

Subjective time distortion during near-death experiences: an analysis of reports

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Abstract – Studies with individuals who have faced life-threatening situations show that a majority of them report an apparent slowing down of external time. Moreover, a majority of individuals who had near-death experiences (NDEs) reported that subjective time had changed. Anecdotal reports of NDEs reveal feelings of apparent timelessness, which is a typical feature of altered states of consciousness. However strongly the sense of time is changed in NDEs, not many systematic studies assessing exactly how time is altered during NDEs exist. Therefore, we conducted an empirical content analysis of a web-based databank from the *Near Death Experience Research Foundation*, which has collected NDE reports since 1998. To cover a considerable time range, we selected individual reports from three time periods: (a) 1998 to 2001, (b) the year 2010, and (c) January to March 2017

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(in total N = 196). We concentrated on responses to the question: “Did time seem to speed up or slow down?” 127 of the 196 individuals reported a change in subjective time (65%). 120 of these 127 persons reported a feeling of timelessness (94%). The different narratives bear witness of individual variations, but they can still be interpreted as the impression of an apparently lost sense of the passage of time. Our study complements individual anecdotal reports showing an extremely distorted subjective time impression in a majority of people who suffered an NDE.

Key words: Near-death experience – subjective time – timelessness – online survey

Subjektive Verzerrung der Zeitwahrnehmung während Nahtoderfahrungen: Eine Analyse von Berichten

Zusammenfassung – In Studien mit Menschen, die in lebensbedrohliche Situation gerieten, schildert der Großteil der Befragten, dass sich die äußeren Abläufe verlangsamten. Zudem berichtet eine Mehrheit der Menschen mit einer Nahtoderfahrung (NTE) von einer Veränderung der subjektiven Zeit. Qualitative Analysen von NTE-Berichten weisen zudem darauf hin, dass die Wahrnehmung von Zeit sehr stark verändert ist, und dass nicht wenige Betroffene dabei ein Gefühl scheinbarer Zeitlosigkeit haben – ein typisches Merkmal von veränderten Bewusstseinszuständen. So auffällig verändert der Zeitsinn während NTE zu sein scheint, gibt es bis heute wenige Studien, die systematisch erfasst haben, wie genau Zeit während NTE verändert ist. Zu diesem Zweck führten wir eine Inhaltsanalyse einer webbasierten Datenbank der *Near Death Experience Research Foundation* (Forschungstiftung Nahtoderfahrung) durch, die seit 1998 NTE-Berichte sammelt. Um eine angemessene Zeitspanne abzudecken, wählten wir 196 verfügbare Schilderungen aus drei Zeiträumen aus, nämlich (a) von 1998 bis 2001, (b) das Jahr 2010 sowie (c) Januar bis März 2017. Insbesondere analysierten wir die Antworten auf die Frage nach Veränderungen subjektiver Zeit: „Schien die Zeit schneller zu vergehen oder langsamer?“ Von den 196 Personen antworteten 127 mit einer Veränderung von Zeit (65%). Von diesen 127 Personen berichteten 120 vom Gefühl der Zeitlosigkeit (94%). Die qualitativ ausgewerteten Erzählungen sind Zeugnis über individuell verschiedene Narrative, die dennoch dahingehend interpretiert werden können, dass für die meisten das Gefühl für den Zeitverlauf scheinbar verloren gegangen ist. Unsere Studie bestätigt die anekdotischen Berichte eines extrem veränderten subjektiven Zeiterlebens während einer NTE.

Schlüsselbegriffe: Nahtoderfahrung – subjektive Zeit – Zeitlosigkeit – Online-Studie

Background

Distortions of subjective time are a prominent sign of altered states of consciousness (ASC), such as reported in meditation, in music-induced trance, or under the influence of hallucinogenic drugs. What people often report is a modulation of the perception of self, space, and time, which can culminate in the apparent loss of a sense of self and in a feeling of timelessness (Berkovich-Ohana et al., 2013; Wittmann, 2015). During ASCs, the awareness of self and time are intensely

modulated, in the extreme leading to the feeling that time is standing still (Berkovich-Ohana & Wittmann, 2017) – a reported universal experience in mystical states when time is not experienced at all, and the self becomes one with the world (Achtner, 2009).

Extreme distortions of time are also often reported after accidents and frightening events, when people experience a slowing down of external events, as if the world, relative to the observer, were moving in slow motion. These experiences are typically interpreted as stemming from an increased physical arousal level in a fight-and-flight situation, which transiently speeds up internal processes to a maximum (Arstila, 2012). There is plenty of anecdotal evidence of a slow-motion effect in situations of extreme danger, for example, accidents that nearly or really happened or violent incidences. Nobel-Prize laureate John C. Eccles' testimony is famous: He saw a truck approaching his car and yet, since all external events seemed to unfold as if in slow motion, he had time to engage the clutch, shift, and accelerate, thereby managing to avoid a collision (Popper & Eccles, 1986: 529). The interpretation would be that since the brain works more quickly in a dangerous situation, the world outside seems to be moving more slowly. The function of such an acceleration, which has been linked to the activation of the *locus coeruleus* norepinephrine system, is clear. When the organism processes environmental stimuli faster than usual, it enables one to respond more readily and, at least potentially, to react to threats in time (Sara, 2009; Arstila, 2012). In a similar way, cardiologist Michael Sabom (2008) described two main components of what he termed *Acute Dying Experience* (ADE) as (1) psychological (or peritraumatic) dissociation and (2) heightened arousal, which includes speeding thought, narrowing and sharpening perception, and preparation for action. Sabom described ADE as an adaptive strategy in traumatic situations that improves the chances of survival as a last resort (Sabom, 2008: 210).

Near-death experiences (NDE) are classically described as an intense psychological experience of unclear nature, characterized by an altered state of consciousness occurring during an episode of apparent unconsciousness and usually in life-threatening situations (Moody, 1975; Sabom, 2008; van Lommel, 2010). Near-death experiences are sometimes treated as authentic reports of the transcendent reality lying beyond the boundaries of the ego and the confines of space and time (Greyson, 2005) or as constructions of consciousness within a body in crisis (Noyes & Kletti, 1976). Medical observations of what is now called NDE have been reported since the mid-nineteenth century (Alvarado, 2011). NDEs thereafter attracted the interest of philosophers and psychologists, like French philosopher Henri Bergson, who considered them to be facts supporting his theory of two independent memories (Evrard et al., 2017). Reports of such experiences are even known from pre-Christian history, ranging from Sumerian to Roman and classical Greek culture (Moraldi, 1987; Nahm, 2009), and they are also mentioned in the Bible (2 Corinthians 12:1–4).

Research on NDEs gives wide coverage to the special motifs (light, tunnel, out-of-body experience, calmness, etc.) that people often report. The focus is on issues, such as incidence and phenomenology (Moody, 1975), clinical and medical factors (van Lommel, 2010; Parnia et al., 2014), anthropological, cultural and historical comparisons (Murphy, 2010; Nahm, 2009; Nahm & Nicolay, 2010; Pasricha, 2008; Zaleski, 1995), and psychic phenomena (Kelly et al., 1999). Regarding cultural differences, a representative survey on NDEs was conducted in Germany in the 1990s (Knoblauch et al., 2001). East and West Germans differed in some aspects of the contents of reported experiences, e. g. attributable to the differences in media coverage of NDEs, which was practically nonexistent in East Germany until 1989, and related to differing religious practices.

One phenomenon related to the sensed passage of time could be of importance for understanding what happens during NDEs. Time is often reported to speed-up, slow down, stop, or become totally irrelevant during an NDE. Systematic collections and analyses of reports from individuals who had a NDE show that 78% of people who thought they would die felt an altered passage of time (Noyes & Kletti, 1977). In that study, the item ‘changes in subjective time’ was the second most prominent item, but beyond the statement that time seemed altered, no further information was collected. In another study, Bruce Greyson discovered that 64% (n=47) of the respondents with NDEs reported that “time stopped, lost meaning” (Greyson, 1983), and 18% (n=27) of individuals in a cardiac-care unit who had an NDE reported “an altered sense of time” (Greyson, 2003). In a study using a question about subjective time with three different, pre-specified answer categories, which we will analyze here as well, 74% of respondents replied “Everything seemed to be happening all at once; or time stopped, or lost all meaning” (Greyson, 1990). As a matter of principle, subjective evidence of altered time is a key aspect of Greyson’s NDE scale – a validated questionnaire for the identification and measurement of NDEs (Greyson, 1983, 1990).

Since subjective time is so prominently changed in NDEs, similar to other incidences of altered states of consciousness induced through various psychological or pharmacological means (Wittmann, 2015), we wanted to further analyze a publicly available web-based databank from the Near Death Experience Research Foundation, which contains a growing number of self-reports. The major goal of this explorative study was to empirically assess what individuals who had a NDE report about their subjective perceptions of time. We employed this databank, which contains among other questions the NDE scale developed by Greyson (1983, 1990), pertaining to a multitude of phenomenal aspects of NDEs. One question of Greyson’s NDE scale is explicitly concerned with the felt speed of the passage of time. This enabled us to analyze respondents’ responses to this specific question. We also quantified two questions in the online inventory relating to whether past and future events had been experienced.

Methods

We chose a web-based databank from the Near Death Experience Research Foundation, available online at <http://www.nderf.org/index.htm> as a source for reports on near-death experiences (NDEs). The website contains a growing number of reports (over 4300 in 27 different languages; last access July 2017) which are available under the category NDE stories. The website was created by the medical doctor Jeffrey Long and the attorney Jody Long, both from the USA. Its stated aim is to be a free public service which does not allow proselytizing. In their own words, they “welcome and encourage all people of all backgrounds, nationalities, countries, and religions to read and participate on the website” for research and study of these extremely altered experiences.

The archive is constantly fed with new reports which go back to the starting year of 1998. The reports are accordingly self-selected and no external validation of the reports is possible. In the discussion we address the limitation of our study design. To handle a workable sample and to cover a considerable time range, we chose to select reports available in English language from three time periods: (1) 1998 to 2001 ($n = 87$; no. 1 to 87), (2) the year 2010 ($n = 63$; no. 2067 to 2139), and (3) January to March 2017 (what was available until data collection in March 2017; $n = 46$; 4267 to 4314). We chose these three time intervals because they represent the first years of data collection (1998–2001), the present year (2017), and one year in between. The website contains reports in 30 languages, some of which were translated into English by volunteers. The chosen reports for our study were either originally written in English or translated from another language into English; therefore, some cultural heterogeneity can be assumed. Included in our data analysis were only first-hand reports. Reports by third persons writing about what a relative or friend experienced were excluded.

Participants who want to share a personal NDE are asked to first fill out a questionnaire (background information) containing demographic data, as well as the pre-specified circumstances around the time of the NDE experience (“check one of the following: illness, surgery-related, childbirth, heart attack, allergic reaction, drowning, etc., other”) and the physical condition at the time of the experience (“1. clinical death: cessation of breathing or heart function; 2. life-threatening event, but not clinical death; 3. illness, trauma or other condition not considered life threatening; 4. Other”). For later analyses, the answers to (1) and (2) are categorized as “life-threatening event.”

Second, a self-report can be provided without any stated specifications. Third, a detailed and structured questionnaire based on Greyson’s (1990) NDE scale is presented. The questions in this questionnaire can be filled out in any preferred length. For example, participant no. 4265 answered the question “Did you encounter or become aware of any deceased (or alive) beings?” *Yes. The woman I saw, I remembered who she was later. It was a former girlfriend who died from*

a car wreck two years earlier. It was her but she looked different, like time had aged her in a perfect way since she had such a youthful appearance for the mature woman she was supposed to become.

The databank questionnaire is divided into four categories pertaining to: NDE elements (n = 25 questions); god, spiritual, and religion (n = 15 questions); concerning our earthly lives other than religion (n = 25 questions); after the NDE (n = 11 questions). Within the category of NDE elements, one question is related to the experience of time during the event (time passage: “Did time seem to speed up or slow down?”) and two to the time perspective (past orientation: “Did scenes from your past come back to you?”; future orientation: “Did scenes from the future come to you?”). Time passage refers to the experience of time at the present moment; past and future orientations are concerned with the experienced perspective of time. The answers to these three questions were particularly targeted in this analysis of time experiences in NDEs. Participants could check the options “yes” or “no” in each question. In the “passage of time” question, three pre-specified answer categories exist: (1) “No”; (2) “Time seemed to go faster or slower than usual”; (3) “Everything seemed to be happening at once; or time stopped, or lost all meaning”. In addition to these pre-formulated answers, participants were encouraged to give their own narratives. We are aware that these answer categories insinuate a direction and could lead to an overestimation of the quantity of reports regarding a “change in passage of time”. Nevertheless, we consider the analysis of the questionnaire as a first step to assess the number of specific changes. Moreover, subjects wrote their own narratives of personal experiences, which we additionally used as examples.

Results

The three questions based on Greyson’s questionnaire (1990) pertaining to the experience of time were analyzed. A qualitative content analysis of the narrative elements of the reports was also undertaken.

1. “Did time seem to speed up or slow down?”

Regarding the answer categories (1) “No”, (2) “Time seemed to go faster or slower than usual”, and (3) “Everything seemed to be happening at once; or time stopped or lost all meaning”, 127 of all 196 individuals reported a change in subjective time (65%; answer categories 2 or 3). For the three separate samples, the numbers are as follows. Sample 1 (1998–2001): 40/87 (46%); sample 2 (2010): 59/63 (94%); sample 3 (2017): 28/46 (61%). Almost all of the 127 people reporting changes in subjective time indicated an impression of timelessness (answer category 3; see Discussion section for our conceptual interpretation of timelessness). Three participants indicated a speeding up of time (2%), 8 participants reported a slowing down of time (6%), 120 out of 127 reported the sensation of timelessness (94%); note that a small overlap (102% reporting) occurs, as 4 individuals reported two different types of experiences.

Typical examples of non-standardized answers were: “Unaware of time passing” (participant no. 2074); “While there, I lost touch with all constructs of time and order” (2078); “Concept of completely distorted time: Long? Short? – it didn’t make sense” (2126); “I could feel infinity. It was as if I was completely aware of how long I had been there and the absence of time all together, at the same time – if that makes sense. I remember being surprised later when I learned I was only out for 30 seconds or less” (4277); “Time was not thought of. Time was just time.” (2405) “Otherwise, it was nonexistent or everything was ‘now’” (4294); “During such experiences, linear apprehension of time disappears. It is as if time stops or everything happens simultaneously. Difficult to be described in words.” (4301)

To see whether the experience of timelessness was bound to a special circumstance and condition leading to an NDE, we looked at potential differences among the 196 participants between those who reported a change in subjective time ($n = 127$) and those who did not ($n = 69$). From the 127 individuals who reported noticing a change in time 111 had an NDE in life-threatening circumstances (87%). Out of the 69 participants who had had no sense of change in time passage 58 also had experienced an NDE during a life-threatening event (84%). Thus, subjective time distortions seem not to be related to whether the NDE was life threatening or not.

2. “*Did scenes from your past come back to you?*”

118 of 196 participants stated that they had seen past events (60%). Separate results of the three samples were: sample 1 (1998-2001): 44/87 (51%); sample 2 (2010): 60/63 (95%); sample 3 (2017): 14/46 (30%).

Typical reports, sometimes in a panoramic fashion or in a judgmental way, were: “My past flashed before me, out of my control. Not a literal review but a review of feelings; good and bad. About how much fear is at the core of our mistakes” (57); “I saw my life scrolling past. I saw only very pleasant times and I left that very quickly. It’s more like feeling than seeing” (4297); “I was in a room with others present. I reviewed my life and made judgments on it. The judgments were not harsh, it was more of an acknowledgement of what I had done that was not right” (85); “When I stopped, my whole past history of my life flashed in a moment. Every thought, every feeling, every act, flashed through me” (4300); individual reports are registered that speak of going back in time beyond an individual’s lifetime: “Then I saw the past come up out of the ground; the last 400 years anyway. [...] Whether they are my past lives or just „past lives”, I can’t say. But then, that doesn’t matter to me. What does matter is that I learned a great deal from these lives as if I had lived them” (62).

3. “*Did scenes from the future come to you?*”

106 out of 196 participants (54%) reported that they had seen future events: sample 1 (1998-2001): 35/87 (40%); sample 2 (2010): 59/63 (94%); sample 3 (2017): 12/46 (26%).

The future scenes were of a visionary sort, which Ring (1980) called „personal flash-forwards”, that is, not in the sense of mere imagination of a possible future, but sometimes of prophetic content regarding a personal destiny or concerning the world: “I saw a flash of myself with a man I knew to be my future husband and he was holding the 2-year-old boy I saw in the picture” (13); “I know I was shown events that would come to pass and people I would meet if I went back, but unfortunately, or fortunately, I’ve forgotten them all. Sometimes when things happen in my life, and I meet people I know I’ve physically never met before, I ‘know’ and ‘remember’ them” (47); “The health problems I am having now. I seemed to know they were going to happen my dad even said I was going on and on about muscle spasms, which I have now, and they didn’t start until three months after the hospital visit” (2123); “After that I saw that the world in what we live will stop to exist the way it is, as of 2020; I saw buildings burning, and hungry people” (4282); “Scenes from the world’s future. They transmitted to me events of the future, in particular about our religions. [...] And I saw fragmented things of other people and events. But, those things were taken from me once I found myself in the room” (4297).

Discussion

The focus of our investigation was the experience of altered time passage reported by people who had experienced an NDE and shared this experience in an online report. So far, knowledge from systematic data collection has revealed that the perception of time changes in 78% of the cases during an NDE (Noyes & Kletti, 1977). Moreover, Greyson’s earlier work (1990) with his time scale, on which the web-based inventory used here is based, showed that 74% of respondents answered with “Everything seemed to be happening at once; or time stopped, or lost all meaning”. Here we confirm this earlier finding with data from later time periods in that 65% of participants of the selected sample (n = 196 person) reported changes in subjective time. Of the 127 who indicated that they had experienced changes in subjective time, 120 (94%) stated that they had felt what we summarized as feeling of apparent timelessness, i. e. temporal order was not perceived, time and duration lost their meaning. This amounts to 61% of people with NDEs who reported the feeling of timelessness. Some variance over the three sample times (1998–2001: 46%; 2010: 94%; 2017: 61%) is detectable regarding the percentage of people stating the feeling of timelessness. However, there is no trend (an increasing or decreasing percentage) which could be explainable by differences in public perception and knowledge of the phenomenon over time that could have affected the interpretation of the phenomenon; cultural differences in media coverage are known to change the contents of reported experiences (Knoblauch et al., 2001). Most likely the variance is due to uncontrollable sample differences related to the open access policy of the online databank (see limitation paragraph below).

Our further analysis found no differences due to NDE circumstances between those participants who reported a change in subjective time ($n = 127$) and those who did not ($n = 69$) in the 196 self-assessments. Both groups reported mostly a NDE in life-threatening circumstances (respectively, 87% and 84%). However, the assessment of what is perceived as a life-threatening situation is complex, as it can be reconstructed post-hoc when medical and environmental conditions are communicated to the subject. Moreover, in our analyses, we didn't distinguish between situations with concomitant organic threats or only perceived threats, as we had to rely completely on the available data. Noyes and Kletti (1977) suggested that a hyper-alertness factor is associated with life-threatening situations as an adaptive response.

The label 'feeling of apparent timelessness' as a phenomenal part of differently-induced altered states of consciousness (e.g., meditation or mystical experiences, or after ingesting hallucinogens) is part of an overall experiential narrative of becoming one with the surroundings, the sense of a collapse of the past and future into an eternal presence, or the notion that time is not existent, or, at least, it does not have significance even when its passage is felt (Wittmann, 2015). Here we corroborate earlier findings and show quantitatively the appearance of massive time distortions in a large sample of people who experienced NDEs.

We also quantified the appearance of the past perspective (60%), which often comprised panoramic memories of one's own life "flashing past" and as related to moral judgments of bad and good acts. This coincides with many anecdotal reports which are complemented by systematic research on life-review experiences, i.e. people watching or re-experiencing series of their life events (Katz et al., 2017; Stevenson & Cook, 1995). Related to a future perspective, 54% of reports were concerned with coming events which partly contained prophetic or pre-cognitive narration (i.e. an illness that would later actually befall the individual). We cannot make any statements on the veridicality of these anomalous experiences, but they confirm that people in NDEs do have exceptional experiences.

Regarding the question of changes in the subjective passage of time, we may overestimate the occurrence of the category 'timelessness'. This is because this category was pre-specified. However, subjects also had the category "No" to choose from, which was selected in 36% of the cases. Since participants who answered "Yes" chose the category labeled "timelessness" in 94% of the cases, one can at least say that the dominant experience (even if it is overestimated) is of this specific nature. The qualitative reports that were added by the participants are testimony of individually different narratives which still can be interpreted and summarized as an extremely altered temporality to the degree that the passage of time seemed absent.

However practical the labelling of the answers as "timelessness" may be, one has to take into account that we relate them to the pre-specified answer "Everything seemed to be happening at once; or time stopped or lost all meaning". The individual self-reports are indicative of a

much richer and varied phenomenology. Further studies noting these differences have to be conducted. Another issue that has to be tackled in further investigations is that people endorsed the item “changes in time” for the whole NDE. However, it is a widely accepted theory that NDEs comprise sequential phenomena (Sabom, 2008; Noyes & Slymen, 1979; Holden, 2009). People may have experienced timelessness at one stage of the experience, but not at others. This is another aspect that has to be taken into consideration in a future study. The current analysis was motivated by the fact that besides Greyson’s reports (1983, 2003) there are no systematic studies concerning the experience of time distortion during NDE. The use of the easily accessible online databank however is related to some serious limitations. The reports are necessarily retrospective and the time span since the incident happened varies considerably. Also, there is the naturally broad variety of triggers of NDE (illness, surgery, combat experience, accident, etc.) as well as a variety of experiences ranging from clear NDEs to only probable NDEs and categories such as fear-of-death-experiences.

We are aware that by analyzing an open databank standards of controlling the input are rather limited. The limitations of our study can only be overcome by a systematic study that better controls who takes part and with what background of experience. New questions can then also be asked. What may cause the radical change in subjective time during NDEs is still a completely open question. Future studies could focus specifically on the question of subjective time and combine the assessment with questions concerning (1) the content and the motifs of the NDEs, as well as (2) inquiring about related forms of experiences. (Ad 1) Common motifs are substantial elements in NDE reports, such as a tunnel, a light, and an out-of-body experience, of which several have been identified as appearing universally (Ring, 1980; Gallup & Proctor, 1982; Sabom, 1982; Schröter-Kunhardt, 1993). The question would be whether time distortions depend on the stage and sequence of narrative elements. (Ad 2) Common forms of experience relate to NDE experiences being characterized by ineffability, timelessness, a sense of hyper-reality, a feeling of being dead, acoustic perceptions, out-of-body experiences, etc. (Sabom, 1982). Next to “timelessness” one could ask whether other forms of experience are registered at the same time. For example, in altered states of consciousness induced through different techniques, the feeling of apparent selflessness (i.e. losing the feeling of a physical and mental self) often goes hand in hand with the feeling of timelessness (Wittmann, 2015). These questions should be addressed in further empirical investigations. In general, we confirm that the notion of timelessness and other subjective time distortions are of importance for understanding the phenomenology of NDEs.

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