



# The life review experience: Qualitative and quantitative characteristics



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## ARTICLE INFO

### Article history:

Received 8 June 2016

Revised 4 October 2016

Accepted 21 October 2016

### Keywords:

Autobiographical memory

Mental time

Episodic memory

Near death experience

Scale

Narrative

## ABSTRACT

**Background:** The life-review experience (LRE) is a most intriguing mental phenomenon that fascinated humans from time immemorial. In LRE one sees vividly a succession of one's own life-events. While reports of LRE are abundant in the medical, psychological and popular literature, not much is known about LRE's cognitive and psychological basis. Moreover, while LRE is known as part of the phenomenology of near-death experience, its manifestation in the general population and in other circumstances is still to be investigated.

**Methods:** In a first step we studied the phenomenology of LRE by means of in-depth qualitative interview of 7 people who underwent full LRE. In a second step we extracted the main characters of LRE, to develop a questionnaire and an LRE-score that best reflects LRE phenomenology. This questionnaire was then run on 264 participants of diverse ages and backgrounds, and the resulted score was further subjected to statistical analyses.

**Results:** Qualitative analysis showed the LRE to manifest several subtypes of characteristics in terms of order, continuity, the covered period, extension to the future, valence, emotions, and perspective taking. Quantitative results in the normal population showed normal distribution of the LRE-score over participants.

**Conclusion:** Re-experiencing one's own life-events, so-called LRE, is a phenomenon with well-defined characteristics, and its subcomponents may be also evident in healthy people. This suggests that a representation of life-events as a continuum exists in the cognitive system, and maybe further expressed in extreme conditions of psychological and physiological stress.

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## 1. Introduction

“My whole life flashed before my eyes” is a common description of the life-review experience (LRE), as people report watching or re-experiencing series of their life-events (Blackmore, 1993). “I was back in my early childhood; and from then on, it was like I was walking from the time of my very early life, on through each year of my life, right up to the present” (Moody, 1975, p. 66), is a description that emphasizes the chronological order of LRE, though different chronological varieties exist as well. Following such reports, LRE has been defined as the vivid perception of images of one's life, encompassing either the person's whole life-span or several significant events (Greyson, 1983; Van Lommel, Van Wees, Meyers, &

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Elfferich, 2001). LRE usually follows a chronological order, mostly from early to late age, but there are also reports of the other way around. The number of distinct life events viewed in LRE may range from several images to the impression of a rapid flow or simultaneous presentation of numerous images depicting one's entire life, and may extend even to the future (Groth-Marnat, 1989; Stevenson & Cook, 1995). Many experiencers describe substantial affective effect of LRE, as is exemplified in the following description: "most things were pleasant to see, some made me very embarrassed. In fact, revulsion and guilt took away any good feelings, making me so very sorry for certain things I had said or done. I hadn't just seen what I had done, but I felt and knew the repercussions of my actions. I felt the injury or pain of those who suffered because of my selfish or inappropriate behavior" (<http://www.iands.org/experiences/nde-accounts/>). Accordingly, LRE is often reported to have a profound impact on the experienter's life (Blackmore, 1993).

Most LREs are reported among people undergoing a near-death experience (NDE), with no correlation to its severity (Osiris & Haraldsson, 1977; Parnia, 2014). A prospective study of survivors of cardiac arrest found that 8 out of 62 (13%) resuscitated who experienced NDE also reported a LRE (Van Lommel et al., 2001). Another analysis of several hundred NDE cases found 24% of them to report some degree of 'revival of memories' during the experience (Kelly & Kelly, 2007, p. 386). Not only NDE, from 205 persons who had encountered life-threatening danger, 60 survivors described an experience resembling LRE or "panoramic memory" of their life (Dlin, 1980; Noyes & Kletti, 1977). Interestingly, LRE was also described in aged-people elaborating on their anticipated death but not among suicide attempters (Butler, 1963; Rosen, 1975).

Several theories attempted to explain LRE's underlying mechanism. From a psychological point of view, Greyson (1981) characterized LRE as a hallucinatory escape from the actuality of death by a 'mental time travel' to "past experiences of a relatively timeless quality" (Noyes & Kletti, 1977), though LRE may include images from all phases of life, and the experience may be experienced as unpleasant or fearful (Blackmore, 1993). Another psychological motivation may be the need to reassess one's life achievements, a motivation that may apply to such a mental process also in individuals who never explicitly described an experience of LRE (Butler, 1963). LRE may also be explained with respect to the underlying functional neuroanatomy. Several authors have argued that decrease in blood oxygenation, derived of low blood pressure such as in temporary cardiac arrest, may account for the different clinical manifestations of NDE. One proposal is "cascade of events", starting with neuronal disinhibition in early visual cortex, spreading to high-order ones which may lead to a more complicated cognitive experiences (Blackmore, 1993; Greyson, 1998; Rodin, 1980). Another proposal relates NDE's manifestations to hypoxia in specific regions, such as tunnel vision due to suffering of the optic nerve, or out-of-body experience due to reduced blood flow to a "water-shed" region at the temporo-parietal junction (Blanke & Arzy, 2005; Mobbs & Watt, 2011). LRE may therefore be related to altered activity in "water-shed" areas in the prefrontal, medial temporal or parietal cortices, which process autobiographical memories (Arzy, Collette, Ionta, Fornari, & Blanke, 2009; Bancaud, Brunet-Bourgin, Chauvel, & Halgren, 1994; Blackmore, 1996; Gloor, 1990; Penfield & Jasper, 1954; Vignal, Maillard, McGonigal, & Chauvel, 2007).

NDE generally appears in people in life-threatening situations. However, its components, such as out-of-body experiences, are also found in as much as 10% of the general population and in patients with several neurological and psychiatric disorders (Blackmore, 1993; Blanke, Arzy, & Landis, 2008; Blanke, Landis, Spinelli, & Seeck, 2004; Gabbard, Twemlow, & Jones, 1981; Irwin, 1985). While out-of-body experiences drew much scientific attention in the recent years (for review see (Blanke, 2012)), this was not the case with LRE. Moreover, the phenomenon of out-of-body experience was not only important by itself, but also taught us much about bodily processing and spatial aspects of the human self (Blanke, 2012; Blanke & Arzy, 2005; Blanke & Metzinger, 2009). As out-of-body experience is the hallmark of spatial alterations in NDE, LRE is the hallmark of temporal alterations. Thus, LRE may be important to the understanding of temporal aspects of the self. Moreover, the cognitive research of autobiographical memory focuses mostly on discrete life-events rather than the continuous life-experience as in LRE (Brunec et al., 2015). LRE may therefore prove to be significant for the neurocognitive understanding of the self in time and extended autobiographical memories.

In view of the central role of re-experiencing the continuum of one's life-events to the temporal self, we hypothesized that the subcomponents of LRE may be found also in the healthy population. To this aim, in the present study we characterized the phenomenology of LRE, and then investigated its radiation in the healthy population. Following recent recognition in phenomenological psychology that quantitative and qualitative research methods should complement each other (Brewer & Hunter, 1989; Campbell, 1975; Cook, Campbell, & Day, 1979; Cronbach, 1975; Firestone, 1987; Gage, 1989; Glesne & Peshkin, 1992; Patton, 1990), we used here first qualitative analyses and in-depth interviews to characterize LRE, and then quantitative measurements on a large cohort of subjects, to evaluate the prevalence and characterize varieties of the LRE in both healthy subjects of different ages and backgrounds as well as patients with NDE/LRE.

## 2. Methods

### 2.1. Qualitative experiment

*Participants.* 7 patients (4 males) that underwent LRE as part of an NDE were analyzed in the qualitative part of the study. 4 patients (2 males, mean age  $\pm$  SD:  $47.7 \pm 7.1$  years) were recruited for the study and interviewed by the authors, while 3 more (2 males) were analyzed from online video descriptions. All recruited patients gave informed consent before participation in the study.

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