



Near-Death-Experiences: Between Spiritual Transmigration and Psychopathological Hallucinations

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Abstract. The research in the field of Near-Death-Experiences (NDE) shows us various reports of the process of dying which contradict the widely shared medical opinions in the past. Based on these observations, Raymond Moody developed and differentiated specific stages in the process of dying. Although these stages cannot be empirically proven, for some of the described stages scientific explanations can be found. For example, NDE have been reported in the terminal phase of life-threatening diseases, which can be explained by neurobiological changes of transmitter substances in dying person's brains. Further explanatory models fall back on other influences, e.g. side effects of sedative medication, psychedelic drugs, meditation, epilepsy, migraine or oneiroid psychosis. The large number of different visual experiences (tunnel vision, encounter with close relatives, bright lights, God, flowering gardens etc.) which appear in the course of a NDE, can be interpreted as visual hallucinations or oneiroid dreams as a consequence of medication or endogenous opioid production; in addition, a genetic predisposition could play an essential role. A NDE possibly is a final protective mechanism of the brain in agonizing patients, which leads to feelings of euphoria and experiences of hallucinations, caused by the explosive release of neurotransmitters. Positive emphasis should be given to the fact that in periods of increasing secularization the investigations of NDE have provided new hope of a life after death in the past 30 years. For many patients, caregivers, physicians and nurses, Moody's book was a great help in overcoming fears of dying and death. In spite of all legitimate criticism, the "nine elements of the Near-Death Experiences", still inspires researchers to have a different look on the process of dying.

Keywords: Near-Death-Experience, out of body experience, external physical perception, astral journey.

“In fact there is (...) no death, because that, what is referred to as death, is nothing else than the ostensible death. It is like taking off the earthly dress which we have worn throughout our lives as our ‘body’, but that we will never wear again. The ‘body’ stays behind, slowly resolving in its elements. The soul however, gradually gets liberated from the dependence on its material body.” (Karl May, 1951)

Introduction

In our life only one thing seems to be certain: death. The question for the meaning of life is inseparably connected with the question for the meaning of death. From a biological standpoint, the dying living being makes way for new life and by this enables evolutionary processes. Subjectively, we experience death as the main threat in life. The fear of death is accompanies us lifelong; repressing any thoughts of death, we have the impression that only other people are touched by death. But in the end, every death around us fuels this fear.

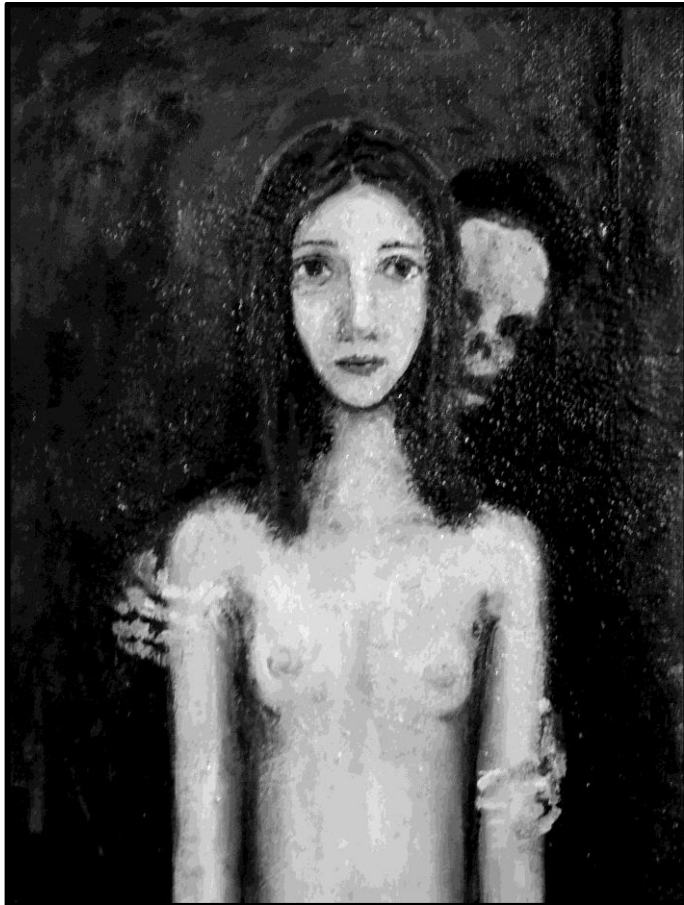


Fig. 1: Human life is not indefinite. Beauty and youth is fleeting and it goes by very quickly. Death stands already behind us, before we expect it. “The Death and the Maiden” (unknown painter, private property)

For millennia, the churches were the only rays of light in this mental dilemma, because almost all religions provide hope of a passage towards a new life, freed of all earthly insignificance. For many people, the thought of their own non-existence is inconceivable and is replaced by the image of the soul floating into heaven. Furthermore, it is a comforting thought that the beloved deceased person exists "*some-where*". Not for nothing, we are talking about decedents "*returning home*" - a promising expression that implies meeting this person again. Faith in an existence after death can endow this unfathomable tragedy with meaning (Kasten & Geier, 2009).

Nowadays, at least in the western cultural tradition, many people cast a critical eye over the churches. In view of all the wars, disasters, famines and epidemics as well as personal life crises it seems to be more and more difficult for a rationally thinking person to believe in God and guardian angels watching over us and steer our life in the right direction. The attempt of the modern civilization to explain everything rationally undermines hope for an existence after the death, for an existence of a "soul". At the same time the fear of the unavoidable end of life grows in the course of the technological progress.

The success of the book "*Life After Life*" by Dr. Raymond A. Moody (1975), showed the longing for another existence after our earthly life explained on a scientific basis. Moody, a physician, had collected extensive reports of people who were dead in a clinical sense, but could be revived with modern methods of the emergency and intensive medicine. Astonishingly many could remember this state and it was even odder that Moody found out that the affected persons reported similar phases which they had gone through in the process of dying.

In the idealized sequence of Moody's stages, a person is hearing how the physician says "exitus" (in the truest sense of the word, i.e. the soul has left the body). Shortly after that, he perceives a sonorous noise and passes a long, dark tunnel. Now, from some distance, he can see his own body from the outside and observe what happens. Sometimes he meets other beings; especially often these are well known deceased persons, who welcome him. Instead of panic the affected persons report overpowering feelings of cheerfulness, love and peace. Many tell about a

light being with a divine radiation and under its influence they see a retrospective of their whole life. On this occasion, scenes of the past run like a terrifically quick slide show in the inner eye. Some get to a barrier and know that they must go back into their physical body. Later the affected persons try to report their experiences to other people, however, they notice that they cannot really describe how it was "up there" and they stop with their reports, anxious to be judged as lunatics. Everybody is still marked by this experience, many change their lives, search sensible new aims for themselves and nearly everybody has lost the fear for death.



Fig. 2: This woodcut from the 15th century shows how the soul, shortly after the death, leaves the body through the mouth. On the left side the devil is waiting to consume the soul, on the right a saving angel comes through the window (Graphic from: Ploss, H. & Bartels, M.: *Das Weib in der Natur- und Völkerkunde*. Leipzig: Th. Griebens's Verlag, 1908, ü. 365).

Moody's book gained an enormous popularity (Thiede, 2006). In the following years several research projects tried to investigate the stages drafted by Moody. In 1978 the International Association of Near Death Studies was founded (ANDS). In this period the results of researches gave new faith in an existence without our mortal veil and had an immense effect particularly in esoteric circles. However, Moody was not the first, who wrote about NDE. Long before, the Greek philosopher Platon had described in his book "The State" (approx. in 370 B.C.) the experience of

a man called *He* who died during a war and came back to life 12 days later. What *He* reported (from his supposed coma phase), contains elements which strongly resemble the nowadays described Near-Death-Experiences.

In 1918 the book *"On the Threshold of the Unseen"* of Sir William F. Barrett was published, which deals with visions on the deathbed. Here it was reported that dying persons often believe to see other worlds before their death, some spoke to other deceased people, some heard music, others saw how their soul left the body. In 1975 the German author Johann Christoph Hampe published in his book *"Death is completely different"* the first volume about these reported experiences. Until then, most physicians were persuaded of the fact that death is a painful matter in whose course the patient is fulfilled with fear of death. As a result of the oxygen deficiency it comes to feelings of panic and, due to the decrease in blood circulation, the brain finally finishes its functions. Reports of people who died with a smile on the face led to doubts about this view and to the notion that, nevertheless, death could be completely different. Though the book was printed almost at the same time as Moody's volume, Hampe hardly attracted internationally attention.

Kenneth Ring, the first president of the IANDES, published a work in 1980 in which he consulted 102 people who have been reanimated; about 50% of them had experienced the stages reported by Moody. Consequently, Ring discerned five steps of human experiences close to death, which differ slightly from Moody's stages: 1. Feeling of peace, 2. Separation of the body, 3. Entry into the dark, 4. Seeing the light and 5. Entry into the light.

Alternative explanations

The famous German singer Nina Hagen admitted during an interview in December 2011 a quite different explanation of her NDE:

Hagen: "... *As a child, I have read that Jesus healed humans. This has always fascinated me. I searched intensively for this unknown being named 'God'. And with 17 years I have finally found him.* "

Journalist of the Kulturspiegel: *"How did you manage this?"*

Hagen: *"I had a Near-Death-Experience. I have died, appeared briefly in the homeland of the souls, called God for help, and he answered and saved me (...)."*

Kulturspiegel: *"Did LSD play any role in your Near-Death-Experience?"*

Hagen: *"Right. By this, you may once again see that God's ways are mysterious!"*¹⁾

The main topics of researches in the field of NDEs in the last four decades were: Is there really a phase sequence of dying? And if so, are the Near-Death-Experiences described by Moody only bound to the fact that a person is dying? Do we really look over the fence in a heavenly world or can we give scientific explanations? How can we explain NDE from a neuro-scientific point of view?

The tunnel experience

The first step in the sequence of the Near-Death-Experiences of Moody contains that a person suddenly has the feeling to rush through a dark tunnel; a process that wakes up the association the soul leaves the body. A virtually typical tunnel experience described Gruber on the Internet page www.nahtod.de: *"Suddenly I saw in the distance a brightly shining star. Because I was in full consciousness, I thought only: 'What is this?' Tensely I pursued the process. First slowly, then faster and faster, I moved in a dark tunnel in the direction of the star. The closer I came to this light, the greater it became, and the more I felt it's unbelievable attraction. When I had arrived at the end of the tunnel, the light had the form of a luminous triangle, and I did not want to go further."*²⁾

The problem of this report is that the author was not dying. According to his information his health was in an extremely good state. He had the experience while falling asleep, and jumped out of the bed, when the experience became too intensive and recognized a rushing similar to a thunderstorm. Obvious one can have the tunnel experience also without any threat of life.

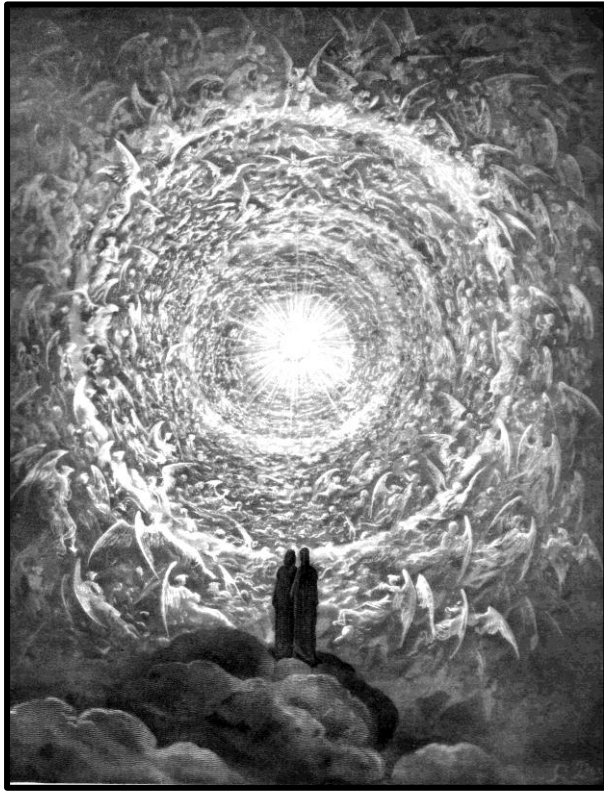


Fig. 3: Many persons report about a tunnel experience with the abandonment of their body and the entry into the white light like it is shown here in an illustration of Gustave Doré to Dantes “Divine Comedy” (from: Bayer, F.J.: Dantes Goettliche Koemoedie in Bildern von Gustav Doré. München: Verlag Josef Müller, 1924, Fig.-Nr. 134)

An interesting theory, from where the tunnel experience may result, states, the experience is a repetition of one’s own birth. The tunnel corresponds to the natal canal, the bright light is the first sight of the enlightened delivery room, the external-physical experience descends from the separation from the body of the mother, and the feeling of floating comes from the lifting by the nurse (Grof & Halifax, 1977). However, to prove this theory is hardly possible. The human verbal memory does not work in the time of birth, the child cannot see the natal canal, because it has closed eyes and also after birth it cannot arrange sensations properly like bright light and floating. Blackmore (1982) checked the hypothesis whether people who had been born by a Caesarean section do not have gone through the tunnel experience in their NDEs. However, she came to the result: Vaginally born people reported the tunnel experience as often as the Caesarean section-born.

The literature is not very uniform concerning the time, when this tunnel experience appears. The classical sequence of Moody noted it before the escape from the body, however, there are also descriptions that the tunnel opens only after the ret-

rospection of one's life and the meeting with the white light and apparently leads then into another world (see. e.g.: Cooper, 2011).

One must not be going to die to have the tunnel experience, after taking a psychedelic drug Ronald Siegel (1998) saw an explosion in a round dance from golden light. At its place stood scaffolding with a fluorescent frame. The frame bent to a long, spiral tunnel of full polygons and other geometrical things. The opening, similar to mouth of a tunnel, turned round to Ronald Siegel, while the tunnel itself writhed like a Euclidean queue pulsating, pregnant with light and form.

In 1928 Klüver had already recognized "tunnels" as an essential base of the visual system and a neuroscientific explanation of the tunnel seeing refers to neuronal assemblies in the brain, which are responsible for an investigation of depth (Cowan, 1982). Psychedelic drugs or the breakdown of inhibiting neural networks can give the impression to fly through a tunnel. Another neuroscientific theory comes from Blackmore and Troscianko (1989). This hypothesis refers to the cortical magnification factor. Only in the Fovea we can see really sharp, in the periphery less neurons are involved in the analysis of the visual impressions. The receptive fields, which are small in the centre, become larger to the periphery in the visual field. This specific anatomical feature could explain why a massive spontaneous unloading, caused e.g. by oxygen starvation during dying, leads to the illusion that something comes up and passes.

However, possibly one must not go to the difficulties of involved neurobiological explanation models for the tunnel seeing. Augustine (2006) had gathered descriptions which show that in the Near-Death-Experiences not only the typical tunnel experience was described, people saw also many other geometrical figures. For example, Greyson and Bush (1992) described a 28-year-old woman; in her NDE she saw black and white circles. A dying patient of Lindley et al. (1981) recognized a spider net, build from bright lights. Hampe (1975) cited a case study in which a net of brightness vibrated with cold energy.

Leaving the own body

NDEs are a very popular subject and therefore it is not astonishing that TV- and print media deal with it over and over again. The following example of the abandonment of the body was taken from the *Stuttgarter Nachrichten*, it describes very typically a floating about the scene: *"During the medical intervention I felt myself suddenly beyond my body. At half-high I floated in the operating room. In an observer's role I watched strangely indifferent what happened with my body there below. At first this was very irritating, because I could not understand the meaning. Then feelings of rest, peace, and luck emerged. I felt no need to return into my body. Suddenly, unexpected, together with the feeling of a big strain, the reality took me back again as if nothing had happened. My body and my consciousness were unified again."*³⁾



Fig. 4: This Japanese woodcut shows the ghost of a woman, she died during the birth of her child, who wanders around as a ghost in a somber scenery (Taken from: Ploss, H. & Bartels, M.: *Das Weib in der Natur- und Völkerkunde*. Leipzig: Th. Griebens's Verlag, 1908, p. 787).

The most frequent alternative explanation of the floating feeling arises from the fact that operated patients received anesthetics and painkiller. Tranquilizers

like Benzodiazepines work at the GABA receptor, and feelings of a "levitation" are a well known undesirable side effect. The feeling to leave the own body can be produced experimentally with the anesthetic medicament Ketamin. Typical is the development of a dissociative anesthesia with pain freedom under extensive preservation of the reflexes. Ketamin often leads to abnormal sensations, nightmares and hallucinations. The users are awake, however, they have the sensation that her body does not belong anymore to them and that they are only external observers. With higher dosages no more recollection exists for the events (Felfernig et al., 2006). Ketamin works primarily at the glutamate NMDA-receptor complex. Glutamate is one of the most important exciting messengers of the central nervous system and Bonta (2004) holds this receptor complex not only responsible for Near-Death-Experiences, but also for other psychopathological disturbances like e.g. schizophrenia or dissociative amnesia. Ketamin produces a blocking effect at the NMDA receptors of this system. In addition, it also restrains the cholinergic system, i.e. it prevents the emission of Acetylcholine (which we need for consciousness, thinking and memory). On the other hand, it shows a slightly exciting effect in Opioid receptors (discreet euphoria) and stimulates the GABA system (relaxation). In addition, it restrains the peripheral Katecholamin resumption. Typical physical results are a raised heart frequency, quickened pulse and high blood pressure. With higher dosage it comes to a damping of the switching circuits between Thalamus and neocortex; while the Limbic system is activated and the peripheral nervous system is blocked.

Ketamin is often preferred in the emergency medicine, because it has blood-circulation-stabilizing effects; sometimes it is given in a low dose also for patients with chronic pains (Webster & Walker, 2006). It cannot be excluded that the Near-Death-Experiences which often were described by victims of traffic accidents, wars or natural disasters, are merely due to the fact that they got Ketamin in emergency intervention (Jansen, 1995, 1997). Naturally, the majority of the descriptions of NDEs arose from the area of emergency medicine or intensive care units, because, otherwise, most affected persons would not have survived to report about their ex-

periences later. Nowadays, in the drug scene, Ketamin often is used as a fashion drug to experience Near-Death-Experiences without having to be seriously ill (Corazza & Schifano, 2010).

However, one must neither be dying nor have got Ketamin to float beyond his own biological body; strong feelings, e.g. panic, are sufficient. Gabard and Twemlow (1991) reported how a naval officer in a school class of cadets showed a grenade and allowed the pupils to hand it around. Suddenly the mine fall down so unhappily that the protection pencil freed itself. The teacher knew that only few seconds remained for action, nevertheless, he stood there paralyzed as icebound. The next what he experienced was that he left his body, going through the upper end of his head, and he floated under the ceiling and went away. Then he realized that the mine had not exploded, because it was only a practice grenade and he was pulled back into his body.

There are other experiences which lead to the impression to leave the body. Cooper (2011) reported about an African man who was tormented, left his body and looked down from a point below the ceiling. The man had eaten nothing for days, so that, in this case, the hunger may have promoted the dissociation of his body.

In the following example a woman reports what happened to her during the course of a relaxation exercise: *“I suppose that I managed the relaxation exercise in this evening especially well or deeply, I do not have another explanation for what happened then. Suddenly I stepped out of my body from the middle of the forehead as a glistening bright ball. (...) I whizzed (everything went terrifically fast) in the form of this light glistening ball from my forehead through the closed balcony door outward and then upwards in the direction of the sky. I saw the scenery under myself, the stars about me and it was night as it was night in reality. I pulled up a very stretchy tape behind myself (as an endless long elastic band) with which I was connected from my forehead to my body there below in the bed. I whizzed so several kilometers away, and felt an unbelievable feeling of ease and freedom. It was no dream, I did not sleep, I was even very awake. Suddenly the thought arose - only for the fraction of one second - the tape could tear and not find the way back me. At the*

same moment I felt dreadful fear and it did a violent, very unsightly jerk (thus, as if one lets go a very long pulled elastic band suddenly and it is snapped back) and I was pulled back terrifically fast and very violently into my body and entered exactly in the forehead again where I had left it. All that lasted only approx. 10 - 15 seconds, more not. Afterwards, my relaxation training was finished of course, because this experience had turned me up very much, because I did not know what it was. I knew only one thing - I had not dreamed all that and I WAS this ball. Since this day I think that I do not exist only in my body.“⁴⁾

The phenomenon described here is known in esoteric circles as an "astral journey" and often appears in relaxation exercises and in particular in meditation. In scientific terms, the distance from one's own body is called "external-physical perception" or "out of body experiences" (OBE). These OBEs are marked by (1) feeling beyond the borders of the own body, (2) perceptions from a raised perspective, mostly below the room ceiling (3) looking down at the own body. Most people tend to explain these experiences on a religious or spiritual basis; in the majority the faith is encouraged that one can leave his or her physical cover. About 8-12% of the normal population and about 50% of people with drug experiences have already had such an experience, most, however, only once (seldom twice) in their whole lifespan for a very short moment (Green, 1968; Blackmore, 1982; Blanke & Thut, 2006).

Rodabough (1985) developed a simple explanation of the levitation phenomenon: For the purpose of a clear description of sequences we are trained since our childhood to imagine scenes from above. E.g. sketches of an car-accident are drawn always from the bird's-eye view. If a patient lies seriously injured in the emergency room, and can see nothing, but hears, then it could be that one imagines the situation intuitively from a perspective from above.

Beside death nearness, torture, relaxation and drugs there are several neurological disturbances in which the patients suffer regularly from external-physical phenomena. OBEs were observed in particular in patients suffering from epilepsy and after vascular caused brain damages. Frank reported in 1995 three migraine patients with such phenomena, one of his single case studies was a male person

who had during the migraine-attack the feeling to stand for some seconds beside himself.

Interestingly, some schizophrenic patients suffer from the feeling to leave their body, too. Möller (1975) reported about a female patient. She had lived together with her mother who suddenly died. Alone in the flat she began to hear voices; Möller continues: "*Lately it seemed to her not to be herself! She recognized herself from the outside: she saw her thoughts and actions from the perspective of another person.*" (Möller, 1975, p. 23)

An incomprehensible point is that people can observe themselves from the outside perspective, while they continue activities. It is hardly conceivable that the human mind leaves the body and, nevertheless, operates further. Augustine (2006) has gathered several such examples. A report came from a marathon athlete who ran during a training a 12-miles-long distance. On this occasion he left his body and observed himself from a perspective above, while he still was running. A police officer, who had left his body during a chase of a suspect, could observe himself from above, watching his body and other people in action. After the culprit could be arrested, he returned into his body (Alvarado, 2000).

In the 1990ies there were several studies, which undertook the attempt to prove that the affected persons had really left their body. Systematically Michael Sabom (1982) had gathered reports of patients who were able to report things which they could not have seen from their position (e.g., on the OP table). He checked the validity by comparing the reports of NDE-patients with the OP protocols and showed astonishing details. A patient could describe precisely which scales and where the pointers at the back of the resuscitation device were, while he lay unconscious and with closed eyes in his bed. The critics questioned immediately whether these reports, nerveless, can be fictitious? Today each of us knows hospital TV serials in which the physicians reanimate patients nearly in the frequency of a conveyor line. Hence, Sabom compared the descriptions of patients, who had external-physical experiences with the fictitious reports of patients who could remember

absolutely nothing at all. His results show that the reports of the external-physical group were considerably truer and more detailed than the fictitious descriptions.

Is it really true, what the NDE-people see, when they float under the rooms ceiling? Tart (1968) laid a paper with 5 numbers on a shelf over the bed of an experimental subject who often reported about external-physical experiences. After the following night the woman had an external-physical experience and could give the number correctly. However, this attempt was criticized immediately, because nobody had watched whether the test person has had a look on the shelf.

A publication of Clark (1984) became famous: The soul of a cardiac infarction patient left during her resuscitation her carnal body, floated first in the operating room and then through the ceiling outside. From above she could recognize clearly the hospital and, by chance, she saw on a windowsill on the second floor a single tennis shoe. Clark checked the suitable window immediately and found the sports shoe there. This story was valid for ten years as a proof of the fact that the mind can really leave the earthly cover. But in 1994 Ebborn et al. checked the circumstances and found out that one could recognize a shoe on this windowsill also from below and they speculated that the woman could have seen it during her admission into the hospital.

There were various other attempts to prove that people can see things in their OBE state which one can detect only from a position from below the ceiling. E.g., the task objects were laid on cupboards in the corners of the operating room or the emergency room. Figures were laid on a high shelve which could not to be seen from below, in one investigation a slip of paper with symbols was put on the top of a monitor hanging on the wall; in another double-blind study a laptop was directed upwards and showed randomized well-chosen pictures from which also the investigators could find out only afterwards whether these agreed with the descriptions of the patients. Basically, one single unquestionably documented case would already sufficient here to prove that one really can leave his or her body. In the investigation time of one year, Holden and Joesten (1990) found only two patients with external-physical experiences. One was an Armenian, who was unable to speak Eng-

lish; by bad luck the other did not lie in the preserved OP hall. Lawrence (1997) found three men who had left their body, but none of them had risen high enough to read the hidden slip of paper. Parnia et al. (2001) interviewed 63 patients with cardiac arrest, four had experienced NDEs, two had left their body, but nobody had risen up to the room ceiling. During five years Sartori (2004) collected reports of people with cardiac arrest, 15 told about close death experiences and eight of external-physical experiences. However, none of the affected persons in this investigation had left his or her body so far that he or she could have recognized the marked slips of paper in luminous colors from above.

Peter and Elizabeth Fenwick (1997) reported about a fight in the 2nd World War during which a soldier was shot by attacking airplanes, he floated in the sky and saw his own body lying in the sand. When he awoke, he recognized the seriously injured body of another man straight across himself, which he had not seen in his vision. In another case a woman had several OBEs during her pregnancy; she floated under the ceiling, saw the empty room, but never her own body. In another report a woman with rupture of a Fallopian tube pregnancy, floated during the operation room and from above she saw a small round tray with a letter on it. The authors of this study questioned a nurse, who insisted on the fact that in the OP hall neither a round tray nor any letter had existed (all last studies cited from: Augustine, 2006).

Buzzi et co-authors (2002) ascertained countless small mistakes in the descriptions of patients with out-of-body-experiences. In one of their cases a man floated above his bed and looked down; the problem was, the man who lay there carried long underpants, he himself never wore such a thing. In another case a young girl saw during her levitation her teacher next to her sickbed, who looked after her and sang a song to her. In the reality the teacher had never visited her in the hospital. Another girl told she has seen her mother from the room ceiling perspective; however, her mother has had a completely changed nose and looked like a pork monster. A female patient who had her external-physical perception during a

bypass operation saw her heart beside her body from above; however, in such interventions the heart is never taken out.

In other works a large number of OBE-patients with brain damages were examined. Often a lesion in the area of the temporo-parietal crossing was ascertained; predominantly concerned were 75% of patients with a right-sided brain damage. It was supposed that external-physical experiences are correlated with a defective integration of visual, tactile and proprioceptive information of the body, enforced by vestibular dysfunctions (Shining & Thut, 2006). This does not lead only to feeling to leave the body, often the patients report strange changes of their body pattern, which are known, otherwise, only by psychedelic drugs. Some affected person suddenly had the feeling an arm or a leg was extended endlessly or feels too short. Blanke et al. (2002) reported about a patient who, with closed eyes, had the feeling her upper part of the body moves in the direction of her legs.

Already in 1941 and 1955 Wilder Penfield and his colleagues had shown in two patients, that the impression to leave the own body, can be caused by electric stimulation of certain regions in the temporal lobe of the brain. One patient suddenly shouted: „*Oh God, I leave my body*“, another started to feel strange, then asked whether she still was here and afterwards she had levitation-feelings. All these phenomena were shown only after right-sided stimulation. The right temporal lobe of the brain is known to be responsible for mystic and religious feelings (van Tellingen, 2008).

During the investigation of a woman suffering from epilepsy, Blanke and his colleagues found out that OBEs could be released by electric stimulation of the Gyrus angularis in the area of the connection between parietal and temporal lobe. The Gyrus angularis is a processing centre for the perception of the own body in which information from all involved systems join (sensory feelings, balance, seeing). The authors of this study came to the theory that Out-of-Body-Experiences are based on mistakes of the brain, which calculates a wrong position (Blanke et al., 2002). During the intervention the woman was conscious and able to communicate with the doctors. During the first stimulation with 2-3 mA the woman reported about per-

ception changes - she felt, as if she fell down or was pulled back in the cushions. With 3.5 mA the patient suddenly had the feeling to be beyond her body, however, could see only her legs and her abdomen. Two other attempts led to the same result, accompanied from a feeling of levitation and flying scarcely under the ceiling. The Gyrus angularis lies in the area of the temporo-parietal crossing which is responsible for the visual-spatial perspective of our own body (Blanke & Thate, 2006). Blanke and co-authors could show in another experiment that this temporo-parietal crossing plays a role also in mental rotating of the body. Their experimental subjects were asked to imagine themselves in a matchstick-man, and to decide whether this figure carried a glove on the right or left hand. Already with such a simple job we can leave our body and project us mentally in a simple stick-figure (Blanke et al., 2005). Last not least, we also leave our body when we read a good novel and recognize the action from the perspective of the central figure. It possibly includes a biological advantage to be able to transfer into another person's perspective, because we can learn better from his or her mistakes as well as from success. From this point of view, the ability to see oneself from the outside may have biological sense.

Positive feelings

A woman with the first name Renate reports on an Internet page: "*I had a Near-Death-Experience in 1980, at the age of 18 years. My ex-friend waylaid for me and knocked me down with an iron rod. I fell to the ground. Suddenly I became quite warm, I saw myself lying on the ground. A mad feeling of security, weightlessness, luck, and love overcame me. I saw a light at the end of a tunnel. Then said a voice, I have to go back. I did not want; however, I could do nothing against it. (...) What struck me strongly, was this feeling of warmth, security, luck, love and a big longing, to experience this feeling again.*"⁵⁾

Why do people with NDEs report so often that, in a state close to death, everything is friendly and they feel happy? One possible explanation is that many dying patients receive pain-killers and sedative which lead to a relaxed state. Saavedra-Aguilar and Gomez-Jeria (1989) assumed that the stress from a live threatening

event also can lead to a spilling of endorphin and opiate transmitters. Interestingly even pain can lead to a euphoric state. In particular descriptions of pain experiences from the sadism/masochism scene are full of relish. The autoerotic asphyxia is an extreme variation, in which the affected person strangles himself during sexual actions, because they can increase positive feelings with the oxygen starvation. The processing of pain in the brain runs in a pain system from the periphery to the CNS. In addition there is a descending analgesic (pain-restraining) system. Here, opiates play a major role. Under strong physical or psychic strain it comes to a suppression of the pain perception. Pain can activate even the reward centre of the brain. Here, in particular the Nucleus accumbens is involved (Zubieta et al., 2001). The Nucleus Accumbens has an important function in the production of a descending analgesia, by blocking the pain information coming from the spinal cord. Moreover, opioide lead not only to euphoric feelings, but also support analgesia. Under the effect from opiates less pain information reaches the CNS, the perception is changed, and the descending analgesic system is activated. A strong activation of the descending pain system has not only a reduction of the torment as result, but can additionally lead to light euphoric feelings. There is a substantial number of people who perform self injure behavior and cut to themselves with razor blades in the arms, e.g. in situations of desperation. These patients report that due to the sharp pain immediately a feeling of release, relaxation and peace comes up. It seems the brain has a self protection which could compensate for overpowering pains in the process of dying by activation of happiness-centers.

In a fMRI study Beauregard and co-authors (2009) tried to understand these feelings. In a meditation session the participants should imagine the white light as it appears in Near-Death-Experiences. This experimental group was compared with a control group, which should imagine in the meditative state only a bright light bulb. In the experimental group predominantly activation was found of those brain centers which are responsible for positive feelings.

However, the feeling of love and peace in the NDE state is by far not uniform. In reports from India, Thailand and Japan the patients experienced often a fearful-

ly court tribunal (Augustine, 2006). Greyson and Bush (1992) described a 28-year-old woman who heard during her dying a clicking noise which had the meaning: *“Your life has never existed. This world has never existed. Your family has never existed.”* After every sentence she heard a mighty laughter. The time seemed endless for the dying woman, the events were absolutely real and she described it as cosmic terror, which she had never anticipated.

Retrospect on own life

Another part of the NDE-phases is the retrospect in which the affected person sees his or her own life passing in a terrifically quick line of pictures. Results of Fenwick and Fenwick (1995, 1997) show that this retrospect of the life is found not very frequent. In a secondary analysis of 350 descriptions of Near-Death-Experiences they were found in 15% of the cases; often only as accidental sequence of weird reminiscent scraps. Only one single person had the impression of a whole show of the own life. One of Zaleski's (1987) patients saw details of her life, but she had the impression to see these pictures on a computer monitor. However, such reminiscent fragments come every person almost constantly into the sense; associations with former events are an essential element of our thinking as well they appear in dreams and are no unique component of Near-Death-Experiences.

French (2005) discussed whether such a sequence of recollections could be a result of an (possibly epileptic) overactivity of the temporal lobes. According to the information of Britton and Bootzin (2004) in NDE-patients four times more often an epileptic EEG activity in the area of the Lobus temporalis was found. The affected persons often suffer from strange visual, acoustic, odor and taste perception; they needed clearly longer to reach the first sleeping REM-phase and on a scale for dissociative disturbances they reached considerably higher values. These data speak for the theory that there is a certain quality of the brain which predisposes for Near-Death-Experience. Also van Telligen (2008) supports this theory: According to his view aged people often live strongly in the past because the cell death of upper layers allows the older recollections to appear better. In the process of dying a dis-

integration of neural connections in which long ago buried recollections are released could be responsible for the retrospection.

Meeting with relatives and friends

Moody found in many reports that people in the NDE-state meet “ghosts”. They see exclusively persons who had already passed away. Several descriptions of other authors confirmed this meeting. Tavalaro & Tayson (1998) described the experiences of a patient in the interworld. He saw his grandmother who was dead already for a long time, she floated beside him in the air and behind her the dying man saw a riverside. The grandmother carried a purple dress with small, white blossoms on it, in addition a purple belt and her black 'granny's shoes'. She stretched her right hand about the water, while she clasped her black handbag with her left hand. The man was up to the chin in the water and heard how she shouted with melodic voice: *“Come to me. Be not afraid, my child. Come to me.”*

The following extract stems from the investigations of Schröter-Kundhard: *“My state got worse so that one had given me up and I was said by the present head of the department to be dead. At the end of the tunnel I came on a meadow and I saw a play of color one cannot describe. (...) From a ground fog three people, whom I recognized as my grandparents, appeared to me. My grandmother lifted both arms to breast height and stretched to me the palms like in a defensive movement, do not get closer please. From this moment the picture started to move away, I saw the tunnel with the bright light again and then everything disappeared.”* (Schröter-Kunhart, in 2002). Another report from an internet page said: *“I saw my granny who had already died years ago, and we could exchange. We do not talk, but I knew what she thought and she could also read my thoughts. At first I was frightened by this kind of communication. Everything I thought was transmitted and everything was taken up favorably and understood well. This exchange of ideas happened in a mad speed and contained all feelings which belonged to the thoughts.”*⁶⁾

However, a comparison of this part of NDEs in different cultures showed that the only element which in all nations was found is that the affected persons met

deceased persons (Kellehear, 1996; Augustine, 2006). Elisabeth Kübler Ross (1989) reported about heavy car accidents in which other members of the family had passed away. Without knowing who had lost his life in the misfortune, the survivors reported exclusively to have met “*there*“ such members of the family who had already passed away at that time.

Alternative explanations were developed. To have the impression to meet other persons is the case in nearly all dreams. The bigger part of our dreams contains social interactions with other humans. It is unclear, why people in the NDE-state meet only already dead individuals. Perhaps, if one knows that he or she is close to the death, then the association seems reasonable to think of other deceased persons. On the other hand it is extremely argumentative whether people meet in their Near-Death-Experiences really only dead persons. Critics see artifacts due to the fact that the meeting with dead people was differently weighted in the publications as when the affected persons had meet people who still lived.

The white light

After the tunnel experience, the abandonment of the own body and the meeting of ghosts, the next phase is the recognition of a white light. A typical description in the book of Raymond Moody the person saw everything pitch-black at first, only completely far back in the distance the dying person could see a light, an incredibly bright light. At the beginning it did not seem to be particularly big, however, it grew more and more, the closer the person came. The patient tried to move in the direction of this light because he thought that it was Jesus Christ; he did all the best to reach this point. (Moody, 1975, p. 69).



Fig. 4: In a state of highest fears a person can see a white light, as shown on this antique woodcut of Carl Thylmann (from: Benghoff, L.: Geprägte Form. Hamburg: Hanseatische Verlagsanstalt, 1923, pS. 345).

The “Tibetan Book of the Dead” (*Bardo Thrödöl*) is one of the oldest descriptions of dying. It serves for the company of a dying person to accompany him through different unearthly states of being. Many of the phases of Moody are anticipated here, in particular the meeting with a pure, white light: “*Son of the noble, hear! Now to you the purest light of the true being will light up. You must recognize this! Son of the noble, the inherent being of your present recognition is just this bare emptiness; this also has no being as a thing, phenomenon or color, but is a bare emptiness. This is the absolute reality as a Samantabhadra. Because your recognition exists only in emptiness, this emptiness is not insignificant: This not yet past recognizing is just the clear, luminous mind of the Samantabhadra. Your own ghostly nature is empty in being an inherent being in any substance, while your intellect is radiant clear. These both are inseparable, and they are the true being, the Buddha. Your ghost-nature, equally clearly and blank, exists in a fullness of light, and be-*

cause it is free from becoming and offence, it is just the Buddha of the imperishable light. This recognize!“ (Dargyay & Dargyay, in 1977).

Various alternative explanations were formed. Necessarily every operated patient has seen a bright light, because above the OP table several extremely garish field lights burn. The state of a seriously injured patient can be read in the pupil reaction, hence, to medical stuff shine with small flashlights often directly into the eyes. Often, after specific CNS lesions, the pupil reaction is absent and the patients are already blinded by normal light. These factors could possibly lead to the fact that reanimated persons remember later extremely bright light.

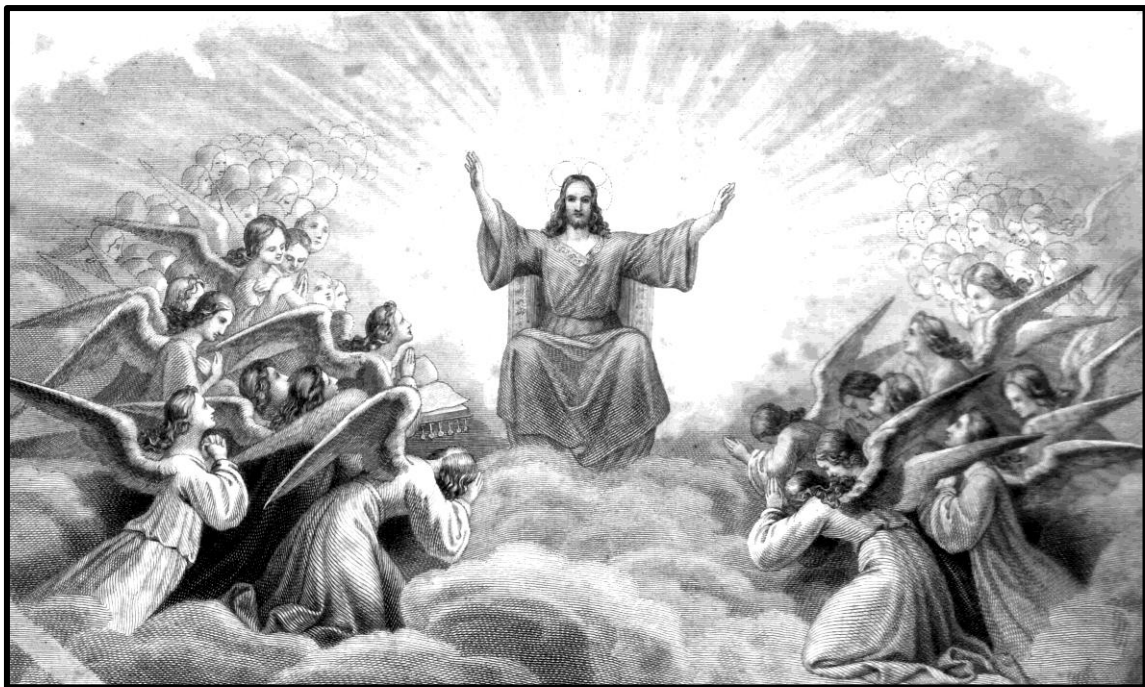


Fig. 5: In the Christianity dying persons often see Jesus, who emits warmth, love and security (From: Franziskaner Bibliothek, golden printing from C. Berg, Nuernberg, ca. 17.- 18. Century, private property)

Additionally we have a neurobiological explanation. Due to a malfunctioning of the visual system it must not become black before the eyes; the "starlet seeing" due to blood pressure rubbish is a frequent event and is based on a disaster reaction of nerve cells which become undersupplied with oxygen. In this state, inhibit-

ing circuits break down apparently earlier as exciting and it comes to a spontaneous excitement which spread out in waves avalanche-like about the visual centers in the occipital lobe. This can result in a sort of very big positive scotoma or a global photopsia. Hobein (2006) reported something similar after a fruitless operation of an eye suffering from macular degeneration: *“If I close the operated eye - the outside world is locked out - there is somewhere in the interior a big white space, brightly enlightened like with a floodlight.”*

Most affected persons see in the white light, however, more than only pure brightness; mostly it owns a religious identity. In the western cultures this is often recognized as Jesus; sometimes God also appears from it. Fenwick and Fenwick (1995) described a woman who perceived a divine figure in the light: *“Jesus came to me with outstretched arms. He carried a long, white gown, had shoulder-length, brown hair and a cropped beard.”* The meeting with warmth and security emitting being is one of the central elements of the Near-Death-Experiences; it leaves the most significant impression in the affected persons and often changes the whole following life.

*“I floated out from this tunnel and was up against a light, a brightness, a beaming cloud - something indescribable. It stood about four to five meters before me in a pleasant darkness. No real space could be recognized, also no colors, only these intensive light. This brightness was no person and there was no recognizable source of light. To me the absolute love shone softly; this is what you always have wished, a warm light, an affectionate waiting for me, in which I would rise in full luck.”*⁷⁾

Children often see a God's figure with flowing grey beard, sometimes angels, a magician, a doctor or their teacher (Morse & Perry, 1992). In other cultures the divinities which correspond to the specific religion are seen. Pasricha and Stevenson (1986) described the close to death experiences of Hindus who often see Yamaraj, the God of the Death. Murphy (2001) reports from Thailand that there Yama, the Death-God is seen. While in the western cultures the affected persons are sent back in their body to fulfill an important job in their real life, in the Asian countries often was said that the bureaucracy *“up there”* has by mistake recalled the wrong

person. In Japan the affected persons see a black river (Tachibana, in 1994). Yoshia Hata and co-authors interviewed 17 Japanese coma patients, eight had Near-Death-Experiences and five had seen a river (Augustine, in 2006).

Why do Christians see Jesus and Hindus see Yamaraj? Into the experience of the white light the dying person projects a divine figure which in his own religion is seen as God. The critics who do not believe in an existence after the life argue that the affected persons really see Jesus or Yama, but it is a hallucination, which descended from the wishful thinking of the dying person. E.g. reported Lindley et al. (1981) of a dying patient who saw Jesus, but he had a horse body like a centaur and wing like Pegasus.

Behind the border

Often the reports of dying individuals contained descriptions of the surrounding of the empire of the dead. However, here the descriptions drift apart and no clear common characteristics were found: *“It was very nice and very pleasant feeling there. The bright surroundings which never dazzled and had not the form of a beaming sun, was everywhere present. Blossoming meadows and unbelievable peace existed everywhere. I could move only due to my thinking, neither suddenly nor in hurry, but as well as I thought and wanted. It was warm there, no heat, just warm, I knew that I had been there already, but questioned this not further. I was not afraid; everything was so peaceful and wonderful. The feeling and the surroundings are impossible to describe. There are no words for so much beauty and peace. Some people, not many, stood on the blossoming meadows and under the green perfect trees.”*⁶⁾

Moody (1977) reported the experiences of a woman; she described a wonderful, beaming light and a nice surrounding. The colors were radiant bright, not like on the earth, but indescribably intensely. The woman saw blinking water, fountains sprayed, a light town, everything was wonderful. On the other hand, Albert Hofmann, inventor of the LSDs had under drug effect absolutely similar experiences: *“I was intoxicated suddenly. The outside world changed like in a dream. The objects seemed relief-like, they got unusual magnitude; and the colors became luminous.*

Even the self-perception and the sense of time were changed. If the eyes remained closed, there came an uninterrupted stream of the fantastic pictures of extraordinary plasticity and liveliness about me which were accompanied by an intensive, kaleidoscopic play of color. “



Fig. 6: The descriptions NDEs are not always as positive as reported from Moody at first. Later investigations showed negative components which remind of the hell like here in an illustration of Gustave Doré to Dantes divine comedy (from: Bayer, F.J.: Dantes Goettliche Koemoedie in Bildern von Gustav Doré. München: Verlag Josef Müller, 1924, Abbildung-Nr. 10.).

On the other hand, dying person had not always overpowering nice experiences. The German author Knoblauch asked more than 2,000 representative people. Near-Death-Experiences had 4.3% of the interviewees. However, the experiences considerably drifted apart. A man who survived a car accident got into another world: *„It was as nice as one fancies the paradise. The people lived peacefully without work, and one knew no technology and also no time.“* Absolutely contradictorily

a woman found herself in the hell. She saw herself in a dark wood, full of foreign animals. She ran fast to avoid them, however, she was in a labyrinth without any way out. According to the analysis of these descriptions, Knoblauch came in his book to the result that Near-Death-Experiences can be extremely unpleasant and accompanied with negative emotions and pictures, even if the concept "hell" was not used by most of the affected persons (Knoblauch & Soeffner, 1999)

Maurice Rawlings (1978) wrote in his book *"To hell and back"* that dying people reported not always only positive experiences, possibly half of them also described very disagreeable, infernal-like visions. Moody wrote 1986 in his subsequent book that some people have reported to him, that they have seen other beings which seemed to be 'caught' in an apparently unhappy state. Their features were of full grief and desperation. They seemed to move slowly as if they were a prisoner's troop in heavy chains. Here it must be said that the first book of Moody had described dying so nice and wonderful that it was worldwide followed by a suicide wave. In this respect it may be clear that Moody now urgently pointed out that all persons who had undertaken a suicidal attempts reported negative experiences; they recurred their state incessantly as in a cycle. Indeed, newer studies showed that people who had NDEs after a suicide attempt undertook in their later life more seldom another attempt (Kralovec et al., 2009).

Sabom (1982) described a case in which the person believed during dying, it would be interrogated by four unknown nurses because of subversive activities. Fox (2003) cited the report of a patient who left in her NDE her body and then floated to the roof of the hospital. Instead of seeing the hospital from there, she saw a Russian battlefield with tanks and corpses of killed soldiers lying around.

Many experiences include neither heaven nor hell, they are neutral in an emotional sense. Fenwick & Fenwick cited the experience of a person who flew in the course of the NDEs in a formation of swans and had the impression, he was moving backwards in the time (1997). Kellehear (1996) described a man to whom in the NDE-state not only a choir of angels appeared, but also Albert Einstein, who sat on a computer. Interestingly astonishing few persons saw the death as a black reaper

with scythe. Merely Lawrence (1997) reported about visions of Death as a skeleton from a patient with heart illnesses. Hence, the suspicion is obvious that such Near-Death-Experiences possible are merely hallucinations or oneiroid dreams (Kasten, 2008).



Fig. 7: Interestingly dying persons rarely look the death as a skeleton with a scythe as shown in this painting of Hans Thoma (From: Benghoff, L.: *Gepraegte Form*. Hamburg: Hanseatische Verlagsanstalt, 1923, p. 289)

Critics on the methods of Near-Death studies

It was shown above that several of Moody's phases can be explained not only as a result of the death nearness. In last decades there were several other points of criticism. Nearly all NDE-studies were interview-based and it was argued that there were influences from suggestive questions and test leader's effects. Obvious many results are based on the fact that the interviewers asked directly for one of Moody's phases. To make NDEs comparable, Greyson developed a scale with of 16 questions for the purpose to grasp the depth of a single experience (Greyson, 1983, 1985, 1990, 2007). This approach makes sense for a standardization of the inter-

views, but Greyson's items asked suggestive whether the phase existed or not (e.g., *Did you feel separated from your body? 0 = No; 1 = I lost awareness of my body; 2 = I clearly left my body and existed outside*).

Augustine (2006) assumed that the whole step-sequence of Moody is an artifact. According to his view, Moody has blown out single hallucinations to a theory which became internationally known in thousands of publications, and only at first no scientist ventured to doubt Moody's ideas. Accordingly several investigators squashed the NDE-experiences into this pattern. Parts of the stories, which do not correspond to the phases, were left out as irrelevant.

Another elementary point of criticism is that Moody's phase sequence got high attention of the media and is well known today. The affected persons did not hide her experiences any more as pathological hallucinations, but reported them as a special spiritual experience. Already a light feeling of levitation, which possibly appeared as a side effect of a tranquilizer, is now interpreted as an external NDE-experience. Lange and co-authors (2004) found out that the intensity of the descriptions of NDEs became better, the more time had passed by since the real experience. The authors interpret this as an understandable attempt to decorate one's own story, and to adapt it to the typical phase sequence of Moody.

It is obvious that the exact neurophysiological base of the NDEs is unknown. In addition to the already described theories, REM-intrusions may play a role. These are special sleeping phases in which sleep and the awake state become blurred (see also: Oneiroid). Affected persons feel in such phases as if paralyzed and often they perceive optical and acoustic phenomena, they are sleeping but have the feeling to be fully awake. In addition it is remarkable, that only few authors are occupied with psychic follows of the NDE (Flanagan, in 2008; Griffith, in 2009).

Sequence of the phases

The first reported very high frequencies of up to 50% of the interviewees, who had NDEs, was criticized in the meantime. According to Cant et al. (2012) 4-9% of

the average population and up to 23% of the seriously ill had such experiences; Mobbs and Watt (2011) assume that only about 3% of all Americans can report Near-Death-Experiences. In other studies during several months of investigation, not one single person could report a NDE. Here, one must know that only between 1-10% of all resuscitations is successfully; Engmann (2001) found only 2%. A substantial part of the survivors is so severely disabled that they are unable to tell anything about their experiences.⁸⁾ In the group of survivors, who were able to tell something about their NDEs, it was again only a tiny fraction of persons who had really experienced all phases (Augustine, 2006). In the notable investigation of the Dutch cardiologist van Lommel and colleagues (2001) 344 patients, who had been revived after a cardiac arrest, were examined. 62 patients (18%) reported later about a Near-Death-Experience.

Schwaninger et al. (2002) examined prospectively all patients with a cardiac arrest for a period of 3 years. 55 of 174 patients with cardiac arrest survived, 30 could be interviewed. From these 30 interviewed patients 7 (23%) reported a Near-Death-Experience during the event, 4 others (13%) had had a NDE during a former illness. Greyson (1986) reported that 16 of 61 patients (26%), who were delivered to the hospital after a suicide attempted had a Near-Death-Experience. After the retrospective evaluation of more than 60 studies the Internationally Association of Near Death Studies (IANDS) assumes that about one third of the people who were life-threatening ill had a Near-Death-Experience once in their lifetime.

Looking at the frequencies of the stages, Moody came to the result that about 60% experienced the feeling of deep peace, 23% entered into the darkness, 10% saw supernatural scenes. After the data of van Lommel et al. (2001) 56% felt positive emotions, 50% noticed that they had just died, 32% already met other dead persons, and 24% gained external-physical experiences. Schröter-Kunhardt (2002) found the following frequencies: Feeling of rest, peace or well-being 89%, feeling of joy or luck 80%, light perception 77%, increased liveliness of the perception 75%, entry into a supernatural world 63%, external-physical experience (OBE) 61%, quickened time expiry 59%, perception of the reality 48%, acceleration of the thoughts 47%, tunnel

phenomenon 47%, unity experience 38%, omniscience 33%, meeting with mystic beings 32%, expiry of events of own past 30%, achievement of a border zone 29 %, meeting with religious figures 27%, perception of music 24%, precognition 3%, and dreamlike oneiroidale components 27%. Even if several phases were reported, the chronological sequence rarely corresponded to the sequence of Moody.

In an investigation on Taiwan (Lai et Al., 2007) 45 of 710 dialysis patients reported death nearness experiences. Half of them (51%) had external-physical perceptions; the tunnel experience was much rarer (less than 10%). Most often these experiences were reported if the affected person was (a) female (b) young, and (c) religious.

According to Morse (1994), the reports of the children, who had never heard something about Moody's phases, were much more fragmentary. Morse and Perry (1992) reported about a four-year-old child, who would nearly have drowned during a car accident. The boy felt he was blown by a strong wind in a tunnel, which was like a spiral noodle with a rainbow in it. Then he saw two other tubes before himself; one went to the animal sky and the other to the human sky. At first he went to the animal sky, there were many flowers and a bee which spoke to him and brought him bread and honey because he felt really hungry. Then he went to the human sky, which he described as an old castle; here he met his late grandmother, heard loudly music and then he awoke suddenly in the hospital. One of Lindley et al. (1981) described children saw in the death a deer, which licked his face. Abanes (1996) referred the story of a ten-year-old who met a magician who played a video game and said to him: „*Fight and you will live*“. Serdahely (1995) interviewed a child with cardiac arrest after an operation; in the external-physical state this child was led back into his body by a soft lamb.

Hypoxia, hypercapnia and anaesthesia awareness

Visual experiences are in the centre of the Near-Death-Experiences. Seeing and recognition occupies nearly one third of our brain and is extremely easy to dis-

turb due to oxygen starvation. Hence, it is in critical situations the first sense, which shows deficits. Due to blood-circulatory problems it becomes „black before the eyes“. The hearing seems to be more robust and is apparently the perception function which decreases very late in dying. Hence, in many stories of OBEs the patient hears precisely what was said, while the visual description is spongy and often contains only what one could imagine on the basis of tactile and acoustic information. Possibly such an imagination is better from an upper position, and the patient fantasies to look down at the physician and nurses, who carried out medical procedures on his or her body. Reported details, e.g. that one of the sisters had fair hair which was tied together to a horse's tail, are relatively meaningless, because many nurses look this way. Alvarado (2000) found out that in 61 case descriptions only three consisted detailed descriptions. However, the reported details often did not agree with the reality.

On this base some studies (e.g.: Cowan, 1982) associated oxygen starvation (hypoxia) or raised CO₂-concentration in the brain (hyperkapnia) with the Near-Death-Experiences. However, in the meantime the theory of "Oxygen starvation" has been doubted, because NDEs also appear with normal oxygen content. Van Laack (2005) said that hypoxia as well as hyperkapnia are parts of NDEs, however, they cannot explain the experience completely. Delirious patients in a state of oxygen starvation are always disorientated, they had no positive feelings and their recollection is fragmentary. NDE-patients seem to be fully oriented and the experience is judged as positive. While the delirium appears always as a result of hypoxia and hyperkapnia, Near-Death-Experiences can happen, when the patient has enough oxygen, for example during an operation.

The question is how much consciousness a patient actually has, when he or she is anesthetized during an operation? From a medical point of view, he should remember nothing at all; in contrast NDE-reports are often a proof that the patient became receptive again and regained consciousness. However, the JCAHO (*Joint Commission on the Accreditation of Healthcare Organization*) published in 2004 the results of a study in which was shown that between 0.1 to 0.2% of the patients dur-

ing the anesthesia wake up and are conscious, a state which is named "*anesthesia awareness*". 48% of these people could tell after the operation what they had heard. Bünning and Blanke (2005) report that higher frequencies are found in some medical interventions: During heart operations there are only about 1.5%, but during surgical treatment of accidents between 11% and 43%. Parnia and co-authors (2007) found out that 10-20% of the patients with cardiac arrest had not lost their consciousness, and were able to report specific details of the revival. After data of Woerlee (2005) there are 20-24% of revival-patients, who maintained their consciousness up to a certain degree during the treatment and could report what happened in their surroundings. This rate corresponds with the frequency of patients with NDE, which was found from van Lommel et al (2001). Therefore Worlee questions critically, why not all 100% of all patients with cardiac arrest have reported Moody's phases?

Can blind people see in the process of dying?

Vicky, a case study from the book of Ring and Cooper, had suffered a severe car accident and suddenly she found herself floating under the ceiling of a provisional accommodation. She glanced down, recognized a body which was very thin and then noticed that it was probably her own. Very exactly she could see the golden jeweler on her fingers. This description corresponds convincing with one of the phase sequences from Moody. But Vicky was blind. „*This was*“, she reported later, „*the only point in my life that I could see and knew what is a light, simply because I experienced it.*“

Ring and Cooper (1999) questioned 31 blind people with NDEs (14 were blind from their birth), whether they had during their experience a sort of visual perception. Surprisingly the interviewees reported not only about visual phenomena, but their experiences differed hardly from that what sighted NDE-patients had told. The blind saw below themselves the scene in which they lay dying, they saw the doctors, who looked after them and they perceived the white light. Ring and Cooper

called this perception property of blind people "*mindsight*", i.e. a kind of seeing without the eyes only with the mind.

The NDEs of people, who were able to see before their blindness appeared, can result from visual hallucinations; but 9 of the 14 natal blind people reported about visual experiences in the state of dying. About 80% of the blind people in the investigations of Ring and Cooper (1999) reported in the clinically dead state to have "seen" something. Indeed, the impression of the seeing was extremely bewildering for most affected persons; often there came statements as for example that they had considerable difficulties to get used to it, because they never have had experienced such a thing; it was very strange for them; or it was like a foreign language, but from which they wanted to know absolutely more.

Atwater (1995, 1998) cited other astonishingly cases in which blind people saw things in their Near-Death-Experiences and could exactly describe what happened. A special proof of the genuineness was that here blind people were able to describe colors. It is a general rule that people, who are blind since their birth, are unable to describe colors, because in their world no colors exist. Blind people can recognize how an object looks with their hands, but they cannot use the concepts of colors.

Another example came from the already cited study of Ring and Cooper (1999): A man, who was completely blind since ten years, had an external-physical experience in whose course he saw, among the rest, a tie whose pattern he later could exactly describe to a friend. When the authors visited this girl-friend, nevertheless, this friend was unable to confirm the story, and she could not remember the whole incident clearly (cit. from: Augustine, 2006).

People, who are blind from birth, and who (as adults) regain their visual ability due to an operation, need years to be able to recognize objects in their first confusing visual impressions. It requires intensive exercises of many months, to learn to identify single objects by seeing instead of by feeling. Fox (2003) asked, how can it be that blind people make up for this deficit suddenly in an incredibly short period in the process of dying? Until today nobody has a really persuasive scientific explanation of it. Of course natal blind persons have a three-dimensional image of

how objects "look" which is formed by tactile experiences. In a trial using repetitive transcranial magnet stimulation (rTMS), Janna Gothe et al. (2002) found out that none of the blind-from-birth-participants saw any light, their brain was not prepared for this experience, they had, e.g., unspecific warm sensations due to the rTMS stimulation.

The experts from the rows of the NDE scientists gave the explanation that in dying it comes to a Synaesthesia, in which recognitions are processed in an absolutely new kind in the brain (Ring & Cooper, 1999). A spiritually based theory explained that there is a reincarnation and blind people have learnt the seeing in a former life. In the moment of their death this knowledge would flame up again, so that they have not many difficulties to recognize objects (Atwater, 1995, 1998). On the other side, skeptics believe that blind people hope quite simply not to be blind in an existence after the death and their recognitions in the process of dying were interpreted as "seeing" (Irwin, in 1987).

Hallucinogenes

To come back to the above mentioned statement of Nina Hagen, there is a considerable number of drugs and anesthetics which can release experiences, which are extremely similar to NDEs. At least a part of the people with NDEs stands under medical drugs, e.g. sedative or pain killer. Already in one of the pages above the anesthetic Ketamin was described.

But not everybody who reports about out-of-body experiences has received Ketamin. The NMDA receptor could have influence on OBEs even without Ketamin. Glutamate, the most important Transmitter of this system, is spilled in a gigantic magnitude when neurons are going to die. However, glutamate in high dosage is a neurotoxin, i.e. it leads to the fact that neighboring nerve cells also die, although they were originally undamaged. If these also spill their glutamate reserves, it came to an avalanche-like propagation. The brain must stop this cascade anyhow; therefore it releases NMDA-receptor-inhibitor-substances, who do, in principle, the

same as Ketamin: they block the glutamate system for some time; perhaps this can lead to the Near-Death-Experiences (Jansen, 1995, 1997).

One could interpret the visual impressions of the Near-Death-Experiences also as complicated visual hallucinations which originate from a breakdown of the inhibitions existing in the brain as a result of the process of dying. Schröter-Kunhardt pointed out in 1993 that many of these experiences can be explained by the emission of hallucinogenic substances belonging to the brain under participation of the temporal-limbic system. Drugs like LSD, cannabis or opium work because humans have specific receptors in their brain; here these drugs can dock and they unfold their effect then with specific patterns of excitement. These receptive stations also react to drugs not belonging to the body. Opiate receptors react to the endorphin made in the brain, LSD works in Serotonin- and Noradrenaline-receptors and for Marihuana Anandamid was found, a Cannabinoid, which is produced by the own body in very tiny dosage. In particular psychedelic drugs as for example LSD and Mescaline can cause hallucinations which strongly remind of Near-Death-Experiences (see. e.g.: Kasten, 2008). It is conceivable that at the moment of the death large amounts of drugs belonging to the own body are ejected, which then lead to a psychedelic drunkenness state.

With Dimethyltryptamin (DMT) Strassman (2001) found another candidate for the Near-Death-Experiences. This substance is not only a drug, it is spilled in situations of massive strain as a neuro-messenger in the pineal gland (Glandula pinalis) and could explain, why people in states of high fears report about death nearness experiences. Another neurotransmitter with psychedelic effects is Agmatine (Kossel, 1910; Thomas, 2004). This messenger binds to adrenergic receptors and blocks NMDA canals which were already described.

Ibogaine, a herbal product from the root of the plant "Tabernanthe iboga" can cause experiences similar to NDEs. In Gabon (Africa) it is used for spiritual purposes to cause para-psychological states (Strubelt & Maas, 2008). Ibogaine leads to a slowing of EEG with theta and delta waves, stimulation of the limbic system and dominance of the nervus vagus. However, the neocortex is still partly ac-

tive, and permits an observation of abilities, but without cognitive dominance. Because - in contrast to Ketamin - also the memory functions work, the user can report about his experiences later.

The psychiatrist Stanislav Grof (1983) went the reverse way. He gave cancer-patients hallucinogenic drugs and released states which resembled the Near-Death-Experience. Due to this procedure, he provided for them religious confidence and took the fear before the death from his participants.

Dreams and hallucinations

Not all people, who were clinically dead and could be reanimated, report about Near-Death-Experiences. Are there differences between those who do not have these experiences and such who report about it? Nelson et al. (2006) examined 55 patients from both groups and found two essential differences: Those who had a NDE also reported that they had had sleeping-based visual or acoustic hallucinations or had suffered from sleeping paralysis. The authors think that either a malfunctioning in the area of the activating arousal system or in the area of the locus coeruleus explains a prearrangement, which not only leads to sleeping-conditioned hallucinations, but also raises the likelihood to make a Near-Death-Experience. Also Cooper (2011) reported about a man who suffered from sleeping paralysis and had during a torture a death nearness experience.

The huge number of different hallucinations (tunnel vision, meeting of close relatives, bright light, God's figure, blossoming gardens, light towns etc.) which appear in the course of a NDE can be interpreted as visual hallucinations or as oneiroide dreams due to medicine, or drugs belonging to the own body; in addition a genetic prearrangement might play an essential role.

Consciousness without brain functions

An objection of the NDE-advocates lies in the simple question, how can it be that a person who is unconscious in the state of dying can still make a fullness of impressive experiences (Rivas, 2003)? Can consciousness exist regardless of brain

functions? In 2011, when the NDE-research had already found more criticism than support, van Lommel wrote: *"The current materialistic view of the relationship between consciousness and the brain, as held by most physicians, philosophers, and psychologists, seems to be too restricted for a proper understanding of this phenomenon. There are good reasons to assume that our consciousness, with the continuous experience of self, does not always coincide with the functioning of our brain: enhanced or nonlocal consciousness, with unaltered self-identity, apparently can be experienced independently from the lifeless body."*

Sabom (1998) described a case in which a woman had suffered from a bleeding of an aneurysm; during the operation she showed no more EEG activities. However, later she could still tell about an external-physical experience. In particular, the affected persons report about high spiritual clarity, while their brain is massive undersupplied with blood and oxygen. This is hardly to bring in harmony with the prevailing theories on the functionality of our ZNS (Greyson, 2003).

Concentration and mental activity already decrease, when too many people are in a room and the air is losing its oxygen. Woerlee (2004) takes the view that the feeling of high spiritual clarity can be an imagination. Astonishingly, under alcohol or other drugs often the impression of an increased attention or awareness can emerge, which then leads to the dangerous overestimation of own achievement property; while -- objectively -- the attention is massively decreased. The above described autoerotic asphyxia indicates that oxygen starvation must not necessarily release only fear or other negative feelings, but on the contrary euphoric or even erotic emotions can be supported. On the other side there are several neurological disturbances in which the affected persons are paralyzed completely, look absent, but are mental and cognitive absolutely clear and awake. In states as, e.g. the passing Cataplexia or the lasting Locked-in-syndrome, the patient looks unconscious or comatose and is unable to communicate, but has absolutely intact mental functions. In contrast to their appearance, these people still recognize everything. Only from the inability to move one cannot conclude that the people don't recognize their environment. Often they understand speech and noises and also feel all kind of percep-

tions like the piercing of a syringe or the shock of a defibrillator and imagine these events in their internal eye. Why this imagination of the scene occurs from a bird's view below the room ceiling and not from the (mostly recumbent) I-perspective, is hardly explicable in spite of different theories to this topic.

At least, Engmann (2011) cited in his book investigations of patients, who really passed away. Here, short before the Zero-line, a firework of neural unloading in the EEG was shown during a complete breakdown of the blood-circulation, in a state of clinical death of the patient. It was speculated whether these waves correspond with Near-Death-Experiences.

Conclusions

All religions of this world strengthen the faith in an existence of our mind after the death. Birk Engmann cites an extract from the book of Döllinger (1870): „... *that a mass of souls in the air floated, partly those who had not come at all into human bodies, partly those who already animates a human body, but have left again. (...) Following the theories of the Pythagoraic school, these souls are laid by the divinity in the dungeon of the body, like in a grave, to atone for the guilt which they have got in a former external-physical state; if they make good use of this time of coaching and cleaning, they are raised after entry of the death again to the disembodied, higher state which they had before in the universe. If they do not use this cleansing time, they are pushed to heavy punishment in the Tartarus ...*“

This idea forms the foundation almost of all religions: The earthly life is only one acid test in which we should do good. The death is not the end, but the beginning of another level of existence. However, this faith in a „life after the life“ is an ambivalent chimera. On the one hand the fear to go to hell and the hope for an endless wellness-oasis in heaven is used from some religions to incite her followers, and to sacrifice money and property for the faith. On the other side this faith regulates our social human living since millenniums; not by chance 10 of our most important law sections come from the Bible.

Nowadays, these millennium old religious dogma is contradicted from a relatively small group of modern neuroscientists, who strictly state that the consciousness of a human person is, nevertheless, only a function of millions of tiny-small nerve cells, which in the course of the evolution have connected themselves so complicated that we can philosophize now about the question, whether we have a "soul" or not.

The research about Near-Death-Experiences has shown us that in the process of dying are odd experiences, which do not agree with the frightened panic which was accepted by the medicine in earlier centuries. From an empiric-scientific view the phase sequence created by Moody is not provable. Rather it concerns extremely individual products of "border experiences" which neither must occur in every person, nor interindividual or intercultural. For many of the described experiences we can develop scientific explanations without mystic or religious background. To NDEs it comes apparently not only if somebody is seriously ill. A huge number of studies point to the fact that it also comes to Near-Death-Experiences if the death is only expected (Gabbard et al., 1981; Stevenson et al, 1990, Gabbard & Twemlow, 1991; Serdahely, 1995; Floyd, 1996; Augustine, 2006; Kasten & Geier, 2009). Near-Death-Experiences can also appear due to a huge number of other influence, e.g., drugs, meditation, epilepsy, migraine or oneiroid dreams (Blanke & Thut, in 2006).

Perhaps in past centuries, the people may have died easier, because they believed in God and that their soul flies into the heaven after the death. The turning away of the civilized modern people from the church in an age of mechanization and scientific research has also strengthened the fear before our death. Unlimited science devoutness leads to the fact that we now believe that after the death is just "nothing more".

It should be marked positively, that in this unreligious time the investigations of NDEs have provided new hope at a scientific level during more than 30 years. For physicians and nursing staff the book of Moody was a great help; it released several patients from their fears (Simpson, 2001; Cant et al., 2012). From this point

of view, it must be admitted, that it is almost a pity that the phases of Moody and others are not supported from empiric-quantitatively working scientists.

Near-Death-Experience could be a sort of a final protective mechanism of the brain which enables the dying patient to master his fears and pains with feelings of euphoria and hallucinations, caused by the explosive spilling of neurotransmitter in the brain. Death is an extremely rare event for the individual, therefore the question remains unsettled why the evolution has developed such a complicated biological program which runs only once in a lifespan?

However, the studies in the field of Near-Death-Experiences doesn't give a final answer to the question whether we are only a biological cell heap or whether the "whole is more than the sum of its parts". Nobody who has been classified as "clinically dead" was really dead. From this point of view the NDEs neither give insight into a divine heaven nor into the diabolical hell. Humans will never be able to answer the question about the origin of our universe, the origin of the time and the life after the death really. In spite of all criticism of his phases the research of Raymond Moody and many others has directed the attention to the process of dying and has shown us that this runs apparently absolutely differently from what doctors had believed before these studies are performed. Whether this is a protective function of our biological brain to make the death easier or whether it concerns the escape of our soul into a divine light, these questions still cannot be answered after more than 40 years of intensive research.

Absolutely on the safe side is, who simply tries in this life to be a good person and then, after his death, looks whether it has been worthwhile. And if there is, however, no life after the life, it may comfort us in the other eternity that we have created some place for a fresh-born baby on this wonderful planet.

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