

Involuntary Memories During Severe Physical Illness or Injury

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This paper reports an analysis of the features of 122 cases of persons who became ill or even came close to death, but who survived and afterward reported that during the experience they recalled memories of earlier events in their lives. The life review varied widely in its form; the number of memories recalled ranged from only one or two to the subject's entire life. Moreover, few of the subjects reported seeing earlier events of their life "all at once," which makes the popular phrase "panoramic memory" a misnomer. One group of 54 cases was compared with a group of 54 other cases in which the feature of the life review did not occur. There were no significant differences between the two groups with regard to nine common features. The life review occurs as one feature among several others of equal or greater importance in the total experience. Its function, if any, remains to be elucidated by further research.

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Many persons who are ill (and sometimes ostensibly unconscious or near death) but who then recover recall unusual experiences that occurred during this illness; such experiences have become widely known in recent years as near-death experiences (NDEs). We have no reliable estimate of the frequency of such experiences. One report claimed from a survey that as many as 8 million persons had had such experiences in the United States (Gallup and Proctor, 1984). This seems like an overestimation, possibly wildly inaccurate, because of ambiguity in the question asked. Even so, it seems certain that hundreds of thousands of Americans have had unusual experiences when close to death. Many persons who have had such experiences have been ignored, rebuffed, and ridiculed when they have tried to describe their experiences to persons who have not had them. A fear of being judged to have "hallucinated" and of being bracketed with persons who are mentally ill often inhibits free communication of the experiences to other persons. Psychiatrists need to be aware of these experiences and willing to listen to accounts of them when offered.

The experiences usually include a number of components, such as enhanced cognition, a great sense of serenity, autoscopic visions, apparent paranormal perceptions, enhanced perception of light (often perceived in relation to a tunnel), and a review of the experi-

encer's life up to the moment of the crisis (Greyson and Stevenson, 1980; Owens et al., 1990). This paper provides data and interpretations concerning the feature of the life review.

It is well known that elderly persons frequently think about the past events of their life and experience a life review. In them, however, the review is usually slow and occurs in segments that come into consciousness from time to time (Butler, 1963). This contrasts with the extreme rapidity with which the memories often occur in persons who confront (or believe they are confronting) death unexpectedly.

One of the earliest persons to describe such an experience, when he nearly drowned, was Admiral Francis Beaufort of the British Navy. He wrote, "The whole period of my existence seemed to be placed before me in a kind of panoramic view" (Beaufort, 1847/1858). The word panoramic occurs frequently in later descriptions of this phenomenon, especially following its use by Kinnier Wilson (1928) to describe the involuntary memories that occur frequently in epileptic persons. As will be seen in the examination of actual cases, the phrase panoramic memory is something of a misnomer, and life review permits an easier inclusion of a wide variety and number of involuntary memories that are usually not presented as a panorama.

Earlier writers have focused attention on the life review as a feature of the experiences of persons coming near death (Noyes and Kletti, 1977); the present report, however, provides the first analysis of the circumstances and features of a large series of cases.

Sources of Case Material and Methods

This paper presents data from two series of cases. Series I consists of 68 published accounts of the life

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review drawn from a wide variety of sources, the majority of which were not medical journals, but newspapers, magazines, and autobiographies.

The cases of this first series appear to have been published mainly because of the impression the life review had made on the person involved. The reports are usually brief, sometimes secondhand, and rarely mention other features of the person's experience when near death. They are thus, to some extent, representative of the life review considered in isolation; they are not representative of the life review in the context of the larger experience that many persons who come close to death (or think they have come close) report.

Series II consists of 54 cases investigated by our group at the University of Virginia. Among a total of 417 cases of persons who have reported to us an unusual experience during an illness or accident, these 54 are all of those in which the person concerned reported having had during the experience a life review, which we defined as involuntary memories of events in his or her life that had occurred anterior to the subject's present situation. Nearly all these cases were reported to us voluntarily by persons who had learned of our research, mainly from articles in newspapers and magazines. Because of the feature of self-selection, the series does not provide a representative sample of these experiences, such as we could obtain in a systematic survey of a sampled population. On the other hand, the persons submitting their reports to us had no reason to think we were especially interested in the life review; indeed, about half the cases of the series had been investigated before we decided to analyze their data for this particular feature. We therefore think that this series is representative of the place of the life review within such experiences.

For the 54 cases of series II, we have an account of the experience in the subject's own words in 52 cases and notes (written after an interview by I. S.) for the remaining two cases. In addition, 43 subjects completed an extensive questionnaire, of which four questions (in a later revision, five questions) addressed the subject of the life review; the remaining questions provided information about demographic details and other features of the subject's experience. Fourteen of the subjects were interviewed; some others furnished additional information about details in correspondence.

Series I had a marked preponderance of male subjects (50 males, 16 females, 2 n.s.). The reports rarely gave specific ages for the subjects, but it is clear that the majority were adults, although several were children.

In series II, there were 34 female subjects and 20 male subjects. Fifty-three of the subjects were American and one was Australian. Their ages at the time of the experience ranged between 3 and 74 years. The median age was 27.5 years; the mean age was 27. The median inter-

val between the experience and its reporting to us was 13.5 years, and the mean interval was 18 years.

We identified what seem to us to be the principal circumstances and features of the life review and tabulated their incidences in the two series. The meagerness of data in the cases of series I did not permit any count of some features that could be examined in series II, for which we had the advantage of the results of our own investigations.

We also compared the circumstances and the features of the experiences in series II with a comparable group of subjects who did not report a life review. We chose 54 subjects without a life review by selecting every eighth case from our files. If the selected case had a life review or if it lacked a completed questionnaire or sufficient information for an adequate comparison, the next case on the list was selected. The groups with and without the feature of the life review were closely similar with regard to age and sex.

Results

Incidence of the Life Review

As mentioned, the cases of series I probably were published because the reported experience contained a life review, which was not true of the cases in series II. The incidence in that series was 54/417, or 13%. This is a much lower incidence than that reported in most other series. Sabom (1982) reported an incidence of only 3% among 61 nonsurgical patients reporting an NDE. Noyes and Kletti (1977), however, reported that 60 (29%) of 205 subjects they investigated mentioned having had a life review; Ring (1980) found that 12 (24%) of 49 subjects who had had an NDE reported a life review. An earlier publication of our own research reported a similar higher incidence; we found that 21 (27%) of 78 subjects mentioned having had a life review during an NDE (Greyson and Stevenson, 1980).

Circumstances of the Experience

Table 1 gives the several categories of the circumstances in which the life review occurred.

TABLE 1
Circumstances of Subject's Experiencing the Life Review

	Series I (N = 66)	Series II (N = 54)	Non-LR Cases (N = 54)
Accidents	74%	54%	24%
Near-drowning	26%	11%	7%
Accidents, falls	29%	33%	15%
Wounds (e.g., gunshot, burns)	14%	4%	2%
Near-accident (without injury)	6%	6%	0
Illness, surgery	26%	46%	63%
Allergic/drug reaction	0	0	9%
Depression	0	0	4%

Table 2 shows divisions of the cases according to whether the illness or injury with which the experience was associated came on suddenly or gradually. We categorized cases of drownings, falls, accidents, and wounds as having a sudden onset. We placed illnesses and surgical operations in the category of "gradual onset," with the following exceptions: When a cardiac arrest, serious ventricular arrhythmia, or other hemodynamic crisis occurred in a person otherwise thought to be well or during a procedure (investigative or surgical) and when the NDE coincided with the crisis, we categorized the onset as "sudden." We also considered anaphylactic shock as sudden in onset. Regarded in this way, 84% of the cases in series I and 50% of those in series II (for which there was adequate information) had a sudden onset of the experience.

In series II, 35 subjects furnished information concerning their expectation of imminently dying at the time of their experience, and of these, 30 (86%) said that they expected to die. The meagerness of detailed data in many cases of series I did not permit quantitative appraisal of this feature in that series. Nevertheless, the reports of 32 (47%) of the 68 cases explicitly mentioned that the subject had expected to die.

Duration of the Experience

No one timed any of these experiences. Nevertheless, many of the informants ventured an estimate of the duration of their experience. In other cases, we can assign outer limits of duration from our knowledge of the circumstances. In cases of near drowning, the outer limit of immersion without death has been reckoned as (usually) between 3 and 5 minutes (Giammona, 1971). In many of the cases in which a near drowning occurred, however, the duration of submersion was much shorter than 5 minutes, especially when the subject was seen to fall overboard or to sink (if he had been swimming) and was quickly pulled out of the water. The duration of the experience is even shorter in cases of falls during mountain climbing or other situations. A free fall or a slide down a nearly vertical cliff cannot last more than a few seconds. Also in some other instances, the duration can be known to be extremely short, as in two cases of series II, in which a child darted into traffic and narrowly escaped being hit by an automobile.

There are, however, other cases in which the whole

experience was much longer, and the life review in such cases may have occurred more slowly, *e.g.*, when the subject suffered from a grave illness, as in the cases reported by Ritchie (1991), Scott (1931), and Uzkuil (1934).

Temporal Location of the Life Review in the Complete Experience

Most of the subjects, especially those of series II, for which we elicited more detail, described features of their experience besides the life review, such as enhanced perception of light, being "out of the body" and able to look down on the physical body as from above, enhanced cognitive functions, and unusual serenity (Greyson and Stevenson, 1980; Owens et al., 1990). Their accounts (and other information furnished) did not always locate the life review in a temporal sequence of events within the whole experience. Nevertheless, some accounts did do this. For example, in four cases of series II, the life review was the sole feature of the experience. In six other cases of series II, the life review was the first (or a very early) feature of the experience. In other cases, the life review occurred in the middle of the experience or even near its end (*e.g.*, Ritchie, 1991).

How the Memories Occurred

Table 3 presents data about the sequence (if any) in which the memories were presented. The most common order of presentation of the memories was from birth or childhood to the present (anterograde). There were comparatively few subjects who reported the phenomenon of simultaneous or "panoramic" presentation of the memories. In series I, only four (15%) of the 26 cases having information on this feature described the memories as "simultaneous"; in series II, only 12 (27%) of 44 subjects described their life review in this way.

A substantial majority of subjects of both series reported a high speed in the presentation of the memories. In series I, 43 (92%) of the 47 subjects whose reports provided this information included this feature; in series II, 15 (75%) of 20 subjects reported this feature. Nevertheless, three of the subjects in series I thought that the memories were presented slowly; one subject

TABLE 2
Rapidity of Onset of Experience

	Series I (N = 63)	Series II (N = 54)	Non-LR Cases (N = 54)
Sudden	84%	50%	41%
Gradual	16%	50%	59%

TABLE 3
Sequence of Memories

	Series I (N = 26)	Series II (N = 44)
Simultaneously, "all at once," "panoramic"	15%	27%
Anterograde (from birth or childhood to present)	62%	43%
Retrograde (from present back to childhood)	15%	11%
No particular sequence	8%	18%

of series II stated the memories "flashed before my eyes, but slowed on certain events."

The high speed of the occurrence of the successive images seems not to have impeded a detailed examination of the events remembered. A case cited by Flammarion (1922) illustrates the combination of high speed in the presentation of the images with an awareness of the details in each image:

During this fall, which could hardly have lasted two or three seconds, his entire life, from his childhood up to his career in the army, unrolled clearly and slowly in his mind, his games as a boy, his classes, his first communion, his vacations, his different studies, his examinations, his entry into Saint-Cyr in 1848, his life with the dragoons, in the war in Italy [1857], with the lancers of the Imperial guards, with the Spahis, with the riflemen, at the Château of Fontainebleau, the balls of the Empress [Eugénie; wife of Napoleon III] at the Tuileries, etc. All this *slow panorama* [italics in the original] was unrolled before his eyes in less than four seconds, for he recovered consciousness immediately (Flammarion, 1922, p. 267).

When subjects commented on the perceptual quality of the memories, they nearly always described them as unusually vivid or "realistic." In series I, 23 (88%) of 26 subjects commenting on this quality used words like "vivid" to describe the images. In series II, the incidence of this feature was similar (27 [84%] of 32 subjects).

Most of the subjects described viewing as a spectator the scenes of their life, and some used the metaphor of a moving picture screen they were watching. Other subjects, however, said that they "relived" the events remembered. The words "relived" or "seemed to relive" occurred in either the reports or the questionnaires of 13 (24%) of the 54 cases of series II.

In contrast to the experience of "reliving," eight subjects of series I and three of series II described having a sense of detachment from the memories, almost as if they were watching a review of someone else's life.

Alterations in Sense of Time

Among the 54 subjects of series II, 45 commented on the sense of the passage of time they had during their experience. Among these 45 subjects, 44 noted an alteration in the sense of time: 71% experienced a sense of timelessness, 20% reported that time seemed to become faster, and 7% said that time seemed to become slower.

Number and Types of Memories Presented

Table 4 provides summaries of the number of memories occurring during the life reviews.

Memories of "long-forgotten" events. Among the 68 subjects of series I, 26% said that their life review in-

TABLE 4
Number of Memories Remembered

	Series I (N = 58)	Series II (N = 48)
"Whole life," "everything"	59%	44%
Many	12%	21%
Some	29%	10%
One or few	0	25%

cluded memories of events long forgotten; 20% of the 54 subjects of series II said this of their memories.

Age of earliest event remembered. In both series, there was scant information about the subject's age at the time of the earliest event remembered in the life review. One subject of series I, however, said that he remembered his birth, and five others recalled events occurring when they were 2 years old or younger. In series II, two subjects said that they remembered their conception or birth, another remembered being carried home from the hospital soon after birth, and four others said that they remembered events that occurred when they were 2 years old or younger.

Judgment About the Events Reviewed

Among the subjects mentioning this feature, 55% of those in series I and 48% of those in series II reported experiencing some judgment of their life. In both series, two thirds of those experiencing a judgment said they conducted it themselves; the rest said they were judged by a "being of light," "God," or some other benign presence. These beings were never described as censorious; indeed, they were invariably perceived as loving and all-forgiving.

Aftereffects of the Life Review

Some of the subjects singled out the life review as having had a profound effect on their later behavior. This was particularly likely to occur when the life review was the sole or obviously the principal feature of the experience.

Additional Observations

Among the 122 cases, eight subjects (three in series I and five in Series II) had had an NDE on two or three different occasions. In six cases, a life review occurred during only one NDE; however, two subjects of series II (one of whom had had two NDEs and one of whom had had three NDEs) reported that a life review had occurred on each occasion.

Comparison of Cases With and Without Life Review

The cases with and without life review differed somewhat in the circumstances that precipitated the experience. First, the cases with life review occurred more often in association with accidents than with illnesses

(see Table 1). Second, there was a higher incidence in the life review cases of circumstances that led us to judge the onset as sudden instead of gradual (see Table 2); the difference, however, was not statistically significant.

Table 5 compares 10 main features of the cases with and without a life review. Only one of the differences was statistically significant: that of a judgment about the person's life.

In two earlier papers (Owens et al., 1990; Stevenson et al., 1989–1990), we examined the question of whether those reporting NDEs were actually near death at the time of the experience, and we found that many of them were not, in fact, near death. We therefore examined all available medical records for the two groups of 54 cases analyzed here to learn whether the seriousness of the medical condition of those reporting life review differed from that of those not reporting life review. It did not: Among the 11 life review subjects for whom we had medical records, seven (64%) were in danger of dying; of 24 subjects not reporting life review, 16 (67%) were in danger of dying.

Discussion

Comparatively Low Incidence of the Life Review in Series II

As we mentioned earlier, the incidence of the life review in series II was 13%, a much lower incidence than that reported in most other series of NDEs.

In our own collection of cases, we may attribute some of the difference between the present and earlier reports of the life review to a more precise definition of the life review that we adopted for inclusion in series

II. In particular, a number of persons reported having had a life review on the questionnaire, but subsequent investigation revealed that they had misunderstood the nature of the question.

All of the cases of the other three earlier series having higher incidences of life reviews (those of Greyson and Stevenson, of Noyes and Kletti, and of Ring) were investigated in the 1970s and published in the late 1970s or not later than 1980. Most of the cases of the present series (series II) were reported and investigated in the 1980s and up to 1993. These later cases may have included a considerable number in which the circumstances did not facilitate the life review. We have already drawn attention to the tendency toward a higher frequency in the experiences with life review of suddenness of onset, such as occurs with drowning, falls, and accidents. A series containing substantial numbers of patients with illnesses (rather than ones involved in accidents) would perhaps show a lower incidence of the life review.

The Wide Variety of Life Reviews

The most important finding of the present study is the evidence of a wide variety in the life reviews the subjects experienced. Noyes and Kletti (1977) drew attention to this variety earlier, but our data demonstrate it in a quantitative way. The popular picture of the "whole life" being seen all at once (panoramicly) is false as a generalization about these experiences. Some subjects do indeed have this kind of experience, but the majority do not.

Popular writings on this subject also often emphasize the feature of a judgment conducted with a saintly presence or "being of light." In both of the series examined here, however, only about half the subjects reported any judgment of the events reviewed, and in most of these cases, the subject made the judgment without any apparent outside aid.

The Difficulty in Appraising Claimed Aftereffects of the Life Review

As we have emphasized, the life review is (almost always) only one feature in an experience that may include seven or eight other components. Persons not having a life review also claim aftereffects (see Table 5). Even coming close to death without any accompanying unusual psychological experience may be followed by significantly altered behavior (White and Lid-don, 1972). Moreover, it is also often difficult to decide whether the changes occurred suddenly and immediately, as a direct result of the experience, or later and more gradually, as the person reflected on and tried to understand the entire experience. We shall not, therefore, venture an opinion here about the significance of

TABLE 5
Features of Cases With and Without Life Review

	Life Review Cases (N = 54)	Non-LR Cases (N = 54)
Out-of-body experience	67%	80%
With view of physical body	44%	41%
Without view of physical body	22%	39%
Tunnel, blackness, etc.	46%	48%
Enhanced light	83%	70%
Being of light or other presence	48%	37%
Deceased relatives seen	28%	11%
Enhanced cognition	46%	37%
Positive affect	72%	78%
Life change	83%	80%
Judgment (by self or other being)	41%	6% ^a
Altered time sense	81%	74%
Faster	17%	6%
Slower	6%	4%
Timeless, time had no meaning	59%	65%

^a $\chi^2 = 18.8$, $df = 1$, $p < .001$.

the life review in claimed aftereffects of near-death experiences.

Personal Time versus Solar Time

Our subjective appraisal of the passage of time (personal time) appears to depend on the number of different images that we experience during a period of solar time. It is difficult for persons who have not experienced a speeding up of imagery to credit the reports of the subjects of these cases who claim to have reviewed their entire life in what can only have been a matter of a few seconds of solar time. Particularly difficult to believe is the further assertion that the events reviewed were carefully examined or even relived. If the life review during NDEs provided the only examples of such high speed of successive imagery, skepticism would be warranted. In fact, however, similar disruptions in the experience of subjective time occur with hallucinogenic drugs (Grof, 1976; Terrill, 1962). They can also be induced under hypnosis (Cooper, 1956).

Interpretations of the Life Review

Mikorey (1960), who had investigated 24 NDE cases with a life review, asserted that the life review occurred only after the subject had abandoned hope of survival and resigned himself or herself to death. According to him, the imperiled subject withdraws attention from sights and sounds, and their place in consciousness is taken by "harmless memory pictures of the past," which have a "euthanasia effect." Noyes and Kletti (1977) offered what is the same interpretation (apparently without being aware of Mikorey's paper). They subsumed NDEs, including the life review, under the term depersonalization and, like Mikorey, believed that "in response to the threat of death, the endangered personality appeared to seek the safety of the timeless moment. There death ceased to exist as the person immersed himself in his experience" (Noyes and Kletti, 1977, p. 192). Kugler (1990) also agreed with Mikorey and suggested a possible neurophysiological process for the release of the life review.

Support for the interpretation favored by Mikorey, Noyes and Kletti, and Kugler might come from a further analysis focused on the question of whether the subjects had given up hope of survival and surrendered themselves to death. The data reviewed here, however, show that although a substantial number of the subjects thought they were about to die, others did not. Moreover, many, perhaps most, subjects who have NDEs think they are about to die and yet comparatively few have the life review. Also, as the psychopathologist's term, depersonalization seems inappropriately applied to persons who, afterward, say that they were having unusually vivid imagery and that they never felt better

in their lives than when they were seemingly about to die.

Any comprehensive interpretation of the life review must attempt to answer an important question raised by NDEs in general and by the life review feature in particular. An examination of available medical records for the cases from our collection showed that many subjects were physically near death at the time of their experience. Many persons having these experiences, especially those who really were near death, report that their mental processes seemed to be not diminished but enhanced during the experience (Owens et al., 1990). The feature of the life review provides further evidence that, at a time when the person's physiological condition might lead us to expect that mental functioning would be diminishing or even absent, it is instead speeding up and becoming more vivid. This feature suggests that the relationship between mental and physical functioning may not be as straightforward as many scientists have long assumed.

In addition, one may ask why, among all possible mental processes, a considerable proportion (13% in our series) of persons having these experiences report the feature of a life review. The life review is by no means a pleasant experience and almost half of our subjects believed they underwent a judgment of their past conduct. If death is extinction, that would seem to be of no value and also far from the "euthanasia effect" suggested by Mikorey (1960). Is it possible to ascribe to the life review some function or purpose other than that of obtunding the fear of death as one senses its approach? Perhaps it would have a purpose if life continues after death, because the person experiencing it might profit from it by amending his or her conduct. This is what many of those who have had a life review when near death assert. One of the most frequently reported changes claimed to result from coming near death is loss of the fear of death (Greyson and Stevenson, 1980). Although convictions about life after death provide no evidence for it, the life review makes sense to those who believe that they will survive death.

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