me	.61*	.35
18. felt that all was perfection at that time	.74*	.22
19. felt everything in the world to be part of the same whole	.72*	.26
20. knew my experience to be sacred	.59*	.32
22. left me with a feeling of awe	.55*	.28
23. experience is impossible to communicate	.58*	-.13
29. all things seemed to be conscious	.46*	.24
31. felt nothing is ever really dead	.54*	.37
32. experience cannot be expressed in words	.63*	-.09
NDE Scale nonoverlapping items:		
2. thoughts were speeded up	.11	.50*
3. scenes from my past came back to me	-.01	.44*
8. saw or felt surrounded by a brilliant light	.37	.48*
9. senses were more vivid than usual	.19	.62*
10. seemed to be aware of things going on elsewhere, as if by extrasensory perception	-.02	.43*
11. scenes from the future came to me	.04	.46*
12. felt separated from my body	.06	.35
13. seemed to enter some other, unearthly real	.40*	.50*
14. seemed to encounter a mystical being or presence, or heard an unidentifiable voice	.18	.66*
15. saw deceased or religious spirits	.08	.57*
16. came to a border or point of no return	.11	.46*

*Items with adequate factor loading to be retained.

DISCUSSION

The results of this comparison confirmed the study hypotheses regarding the occurrence of mystical phenomena in NDEs, corroborating prior qualitative reports of NDEs (Cressy, 1994; Greyson, 2006; Hufford, 1985; Noyes, 1971; Pennachio, 1986), in that survivors of a close brush with death whose experiences met the criterion for NDEs had significantly higher scores than did survivors whose experiences did not meet that criterion. That was true for the entire Mysticism Scale and for each of the eight conceptual categories of mystical experience. In addition, 66% of those whose experiences met the criterion for NDEs scored within the range for a mystical experience by Hood's criterion, whereas none of the other participants scored within that range. Furthermore, as posited in the secondary hypothesis, depth of NDE as measured by scores on the NDE Scale had a significant positive correlation with scores on the entire Mysticism Scale and on each of the eight conceptual categories.

As previously noted, there is some overlap between the items on the NDE Scale and those on the Mysticism Scale. However, even with those overlapping items removed, the remaining items on the NDE Scale were highly correlated with scores on the Mysticism Scale. A factor analysis of combined nonoverlapping items from the NDE Scale and the Mysticism Scale yielded a two-factor solution that was readily interpretable as reflecting distinct mystical and NDE factors, suggesting that NDEs have commonalities with, but can be differentiated from, mystical experience. Some of those items that loaded preferentially onto the NDE factor may reflect the perception of being close to death, such as the life review, the border or “point of no return,” and apparent encounters with deceased acquaintances, although all of those have been reported with lesser frequency in mystical experiences not associated with a near-death crisis as well.

Gender, religious identification, ethnic identification, self-reported closeness to death, and years elapsed since the brush with death were all associated with Mysticism Scale scores. However, because none of these confounding variables was significantly associated with the presence or depth of NDE, these associations cannot explain the significant association between NDE presence or depth and Mysticism Scale scores.

Methodological Considerations and Additional Future Directions

The self-selection of participants in this study and the reliance on retrospective self-reports of experiences may have limited the generalizability of these findings. It is conceivable that NDErs who had a mystical experience were more likely to participate in research than those who did not, although participants within the study sample had a wide range of scores on the Mysticism Scale. As with any retrospective experiential report, accounts are vulnerable to memory decay, distortion, or fabrication, although a prior study of the consistency of the NDE Scale over a period of decades suggested that passage of time did not materially influence memories of the experience (Greyson, 2007).

Although this study suggests a high incidence of mystical features in NDEs, the mean Mysticism Scale score of participants who had NDEs was not as high as reported in some other studies of mystical experience. For example, recent studies of mystical experience associated with the psychoactive tryptamine alkaloid psilocybin yielded higher scores on the Mysticism Scale (Griffiths, Richards, Johnson, McCann, & Jesse, 2008; Griffiths, Richards, McCann, & Jesse, 2006). Mysticism Scale scores of NDErs in this study were lower than those of participants in the psilocybin studies who received the highest dose of the drug but were comparable to scores of those who received lower doses of psilocybin (Griffiths et al., 2011). However, there were differences between NDErs in this study and participants in the psilocybin studies that may have contributed to the greater intensity of mystical features in the psilocybin studies.

First, participants in the psilocybin studies were actively engaged in spiritual practices, were curious about the effects of psilocybin, and provided extensive support and expectations of a profound experience prior to their psilocybin sessions. These factors may have enhanced the intensity of mystical experience in those studies, as there is abundant evidence of the effect of set and setting on mystical experience, and particularly on drug-facilitated experiences (Hood et al., 2009). By contrast, NDErs in this study had no preparation or support before their experiences and were not recruited from a sample with prior spiritual practice or otherwise

predisposed to experience transcendence. It is likely that many of the participants in this study had been exposed to discussions of NDEs presented in popular media in the years between their NDE and participation in this study. However, prior research has shown that personal accounts of NDE are not substantially influenced by exposure to information about NDEs from external sources (Athappilly, Greyson, & Stevenson, 2006).

Second, participants in the psilocybin studies completed the Mysticism Scale 7 hr after ingesting the psilocybin; a related study of persons who had psilocybin-related mystical experiences in the past under uncontrolled circumstances administered the Mysticism Scale an average of 8 years after the experience (MacLean, Leoutsakos, Johnson, & Griffiths, 2012). Participants in this study who reported spontaneous NDEs completed the Mysticism Scale an average of 34 years after their experiences. It is possible that recall of the mystical features of an experience may have faded in the intervening years: Among participants in this study, elapsed time since the close brush with death was inversely correlated with scores on the Mysticism Scale.

The finding that scores based on the positively worded items alone and scores on the entire Mysticism Scale were highly correlated, and therefore likely measure the same constructs, suggested that in this sample, grammatical construction did not materially influence scores, and that, in linguistically limited or challenged samples, administering the positively worded items alone might be a reasonable alternative.

This study assumed that NDEs are unitary phenomena, and indeed a Rasch rating-scale analysis of the NDE Scale lends statistical support to that unidimensional approach. However, it may be helpful in future research to distinguish between types of NDE, for example, between pleasant and frightening NDEs, those associated with different kinds of near-death crisis, or those occurring in the setting of specific cultural rituals (Hood & Williamson, 2011).

Because NDEs from different cultural or faith backgrounds may differ in their understanding of mystical phenomena and of the dying process, it would be helpful to extend this research to include samples beyond the predominantly Christian American population in the current study. In addition, a substantial (but unquantified) proportion of the participants in this study had participated after their NDEs in NDE-oriented workshops, meetings, or support groups, and/or in spiritual or contemplative practices initiated at least in part by their NDE. Because such activities might alter the memory or interpretation of an NDE, it would be helpful in future studies to compare such participants to those who had not engaged in sustained spiritual practices or support groups.

The *phenomenological* similarities between near-death and mystical experience in this study suggests further investigation of the reportedly similar *transformative* aspect of these experiences (Noyes, 1971; Pennachio, 1986). NDEs reportedly have profound and lasting impact, often precipitating loss of fear of death, strengthened belief in postmortem survival, enhanced relationship to the Divine, new sense of meaning and purpose, heightened self-esteem, enhanced compassion and appreciation of nature, and decreased interest in material gain or social status (Noyes et al., 2009). Mystical experiences have likewise been recognized for more than a century as leading to sudden and lasting changes in character and values (James, 1902), including changes in the person's relationship with God, perception and appreciation of nature, attitude toward self, and attitude toward other people (Starbuck, 1899). The transformative aftereffects of NDEs do not follow close brushes with death in the absence of an NDE (Greyson, 1983; Ring, 1984; van Lommel et al., 2001). The current study suggests that the profound

transformations that follow NDEs may be related to their mystical elements. Future research might pursue that hypothesis, as well as Cressy's (1994) suggestion that both near-death and mystical experience unfold in stages of increasing complexity and meaning.

CONCLUSIONS

This study compared responses on Hood's Mysticism Scale from a sample of individuals who had come close to death, contrasting those whose experiences met the criterion for NDEs and those whose experiences did not. NDErs had higher scores on the Mysticism Scale and on each of its eight conceptual categories; two thirds of the NDErs reported mystical experiences at the time of their close brush with death, compared to none of the comparison survivors; and depth of the NDE, as measured by scores on the NDE Scale, were positively correlated with scores on the Mysticism Scale. A factor analysis of phenomenological features during the close brush with death yielded two related but distinguishable factors representing mystical and near-death elements.

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