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David Luke

Oliver Robinson

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Smokable "Vine of the Dead": Two Case Studies of Experiencers of Both Changa and Near-Death Experiences

Pascal Michael

University of Greenwich
London, UK

David Luke

University of Greenwich
London, UK

Oliver Robinson

University of Greenwich
London, UK

Introduction: Virtually no studies have looked at psychopharmacological combinations as models of the near-death experience (NDE), which is inadequate given the evidently complex neurochemistry occurring near- or at death. An example of such a combination is ‘changa’, a smoked mixture of the psychedelic *N,N*-DMT and monoamine oxidase inhibitor (MAOI)-containing plants, and as such has been referred to as ‘smokable ayahuasca’ (vine of the dead). Only very few studies, yet not systematically, have included experiencers of both NDEs and psychoactive substances.

Methods: Two case studies are presented of individuals who have experienced both a near-death experience and a changa experience, making them invaluable in this comparative project. Interviews were conducted encompassing the content of both experience types, as well as the participants’ reflections on, including quantification of, perceived comparability. A detailed content analysis was performed and the presence or absence of each feature between the two experiences is tabulated. The near-death experience scale was also applied for both states as a quantitative measure.

Results: Case SR (NDE from misaligned vertebra) reported high, while case DA (NDE, initially, from allergic reaction) reported medium perceived similarity between their NDE and changa experience, supported also by their NDE scale scoring. SR’s changa experience, however, shared only 36% of features with his NDE. Despite this, there were only a few notable differences in features with near-death experiences at large (exhibiting 83% similarity with NDEs at large)—and the presence, and ordering, of other features is strikingly NDE-resembling. Although, the content by which these appeared was idiosyncratic of DMT. DA’s changa experience shared a comparably low-moderate 42% of features with his NDE, and did appear to entail more discrepancies with NDEs in general, which were classically DMT-like (but also exhibiting 83% similarity with NDEs generally). Despite this, several other features, though again DMT-like in content, appeared particularly NDE-resembling.

Discussion: These similarities, to greater and lesser degrees, in both features and content, qualitatively and quantitatively, between the NDE and the DMT-MAOI admixture across the case studies are discussed in light of semantic analyses and physiological studies suggesting monoaminergic activity near-death, motivations for drug-induced re-experiencing of the NDE, and implications of state-dependent memory mechanisms.

Keywords: *changa, DMT, MAOI, endogenous, psychedelics, near-death experience, content analysis, case study*

Changa is a blend of *N,N*-Dimethyltryptamine (*N,N*-DMT) crystal freebase added to plant material, often *Banisteriopsis caapi* or *Peganum harmala*, where the plant contains monoamine-oxidase inhibitors (MAOIs), such as the harmala alkaloids (with possible further herbal admixtures). Infusing extracts of the DMT and harmala alkaloids into any smokable plant matter is also possible to form changa. The mix is reported by users to increase the

duration or intensity of the DMT experience for the same dose of DMT, though sometimes lower doses may be used compared to when pure DMT is used. For this reason, changa is sometimes referred to as an ayahuasca analogue or “smokable ayahuasca”—the Amazonian shamanic brew constituting DMT-containing and MAOI-containing plants. Ayahuasca is Quechua for “vine of the dead.” The master’s thesis study by Gaia (2016, 2017) appears to be the

only formal research into the phenomenology of the experiences resultant from smoking changa, yet that of DMT alone has been studied rather extensively (Cott & Rock, 2008; Davis et al., 2020; Strassman, 2001). As such, the experiential differences between changa and DMT, or indeed ayahuasca, have also not been well delineated, but are addressed to some degree by Gaia (2016).

The term “smokable ayahuasca” seems to be justified, not only due to the chemical link, as many of Gaia’s participants reported undeniable similarities in the visionary experience, and being akin to “the peak of an ayahuasca session” (Gaia, 2016, p. 37). Online communities such as *DMTNexus* list changa recipes, including one named “Ayahuasca android.” Changa’s development is usually attributed to Palmer in 2003, who then coined the name in 2004, and himself suggested a herbal mixture with 20-30% DMT extract, or at least 50% DMT alongside MAOI extracts for enhanced and prolonged effects. Commenting on the so-called “changa effect,” i.e., the experiential differences from DMT owing to the MAOIs, he felt cite needed that changa allows for the retention of the ego such that the whole experience is more grounded, and the ‘come up (i.e., the period between transitioning from a sober to a state under the influence) is gentler. The differences have been alternately described by Gaia’s (2016) participants as encompassing being “more friendly and balanced,” “more gentle and deeper...more healing,” where the space “is easier to navigate” (p. 35).

Regarding the basic structure of the changa experience itself, though not transparently contrasting to DMT itself, Palmer cite set out five levels: 1) higher definition, clarity and crispness to reality, 2) closed-eye visuals, especially geometry and fractals, 3) “other dimensional” objects, landscapes and beings, 4) telepathic communication with entities, 5) more meaningful communication, mystical experiences such as unitivity and spacetime transcendence. Gaia (2016) conducted interviews with experienced changa users, reporting extensively on the qualitative content outlined below.

Changa and the near-death experience

The present article aims to explore the relationship between changa and the near-death experience (NDE). A classical NDE is a specific

altered state of consciousness when proximal to death, such as during temporary loss of vital signs and a period of unconsciousness, but may be broadened to consistent phenomenology occurring when significantly physiologically impaired, such as when scoring >7 on Greyson’s (1983) 16-item NDE Scale (NDES). The more recent NDE-Content (NDE-C) scale now includes several additional features not itemised in the NDES, such as unusual sensory experiences, entering of a gateway, non-existence or void, sense of ineffability, decision or coercion to return, and indeed, feelings of being dead (Martial et al., 2020). Charland-Verville et al. (2014), have most reliably illuminated the commonest features of the NDE across the Greyson NDE scale, as comprising peace or joy, bodily separation, seeing a bright light, meeting deceased people, encountering a mystical presence and time distortion.

Cassol et al (2018), via a thematic analysis of 34 NDE records, identified the following features (parenthesis indicating frequency): Entering the NDE (6), Light (25), Altered time perception (16), Meeting/Encounter—for example, Deceased, Beings of light (15), Description of scenes (14), Hyper-lucidity (14), Darkness, e.g. Tunnel (13), Out of body experience—for example, Viewing death (12), Awareness of death (9), Life events (8), and The return (19). Charland-Verville et al. (2014), also compared scores on all NDE scale items between classic NDEs and so-called “NDE-like” experiences, for instance from drug experiences, hypnosis, temporal lobe epilepsy, meditation, sleep states, and so forth, finding insignificant differences, concluding canonical NDEs and those in non-life-threatening conditions to be, at least according to the NDES, indistinguishable and thus the near-death context being superfluous to generate the same phenomenology.

Gaia’s (2016) participants’ experiences of changa, of greater relevance to the NDE, include entry to parallel universes/other dimensions, magnificent natural scenery and wildlife, temples and beautiful cities, communications with entities, such as religious authorities, experiences reminiscent of mystery cults of antiquity, or experiences discontinuous with one’s own sociocultural background. Her category of “fantasy”-related themes appeared more reminiscent

of *N,N*-DMT trips, entailing encounters with non-human/animal entities, including aliens, such as a big-headed, humanoid, gel-composed, floating creature; aliens conducting genetic reprogramming via green light-rays (a common motif, according to Gaia); or explicitly distressing experiences, such as aliens of darkness with hegemony of the planet.

Other experiences in this fantasy domain were, importantly, more like typical NDEs, such as a report of high-pitched noises, travelling at speed through a complex of timelines amongst familiar doctor-like beings, attempting to re-enter one's "original universe," or another of a vortex of white light, seeing a friend in robes, communicating information about ecological matters. Gaia stated *topoi* of death and rebirth to be not unusual, and her themes from the "spiritual-supernatural" category more directly echo NDEs. These encompassed divine beings and experiences of metaphysical meaning—specifically, a hyper-real, transforming presence of Kali (where the experient was notably naïve to this being, and Hindu deities are again, according to Gaia, common); entheogenic experiences of connecting to "the God within;" and one especially NDE-evocative report comprising sudden brightness, movement upwards at speed, disintegration of one's life, identification with a creator, recognition of *maya* (life as illusory), sensation of dying, a cosmic void, extreme serenity, realisation that it is "not time to go" and final rebirth.

Rationale and aims

Pertinently for the present article, while the phenomenological or qualitative parities between many drug-induced altered states of consciousness and the phenomena of NDEs have been more thoroughly investigated (Charland-Verville et al. 2014; Corazza 2008; Jansen 2000; Martial et al. 2019a), especially DMT (Michael et al., *in review*; Strassman, 2001; Timmermann et al., 2018)—this has not been studied regarding changa's relationship to NDEs. Indeed, a comprehensive semantic analysis of psychoactive drug states and NDEs (despite the inclusion of ayahuasca; Martial et al., 2019), as well as a survey of DMT entity encounters (Davis et al. 2020), seem to have inexplicably excluded changa use (not owing to its being a drug combination since ayahuasca was included). Many of Gaia's

(2016) above outlined changa reports show clear parallels to near-death experiences, indicating a need to dedicatedly explore their comparability. Additionally, Jansen (2000) feelings of peace, bliss and timelessness, life review, the sensation of traveling through a tunnel and an irreversible threshold. Janssen (2000) and Grof (1994) appear to be the only works to include reports of individuals having had both a psychedelic and near-death experience, in the former case two persons regarding ketamine experiences, and in the latter, one regarding LSD. While they were concluded to be essentially the same, this was not based on any systematic comparison or analysis.

Method

As such, the present article aimed to systematically compare the NDE and changa experience, specifically in those able to report undergoing both. Such a unique comparison may allow for appraisals by the participants themselves in terms of their subjective evaluation of the similarities or otherwise, which is here quantified, as well as for a more direct comparison of two different states in within-subjects conditions versus between subjects. Any experiential similarities between the changa and near-death experience, especially in qualitative content, may be valuable not only as experimental models of the NDE state but as possibly suggestive of some combination of endogenous DMT, serotonin, dopamine and noradrenaline being implicated in the near-death process, given that changa contains DMT and upregulates the transmission of these monoamines. Two case studies are the subject of the present report, their experiences are provided at length, their content analysed in the context of their own, and typical, NDEs, and their features psychometrically compared.

Participants

No specific exclusion criteria were used for the selection process, and the only inclusion criteria included having at least i) 1 previous "breakthrough" DMT experience, defined as very strong psychoactive effects, which may include emergence into a novel space, and ii) 1 NDE triggered by any physical injury or illness, evidentially significant enough to have elicited the NDE. The reason for

these criteria was to ensure sufficiently content-full experiences for the purposes of comparison, and as per the NDE criterion, the main rationale being to use the less conservative operationalising of classical NDEs (during a life-threatening condition), yet still ensuring the omission of anticipatory (fear-death) qualities that characterize more strictly NDE-like experiences.

Recruitment

Advertisements were posted on social media inviting participants who had experienced both DMT and a near-death experience to undertake an interview regarding their experiences, as well as published on the website for the International Association of Near-Death Studies (IANDS). An email was additionally sent to individuals who had already participated in a DMT field study (Michael et al., 2023, 2021), inviting anyone for a subsequent study who had also experienced an NDE in addition to their DMT experiences.

Instruments

The Near-death Experience Scale (Greyson, 1983) is the standard psychometric tool for measuring the NDE, totalling 16 items rated 0-2 (high–low intensity), with a score maximum of 32. The scale shows high internal consistency, split-half reliability, test-retest reliability, as well as criterion validity via its highly correlating with Ring's Weighted Core Experience Index. It is also capable of distinguishing unequivocal NDEs from questionable ones and experiences resultant from other brain syndromes or physiological stress.

It was initially utilised during the recruitment process for screening purposes to standardise the participants as "achieving" an NDE, confirmed by scoring a minimum of 7/32 on the NDE Scale. The scale was also employed as part of the data collection proper to supplement the qualitative analyses with a quantitative component and also allow the comparisons between the NDEs and DMT experiences.

Procedure

Participant information and a consent form was sent to each participant upon contact, and after acceptance, via selection criteria, and confirmation of signed consent, a video-call was scheduled for interviewing.

Semi-structured interviews were carried out to reveal i) the detailed experiential content of both the changa and near-death experiences, ii) the participants' reflections on the similarities and/or differences, and—adding a more quantitative dimension—iii) ratings as to the similarity and belief in the possible endogenous role of DMT in the experience. The initial request was for the description of each experience in full, before probing questions, both open and closed, were asked for elaboration, where example questions included, "What was your emotional experience, you said it was pleasant?" "The [Buddha's eyes] were giving you this sense of reassurance to the point of sleep, but was there a communication in any subtle way?", "...Was there also this diminishment in your regular 'self'?" (Appendix 1).

Questions to quantify participants' perception of experiential similarity and the possibility of biological implication of changa's pharmacology in NDEs were also asked based on the rationale that, if neurotransmission mimicking changa was considered probable, this is likely due to the two experiences being considered similar: *Could you rate on a scale of 1-10* i) how similar your changa and near-death experiences were (where 1 = completely different, and 10 = identical); and ii) extent of your belief (if any) in the production or occasioning of your NDE being due to endogenous psychedelic-like brain chemicals, such as DMT (where 1 = absolutely impossible, and 10 = absolutely definite).

The NDE Scale (NDES, Greyson, 1983) was administered to each participant twice, once with respect to the changa experience and once regarding the NDE, to allow a quantitative comparison between states, where no inferential statistical analyses were possible (given the small sample).

Treatment of Data

The interviews were transcribed in full and then summarised, where summaries are provided in the results below. A thematic content analysis was performed on each of the original, raw interview transcripts for the NDE and changa experiences, where very specific content items were initially identified and then followed by groupings into

higher-order features. The presence or absence of each feature between the two experience types was analyzed, additionally alongside their presence across the NDE phenomenological literature. This latter process entailed the cross-referencing of these items with a broad repertoire of NDE literature encompassing empirical, qualitative and popular reports, though not systematically selected (including, yet not exhaustively limited to, Blanke et al., 2015; Cassol et al., 2018, 2019; Charland-Verville et al., 2014, 2020; Greyson, 2021; Greyson & Evans Bush, 1992; Marsh, 2010; Martial et al., 2019, 2020; Michael et al., *in submission*; Moody, 1975; Ring, 1992; Ring & Cooper, 2008; Royse & Badger, 2020; Schlieter, 2018; Shushan, 2018; Zaleski, 1987).

This overall analysis was informed by Wilkinson (2000; cited in Braun and Clarke, 2006), which describes a *micro* approach to coding and content categorising, i.e., attending to fine-grained experiences, as well as incorporating a quantitative element—for instance, as in the present study, comparing the percentage of features common to both the NDE and changa experience (content frequencies, however, were not possible herein, owing to the small sample).

Ethics

All collected data were anonymised and assigned unique identifiers (pseudonyms; Access to the raw data was restricted to the principal investigator and authorised research team members, and all electronic files were securely stored with password protection; Any identifying details were redacted to prevent the disclosure of sensitive information. The present study was approved by University of Greenwich Research Ethics Committee (Ref. 18.5.5.17).

Results

Only two respondents reported using changa and having had an NDE. One, DA, was sampled from a DMT field study (e.g. Michael et al., 2021, 2023b), yet excluded from the original reports due to using changa versus pure DMT, and thus included instead herein. SR was recruited via the above online means. Regarding the interviews, in DA's case, the interview was only about the NDE, as the changa experience was already on record).

As such, the setting of the experience for DA was his bedroom during the field study, and the setting for SR was his bedroom during his personal usage (not within the field study). Interview duration was 1 hour 46 minutes (DA), 1 hour 21 minutes (SR).

Their cases are presented sequentially. Within each, first the focus surrounds the qualitative dimension of their experiences, by summarising their NDE followed their changa experience, largely centring on an in-depth content analysis of each experience type, presented in parallel and without repetition of content to facilitate comparison, and ending with participants' statements as to their comparability in their own appraisal. The quantitative dimension is then provided, beginning with participants' ratings as to perceived similarity and possible physiological implications, and concluded with scoring on the near-death experience scale.

Case Study 1: "SR", Male, White British Age 20 (at interview)

SR experienced an NDE approximately 1 minute in duration ascribed to a vertebral misalignment during the summer of 2017, at age 17, and a changa experience in May of 2019, at age 19.

Near-Death Experience

When SR used to play semi-professional football, one morning he woke up extremely fatigued and stiff, and as he pushed against the bedframe to stretch he felt and heard his neck "click" (later verifying that his vertebrae had become misplaced, impinging on his oxygen supply).

He experienced momentarily disconnecting from and losing awareness of his body, the freezing of time, feeling "at peace, everything felt neutral, nothing was good or bad," and losing his sense of self. There was an ineffable, familiar sense of being safe at home, "like déjà vu but not connected to anything, but able to 'feel the past.'"

He reported that "energy was stretching out, encompassing space", and he found himself visually elsewhere, as he "went into a kind of space and felt contact with a Mother energy...another being." He related another experience similarly difficult to express, of "flashing through a mystical light, when I snapped out and then snapped back into it...there was a light. It was somehow not within it, but it was

more like being in space with stars—kind of? As if the stars made this light, but I didn't see stars... I just flashed through the light—but when I was with the Mother energy I was in a kind of space with stars as light as if from a distance. A bit like the night sky." He had a sense of receiving insight during his communication with this other being, and the implicit knowledge that even though he felt lost at the time "everything would work out fine down the line—and it did!"

He eventually felt that "time was running out," which he later knew to mean the oxygen to his brain was running out. As the entity communicated with him, he suddenly snapped back to "reality," where he said "when I came back, I felt like the presence had something to do with it, as if it put me back in my body." He elaborated,

I had to make a decision...to let my body die or let this entity take me back ...I didn't consciously think, my instinct kicked in. It was as if I communicated with it and we decided together to go back—because time was quote-unquote "ticking."

He was unsure as to exactly how or why he "came back," but speculated that "maybe the moment wasn't right, to die." Despite the ostensibly less rich experience, he gave his NDE the same intensity as the changa experience, 9/10.

After this incident he noticed feeling extremely fatigued and (in December 2018) travelled to Rome to be treated by a respected osteopath, who identified and rectified a misaligned vertebra impinging on blood circulation. He mentioned that the osteopath suggested that it was probably owing to a physical vulnerability from birth. Interestingly, SR recounted that "when I was born, I had the exact same experience [of being asphyxiated]," and that he was later told by his parents that he was choked by his umbilical cord.

Changa Experience

SR's changa experience involved 30 mg DMT on MAOI herb, lasting 12–19 minutes. Upon smoking, SR felt his "consciousness elevated, and forgot about human concepts," hearing a growing high-pitched noise and feeling as if he could see his friends' emotions as the world pixelated around him.

He then closed his eyes whereupon he witnessed geometric-fractal kaleidoscopic shapes and lights and was redirected into and through a "tunnel."

In the tunnel he stated it was like "sitting in a cinema room, but I was behind it, I was the awareness watching my body ... watching lots of codes and numbers in the geometry," which he knew to represent his emotions and experiences from the past, "like going into my DNA, stimulating it and feeling it... the essence of myself, but every part of myself over and over, timelessly, everything, then nothing, then everything, like in a circle." He saw this code, which

coded for parts of his life, and would feel it based on the codes seen, relative to my vessel [body]". It also included elements which he couldn't as readily understand or distinguish as his past experiences—concluding it may be unconscious, ancestral or even future experiences. He reported it as "not like a screen, as it was curved as if it was all around me... it was definitely more than 3D everyday experience, as I could shift through anywhere in space and time if I tried. It was like [seeing with] 360 degree vision, but it was difficult and took a lot of energy for me to. It was more like I felt everything at once.

While around three-quarters of the way through the tunnel, SR encountered a "female entity, a female energy presence communicating, not verbally but telepathically" with him. She appeared as a blue "old theatre mask," who "talked through" the geometry, showing images which he would interpret and translate into language, telling him "to reconnect with all of you, do not suppress parts of you"—a message of inspiration to discover and embrace his whole self. SR further qualified this being as

really loving, all I felt was pure love... There was a sense of laughter...a warm blanker of 'it's going to be OK'. I felt really safe, like I was a child and that was my mother—but like a Universal Mother, it felt like a mother energy... It felt like the Creator...like it was Everything in One, but a representation of everything; an expression of the universe if it could place itself in a person,

or a being you could contact to communicate with.

She was complete, and pure love, who directed all of the imagery of his experience—and guided the fate of the universe. He sensed she held back, giving only a teaser, as he said every time his ego wanted to know more it made her keep a distance.

He experienced himself as an energy flying through the tunnel, at the end of which was a “metal gate, with gaps” which did not open, and he could not go through as it vanished as soon as he approached it, while the “feminine entity went through the tunnel, evaporating when it hit the gate.” It felt like a signal of “you’re not ready yet” or perhaps, he said, he did not inhale enough to go through and the effects wore off. After asking what would have happened if he had gone through, he responded.

Maybe my consciousness wasn’t ready yet. But it definitely felt like I could feel the energy, as I was getting closer something was growing inside of me. It could be a parallel or another realm—but I don’t know what realm I would’ve gone to.

In terms of the sensory, emotional or psychological effects, he reported his senses to be mixed or muffled as “all one thing of being me.” The experience was “vividly dream-like... feeling more real than this reality, in the moment... but with a watery-fading effect.” SR felt a déjà vu sensation, as if feeling at home with the message of “you’re here again!” as well as there being no concept of time. He mostly lost awareness of his body, but felt “more alive than alive, with a rush of energy flowing through every cell... electricity running through my body up to my brain.” He also felt as if the “[consensus] world was like a flat 2D plane... and although I was sitting down my body felt like jelly on the floor.” There was no identification of himself as “SR,” but he retained his sense of “being a being with experience”—only upon seeing the codes representing his “self” did he

realise who I was, I relearnt during that cinema-stage ... where I became my ego, but didn’t emotionally attach to it”. He didn’t feel he had

SR's Changa	SR's NDE	NDEs General
Disembodiment	Yes	Yes
Rush	No	No
Ego dissolution	Yes	Yes
Noise	No	Yes
Hyper-empathy	No	Yes
Synaesthetic	No	(Possible)
Pixelation	No	No
Tunnel	No	Yes
Geometric/fractal	No	No
Life review	No	Yes
On cinema screen		Yes
360 / Hyperdimensional		Yes
In code		No
Time transcendence	Yes	Yes
Noetic	Yes	Yes
Flying	No	Yes
Entity	Yes	Yes
Feminine/Motherly	Yes	Yes
Masked	No	No
Presenting	No	Yes
Soothing	Yes	Yes
Guarding	No	Yes
Loving/Benevolent	Yes	Yes
Omnipotent + Omnipresent	(Unreported)	Yes
Telepathic	Yes	Yes
Gate / Threshold	No	Yes
Unity	Yes	Yes
Hyper-reality	No	Yes
Familiarity	Yes	Yes
Peace/Bliss	Yes	Yes

Table 1a: Content analysis of features from SR's changa experience compared with SR's near-death experience, and presence or absence in general NDE literature

SR's NDE	SR's Changa	NDEs General
Light & Dark (simultaneous)	No	Yes
Outer space	No	Yes
Return / Sent back	No	Yes

Table 1b: Content analysis of features from SR's near-death experience compared with SR's changa experience, and presence or absence in general NDE literature

any revelatory epiphanies as he “already knew I was one with the universe... the oneness wasn’t shocking as I already believed that... You learn it [from previous psychedelic experiences], but it goes into the unconscious... it felt like all the answers resurfaced.

He rated the changa experience 9/10 in intensity.

Content Analysis

Tables 1a and 1b show that SR’s NDE was neither substantially different from, nor only slightly different from, his changa experience—but still notably distinct. Of the overall 33 features, 12 (36%) were common to both, with such comparability lying in disembodiment, the general mystical components of ego dissolution, time transcendence, noesis, unity, bliss, as well as familiarity, and finally a sense of presence with motherly, soothing, benevolent and telepathic qualities. The changa experience, however, was still highly comparable to the potential phenomenology of NDEs at large, where the only key differences with typical NDEs lay in the sense of rush, synaesthesia, pixelation, geometry, code, and a masked entity—with 24/29 changa content items consistent with

reported NDE features, representing an 83% similarity.

Participant’s Reflection on Changa–NDE Comparison

When asked to comment on how each experience felt in relation to the other, and if having undergone both experiences he believed endogenous DMT could have been involved, SR responded:

Comparing afterward [after the DMT]... [the NDE] did feel very, very similar... they all interconnect, overlapping with each other... the same feeling overlaid the whole experience... maybe in parallel spaces... I do believe that in the NDE, DMT was released by the brain, as when I had the DMT experience it was like a *déjà vu* to the NDE.”

Quantitative Analysis of Similarity

On a scale of 1–10 (1 = completely different; 10 = identical), SR rated that the extent of the similarity between his changa and near-death experience 8/10. On a scale of 1–10 (1 = absolutely impossible; 10 = absolutely definite),

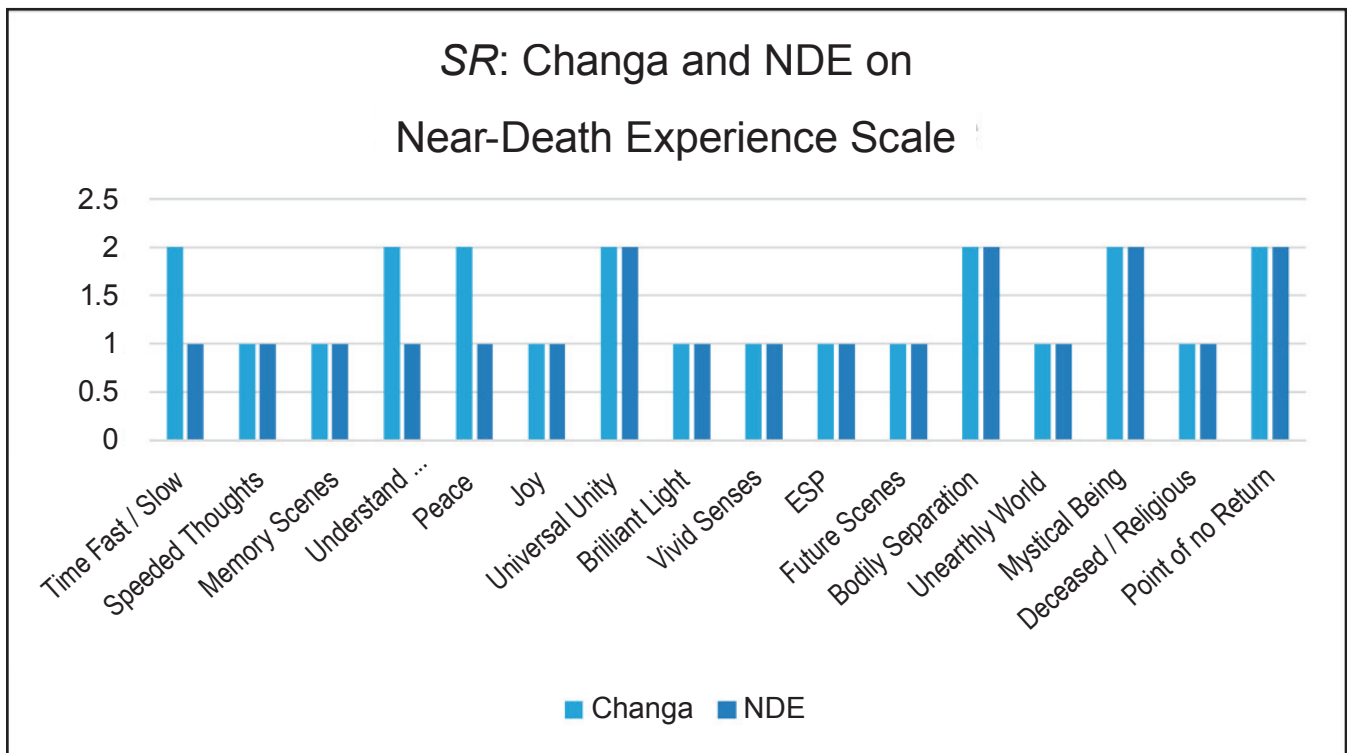


Figure 1: SR – Scores from the Near-death Experience Scale compared between the changa and Near-death Experience

SR rated the extent of his belief (if any) that the production or occasioning of his NDE was owing to endogenous psychedelic-like brain chemicals, such as DMT, 10/10. Figure 1 shows SR's scores from the NDES compared between his changa and NDE experiences.

Case Study Summary

Despite just over a third of the content being shared between the two experiences, SR in his own estimations considered his changa experience and NDE to be particularly comparable, as suggested by his ratings of similarity and belief above. This is bolstered by his scoring of the NDES (Figure 1), which assigned 23/32 for changa and 20/32 for the NDE, by exhibiting almost identical results between the experiences—where 13/16 items were scored the same (81% similarity), except for the mystical-related elements of time distortion, understanding everything and sense of peace to be scored higher for the NDE versus the changa. These features were also present in the content analysis for both states, yet may have been more intensely experienced in the NDE.

Case Study 2: "DA," Male, British-German

Age 32 at changa interview

Age 33 at NDE interview

DA experienced changa at age 32, then had two NDEs at age 33—one associated with an allergic reaction, and another with a possible Cotard's syndrome incident, both in May 2020, when he was 33.

Near-Death Experience Episode One (Allergic Reaction)

Before reporting his NDE, DA prefaced that in the preceding months to it he was going through "a lot of anxiety, fear, some symptoms of PTSD" due to previous experiences, but that this allergic reaction precipitated a certain turning point, such that he stated "from then I had a very altered state of consciousness."

DA described a histaminergic reaction to being stung on his nose by enthusiastically smelling a "dwarf nettle plant that has been fasciated" (when a plant gets an infection which causes the genes of the plant to mutate), emphasising that such fasciation renders nettle sting's "very very strong." Owing to some symptoms reminding him of brain injury, some

30 seconds later he tried to alleviate his anxieties by lying down on his bed. Some 20 seconds later (within 1 minute total), he "felt this massive rush of energy ... going up the back of my neck, a pain, very much physical sensation ... and a sense of movement up to the top of my skull", as well as a

sense of pressure that began on one side then started to move between both sides [of my head], then it ended up being really fast. This sense of pressure, pain, energy, heat that was flitting really really quickly between both sides.

At this point he panicked, thinking, "WTF is going on, am I having a stroke or about to have a seizure?" relating that he felt he "was on the brink of collapse, I don't think I physically collapsed."

Describing the psychological sequelae of the sting, he said, "I began to have visual and auditory hallucinations." Upon closing his eyes, he "began to have the most fascinating hallucinations. I had the Buddha's face appear before me, these blue eyes, and I was dwelling in this space for a long time." He also described "kaleidoscopic hallucinations It was more kind of, there were more lines, slightly more like looking into an actual kaleidoscopic than the visions you get with changa". Approximately half an hour afterwards, "it got less kaleidoscopic and more detailed, closed eye visions of basically becoming one with what appeared to me as these Buddha eyes. I was dwelling in this blueness, it was a very lovely feeling." He elaborated on this feeling of identification with this Buddha image, and the nature of it as an entity offering a communication:

It was a feeling of merger, I felt they were external but also felt that, there was a feeling of me absolutely kind of merging with that colour, those eyes, that atmosphere... a very clear communication about peace and just, relax... definitely felt like it had a will, and it was positive, and it was holding me in this blue space... these eyes are my eyes as well, I'm seeing in these eyes in the place where my eyes as well, in some ways this is a mirror.

In respect to time perception DA said, "Time felt very very warped, like time had slowed down but

only because everything, my thoughts seemed to be very fast in comparison to things going on around me." When questioning on bodily awareness, he instead resided in a deep contemplative state amidst the Buddha eyes, explaining,

I was really no longer aware of my body, and I would compare it to a very deep state of meditation in that I wasn't thinking... I was quite deep in a state of concentration, or I don't remember having many thoughts or much of an internal narrative at all, more a sort of dwelling.

Near-Death Experience Episode Two (Cotard's Syndrome-like, Ketamine Trigger)

DA himself was not sure whether he would categorise the first experience as a "near-death experience," given that he "had no idea whether, physically, I was actually near to death." However, "certainly during that point and couple of weeks after, this last phase of this episode, I was convinced I was dead."

After the above delineated experience, for approximately a week he described himself to be "in a very peak state" followed by a week of relative "normality" until, "partly triggered" by a high dose of ketamine, a further week and a half of a return to "a heightened state." Halfway through this second period of some elevated state of consciousness, "all sorts of things happened in my mind at that point to try to explain what was actually going on, all sorts of weird and wonderful ideas." This eventually culminated, through a process of elimination as to the ultimate cause of this experience, in DA's concluding that "the only logical explanation I can find for this was, I must be dead," a conviction which played out for up to five days. He could not understand his experience with any alternative, compelled to believe that, "I have transitioned in some way to some form of different dimension, realm, reality, state of consciousness."

Then DA articulated an arduous attempt to pinpoint how he might have died, which evolved into a "life recall" of his entire life, in which he "was digging up memories that I had no idea were still there... in a lot of detail, quite photographic recollections of memories. Exploring all sorts of stuff in my life." In expanding on the content of this life-review-like

episode, and its valence, he conveyed a "tendency toward looking at the negative, and it was more at times a conscious effort on my part to also view the positive... voluntary interspersals of 'No, this was pretty good and this had really positive effects on other people,'" such that he considered that this more accessible negativity was linked with how terrifying this whole experience had become for me, I was like, 'Well shit, I must have done some really bad stuff to be in this space where everything is so fucking terrifying, potentially after I'd died!'" Reflecting the interpersonal emphasis during evaluations of one's life, DA said, "It felt very empathic, in that I think I was putting myself in the shoes of other people." Yet he eventually surmised that this largely harrowing experience felt it must be a natural consequence of his actions toward others, as the experience

would kind of fast return in the loop to me, in that it was so interspersed with this uncertainty, unknowing, this fear of being in this place that was a really scary place that I don't know whether it had an end—so there was this feedback loop of, "Ok well, so I did this action that had these negative consequences, and that's scary because it seems—Is the sum of all these things what I'm experiencing now!?"

Through the review process, he felt he could select other moments in his life when "maybe it went a little weird afterwards," that is, other incidences which could have precipitated his "death," which again instantiated the notion that "I have to entertain the possibility I'm dead." He was initially shocked—"Well, I'm surprised that that's what death is like, you don't even know you fucking died!? Like come on guys, that's not fair is it!?"—but soon reconciled that, irrespective of the ambiguity over his death, he felt that

I was in a place where I was judging all these things in my life, I was having this self-judgement, like, 'Did I, could I've acted differently in this way?', 'God, my ego was out of control right there', 'God, I treated this person really badly'. But then also looking at positive actions as well. I was like 'Ok, I feel like I'm in this stuck place, so maybe I am in some kind of realm, some

in-between realm, maybe I'm some kind of ghost, maybe I'm in some hungry ghost realm', maybe in a place where I'm not able to move on because I'm not dealing with particular things.

That is, he integrated these realisations by coming to the knowledge that he

need[s] to make sure that I'm addressing these, I don't know whatever, karmas, samskaras, or even simply just the way I feel about things that have happened in my life, and the way I lead my life—or death!—from now on Regardless of whether I'm alive or dead it's still the same outcome: I still need to live life as self-compassionately and compassionately towards others as possible.

He framed this experience as eliciting “an emotional outpouring,” leading to a conversation with a friend in Thailand, a long-term practicing Buddhist, and later with his mother.

Upon taking a “very small amount of Valium, like 2mg,” he slept for a few hours, woke up, and “it was like everything was mostly—in terms of the altered state of consciousness—pretty much back to normal.” Since the abating of this experience, DA reported that he has been, and continues to be, working through a great amount of integration. These encompassed some provocative, metaphysical lessons he feels he took from it: “Well, I've never known, really, the *true* nature of my reality and everybody else's reality. Sure I may not know if I've actually—I may well have died, but how do I know that I was ever alive!?”—as well as certain changes he felt important to make to his life, after contemplating that, “it was interesting that the whole thing resolved for me when I finally, really came to peace with the idea that I might be dead, I might be alive, whichever way round—it's still the same thing.” Such a conclusive teaching he received from the experience, irrespective of his mortal status or the ontological musings thereof, was movingly rendered in his final words:

I couldn't think about anything else actually—it seemed very clear that in those few days, which

eventually brought about the end of this experience for me, coming to terms with this—[that] it was so strongly about the implication of my actions and how I ... could change or act differently in the future, whatever that future was. Whether that future was in life, or whether that future was in wherever I was now! I simply didn't know whether by coming to the end of this review and coming to terms with this, did this mean that I was gonna shoot out of my body and be reborn as a cow!?! I have no idea what's gonna happen! But whatever the outcome is, it's still the same—I still need to learn the lessons from this experience, and those lessons are all about suffering and compassion, basically.

He gave the NDE an intensity rating of 10/10.

Changa Experience

DA's changa experience involved 50% DMT freebase and B. caapi; it lasted 20 minutes on September 26, 2019, when he was 32. The very first sensations DA described surrounded an aperture and geometries, giving way to anxieties and a fear of dying:

There was kind of a portal, a kind of circular or spherical shape of patterns, and yeah then a wave of kind of fear and panic came over me where I suddenly felt, ‘Woah is this kind of too much...this is really really intense, what am I doing, where am I?’ And yeah this feeling like I was dying or going to die, and that kind of levelled out”. About his body he relates that “my body wasn't really relevant to that at all, I was just very much in this place of experience, I wasn't aware or conscious of my body.”

From this bodily disconnection he emerged into another circus-like space inhabited by a threatening being: “It was quite sort of carnival-esque and there was an initial...sort of entity that was a kind of jokery-type trickstery character with very long fingers, and was basically at the beginning telling me to ‘Fuck off.’ Yeah (laughter)!” DA paralleled this to other prior experiences, since concluding,

It's sort of part of my psyche, like feeling like telling me that I'm kind of not worthy or

accepted in this experience. So yeah it wasn't a scary or shocking thing when that entity came up, it's kind of quite usual.

The "menacing presence" of this being, "pretty aggressive, pretty hostile" yet also "really powerful," manifested in the clown-resembling form of "a jester, a joker wearing what looks like a kind of jester-type hat. It wasn't really a hat but part of its being." This ambivalence or trickster-reminiscent duality seemed to DA to be mirroring of certain personal dimensions of his own, who said, "I perceive this entity to be a part of myself...that doesn't feel worthy, that feels unlovable, that feels not good enough. A part of myself that doesn't want me to have, doesn't want me to love myself."

This multidimensionality to the jester continued,

At the same time it's welcoming me, because it's right at the beginning as well. Like Okay, 'Hi familiar face'... [But it's also] telling me to fuck off! I suppose welcoming in terms of it just greeting me with a fuck off!

Similarly, the jester was couched in terms of providing "a kind of test," as he served a gate-keeping-like function at the juncture of the portal, "Like 'Are you gonna, Can you get past me?' basically." This lent itself, according to DA, to a notion of the entity as "actually a bringer of wisdom and healing," connected to the concept of its resonance with his own internal processes, on account of how

It requires quite a lot of strength to face that and say, 'Okay, there's this fucking aggressive, quite scary thing telling me to fuck off', just 'Get the fuck out of here' basically. Sort of pushing through that to see that, just as a kind of resistant part of myself, and once I can do that, if I'm able to do that, then it just kind of evaporates, it lifts.

DA contextualised his encounter by bringing to light the historical representation of this "trickster" figure:

In different kinds of philosophies and spiritualities around the world, there's often this jester, trickster figure, who is kind of an interdimensional traveller

... this idea of using comedy and play and drama to kind of almost, well to teach people things, but also veil its own power... Playing the fool, yeah exactly, but this idea that actually, certainly in Europe anyway, the jesters in royal courts held a lot of power.

Upon the dissolution of this chapter, DA then inhabited some hypercolourful realm characterised by a certain fun freneticism, described as

quite a playful, carnival-esque kind of almost like a playroom with lots of kind of moving objects, that were like very very much alive, yeah lots of colours... but it was so intense at that moment that it was kind of like being on a fairground ride, just so much that was too much to really take in.

Upon being asked why he felt "carnival" or "playroom" would be the best descriptors for this space, DA illuminates that it was related to

the joker/jester, the intensity of it, the sort of whirling and full-on-ness of it all, the playful—it felt playful, like there were these things that were like living toys, there were things that were playing with each other, like a sense of push and pull, swirling around, this was happening all around me, this sense of movement and play interaction ... very colourful.

The subsequent scene involved a mysterious, fluctuating light associated with a sense of movement as if guided by others:

I started to get like a really very very vivid sort of purple or purplish light or colour, it wasn't really a light, just a total kind of absorption...and it was flickering on and off, and I was aware that if I brought my attention upwards in my mind toward my 3rd eye toward my crown, it would become more solid... at the same time there was a kind of whooshing sensation, with sort of not quite hands, but just this sort of sensation of 'Yes go up there, direct your attention up there'. So I then kind of focused on it and it was almost bathing in this light, it felt really really beautiful, really comforting.

Further qualifying this multifaceted “light” encounter, DA depicted it as a light which was simultaneously “emotion and vibration and sort of energy, yeah all of those things at once.” In responding to the sentient nature of this light, DA was initially uncertain, but did state,

I definitely felt like the light was alive for sure... It was like this huge rush of energy, coming out what felt like coming out of my 3rd eye, then it was like everything was kind of juddering, this white light was really really alive. It wasn't like it was just light, it was like it was feeling as well, it was rushing into my body and all around my body, I could feel it in my fingertips and in my shoulders, and in my face and in my jaw particularly as well.

A definitive sense of the presence of “another” was evoked by “the way [the light] was being directed into me, I felt a kind of sentience in that there was a kind of guide, something that was guiding that experience and guiding that light.”

The light's oscillations then transitioned into a transportation through and into a darkness, albeit one which appeared to be yet another dimension to this magical-seeming light:

[It] became a sort of outward projection, then everything went black, but still shimmering and vibrating, and I felt like I was shooting through something, through some kind of atmosphere. And I had this sensation like I was in space, and yeah that I was going upwards, and I was really just sort of letting this blackness in, but yet at the same time, I also had this sensation that it was the same thing as the white light. And that also felt like this really sort of comforting feeling, that behind this blackness is light.

Later, the aforementioned guides, not visually manifest yet apparently behind the light and his transportation, were further fleshed out by D: “I had this sensation that there were these beings there, who had guided this process of shooting into space, and who were offering sort of protection and healing.” This “very strong energetic experience” was felt to be “guided by these like Star People entities that as I mentioned before I've experience with on ayahuasca and DMT, but also just sober

with yoga as well,” and their demeanour was one of total benevolence—“just loving. I think love is just the best way to describe it really. I think maybe a sort of like an intention of like compassion and wanting the best for me.”

Finally, for this arc of his journey, DA added further nuances to this experience of glistening void, whose paradoxical vitality in its dead space, encoding a powerful symbolism, suffused him with a profound sense of reassurance:

The transition from the purple light to the fluttering euphoric white light, then to the sort of projection into darkness... what was really really beautiful about this was I was in this darkness, I let it—I let myself go through it, let it fully encompass me, and I had this deep deep sensation and knowledge that the fluttering light was still there actually. That it still felt the same, so either the white light was still behind it or it was literally the same thing as the white light just in a different form... it felt like there was life there, simultaneously it felt infinite and expansive like there was nothing, but at the same time it felt like it was filled with everything ... although I kind of experienced it as a white light flooding in, the fact that it was flickering meant that there was darkness, that it was going between light and dark really really quickly.

Regarding time perception, DA stipulated that “there were points which definitely felt like a time expansion, and then other points a time contraction. But timelessness would definitely be the best way, or a kind of bending of time.” And ultimately, even as the experience was winding down, he “felt like [his] third eye was so so open, like energy was just flooding in and out of it at such a huge rate, and it felt amazing” until he felt himself finally reassociating with his body, and the visions began to fade out.

He rated the changa experience an intensity of 7/10.

Content Analysis

Tables 2a and 2b illustrate that 21 of the 51 total features were shared between both his changa experience and NDE (42%), in turn indicating that DA's changa experience was comparable to SR's

DA's Changa	DA's NDE	NDEs General
Tunnel	No	Yes
Portal	No	(Possible)
Panic / Confusion	Yes	Yes
Sense of dying	Yes	Yes
Disembodiment	Yes	Yes
Carnival-esque scene	No	No
Playpen	No	No
Transforming toy-like objects	No	Yes
Sentient	No	No
Playful	No	Yes
Flux	No	Yes
Entity	Yes	Yes
Joker/Trickster	No	(Possible)
Menacing	No	Yes
One with entity	Yes	Yes
Powerful	Yes	Yes
Guiding	Yes	Yes
Teaching	Yes	Yes
Healing	Yes	Yes
Overwhelm	Not reported	No
Colourfulness	Not reported	No
Translocation	Yes	Yes
Presences	Yes	Yes
Hands	No	(Possible)
Guides	Yes	Yes
Healing	No	Yes
Loving/Benevolent	Yes	Yes
Humanoid	No	Yes
Highly evolved	No	Yes
Bright light	Yes	Yes
Flickering	No	(Possible)
White	Yes	Yes
Synaesthesia	No	Yes
Rush	Yes	No
Light & Dark (simultaneous)	Yes	Yes
Outer space (Alien-like)	Yes	Yes
Beauty	Not reported	Yes
Letting go	Not reported	Yes
Time distortion	Yes	Yes
Ecstasy	No	Yes
Noetic / Personal insight	Yes	Yes
Unity	Yes	Yes

Table 2a. Content analysis of features from DA's changa experience compared with DA's near-death experience, and presence or absence in general NDE literature

above, in terms of overlap with their own NDE. This common experiential ground lay in a feeling of confusion, dying, and disembodiment; mystical elements of time distortion, unity and noesis; sense of presence with powerful, guiding, teaching and healing qualities, with which they felt oneness; translocation elsewhere, further presences with benevolent qualities; bright white light, a bright darkness, and alien-resembling feelings. Similar to SR above, almost all elements of DA's changa experience are identifiable across the repertoire of NDE phenomenology, except the changa state's inclusion of a carnival-esque environment, and the presence of geometric displays in their NDE—with 35/42 changa content items consistent with NDEs, also representing an 83% similarity.

Participant's reflection on changa–NDE comparison

When asked to comment on how each experience felt in relation to the other, and if having undergone both experiences they believe endogenous DMT could have been involved, DA responded:

Without a doubt... I'd absolutely say there was clearly, probably DMT pumping around my body in bigger amount [during the NDE]... Obviously, having used external substances to change my consciousness has a large bearing on the way I now frame that [NDE] experience [i.e. after experiencing psychedelics like DMT, the NDE can be linked to DMT].

DA's NDE	DA's Changa	NDEs General
Buddha's eyes	No	No
Friendly / Peace	not reported	Yes
Geometry/Fractals	not reported	No
Clear mind	not reported	Yes
Life review	No	Yes
Limbo / In-between	No	Yes
Loving	No	Yes
Speeded thoughts	No	Yes
Hyper-empathy	No	Yes

Table 2b. Content analysis of features from DA's near-death experience compared with DA's changa experience, and presence or absence in general NDE literature

Quantitative Analysis of Similarity

On a scale of 1-10 DA rated the extent of the similarity between his changa and near-death experience 6/10. On a scale of 1-10), DA rated the extent of his belief (if any) in the production or occasioning of his NDE being due to endogenous psychedelic-like brain chemicals, such as DMT, 9/10. Figure 2 illustrates DA's scoring of the NDES for his changa and NDE.

Case Study Summary

Just over 40% of the content appears to be common to both the changa and NDE experienced by DA according to the content analysis, which is somewhat mirrored in the participant's own estimations as indicated by his ratings of experiential similarity above (6/10). The rating as to belief in the likely implication of endogenous DMT in his NDE is higher than the similarity rating, echoing his personal statement as to prior drug experiences generally permitting the linking of these with such "natural" states as NDEs. The NDE Scale results were 18/32 for changa and 24/32 for the NDE, and also suggest a mixed relationship between the two states (Figure 2), where 6/16 items were

scored the same (38% similarity)—except for time distortion, body separation, entering another world, and encountering an entity being higher for the changa; where speeded thoughts, scenes from the past, understanding everything, extra-sensory perception, scenes from the future and coming to a threshold of no return were higher in the NDE state.

Discussion

Each participant had changa experiences which, according to the content analyses (Tables 1, 2), were moderately similar to their respective NDE—and this was comparable between the two cases (36–42% overlapping features).

When contextualising in the wider phenomenological literature of NDEs, despite this moderate similarity almost all features are observable in NDEs—except rush, synaesthesia, pixelation, geometry, code, masked entity, and (in DA) carnival-esque environment across the changa reports, and geometry in DA's NDE. These, explicitly enough, represent the more prototypically psychedelic, especially DMT-related, themes, and are conspicuously absent across the vast majority

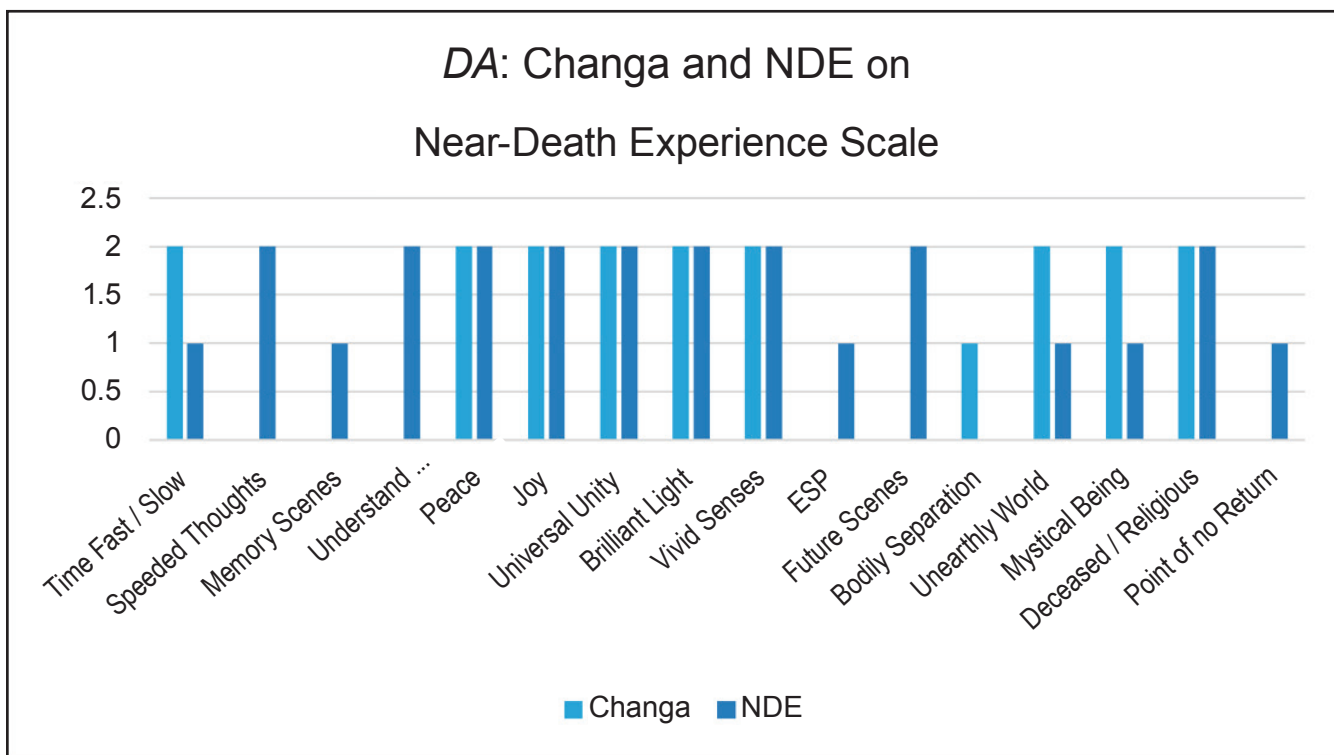


Figure 2: DA – Scores from the Near-death Experience Scale compared between the changa and near-death experience

of NDEs—which is supported by other qualitative comparisons (Michael et al., *in review*). This being so, also strongly emphasised in Michael et al. (*in review*), many NDEs can be very idiosyncratic in nature and as such more closely echo such psychedelic/DMT states. An example of this is the entity presenting itself as a mask in SR’s changa experience guiding him toward a threshold, where one NDE reported in Michael et al. (*in review*; reproduced in the appendix) involved a similar being manifesting as a face luring the subject through a threshold, and was on the whole tremendously DMT-resembling. In this way, this changa experience, though not incomparably to many DMT trips, was mimetic of such idiosyncratic NDEs.

Additionally, SR’s changa experience incorporated being taken to the foot of a gate, symbolic of some border of “no return” to another space. This is an especially interesting finding, as such an overt threshold feature is almost never encountered across psychedelic/DMT reports, but is an especially prevalent element to NDEs (Greyson, 2014; Michael et al., *in review*; Timmermann et al., 2018). As such, SR’s changa trip reproduced this typical NDE feature of the “point of no return,” interestingly despite the possible neural or psychological rationale for its typically featuring in NDEs and not with psychedelics, such as expectancy given actual proximity to death. This being so, one study appears to have found statistically similar scoring on all NDE scale items, including the threshold, when comparing NDE-like events with no proximity to death, including drug states, and classic NDEs (Charland-Verville et al. 2014). But subjective feelings as to death-proximity may still arise in such NDE-like conditions, including changa here. As to the inclusion of geometric arrays in DA’s NDE, again this may constitute an idiosyncratic component of an NDE, as such a dimension is classically the domain of psychedelic/DMT experiences, including the patterns reported in DA’s changa trip.

Regarding the quantitative ratings, again, despite the fairly low similarity according to the content analysis (Tables 1, 2), both cases indicated a very high level of confidence in their belief that endogenous psychedelics, like DMT, could be contributive to their NDE (SR = 10/10, DA =

9/10), though in terms of experiential comparison between their changa and NDE states, DA indicated less comparability (6/10) than SR (8/10) (despite the content analysis showing marginally higher similarity than SR), which was more aligned with their content analysis similarity (42%).

In terms of the psychometric analysis, SR responded virtually identically on the NDE scale between both experiences (13/16 items as same, 81%), despite only a 36% similarity reflected by the content analyses. Though this suggests an extremely strong reproduction of their NDE by the changa, it also highlights a relatively marked discrepancy between the participant’s first-person ratings compared to the third-person content analysis of features. However, such content analyses (or thematic analyses in general), over and above questionnaire administration, are a significantly more in-depth method with greater opportunity to highlight differences not otherwise captured, and thus they likely offer greater fidelity to the experience (Michael et al., *in review*, 2023). Again, more aligned with their fairly low content analysis similarity, the other case, DA, presented much more mixed results on the NDE scale between the states (6/16 items as same, 38%). Many of these incongruences covered entering another world and encountering an entity being higher for the changa—which is consistent with previous comparisons of the pure *N,N*-DMT state and NDEs (Michael et al., *in review*); as well as scenes from the past (life review), extra-sensory perception/scenes from the future and coming to a threshold of no return being higher for, and thus possibly more quintessential to, the NDE state—also continuous with Michael et al. (*in review*; cf. Greyson, 2014).

One theoretical speculation as to why the changa experience specifically may be of particular interest to investigate cod phenomenological resonances with NDEs is the fact that the presence of *N,N*-DMT and harmala alkaloid MAOIs (increasing monoamine activity) roughly corresponds to a pivotal finding in the neurobiology of the mammalian (rodent) dying brain, that a host of neurotransmitters is released in highly significant concentrations (especially at 3–4 minutes), including (though not limited to) DMT itself (Dean et al. 2019), serotonin,

upon which DMT acts at the 5-HT_{2A} receptor, and the other monoamines of noradrenaline and dopamine (Li et al. 2015). Martial et al. (2019b) also identified drug experiences (including ayahuasca) involving the monoaminergic system to very closely parallel the NDE state, despite excluding changa prior to analysis, where Liester (2013) also concluded the ayahuasca state to be similar enough to the NDE to draw mechanistic parallels.

The overarching sequence, in rough chronological order, of demarcated events (excluding the diffuse mystical components, which are themselves accepted NDE features) of both the present case studies' changa experiences incorporated the following: For *SR*—disembodiment, a noise, flying through a tunnel, a life review (as if on a 360-degree screen), hyper-empathy, a benevolent god-like entity, and a threshold-like gate; For *DA*—confusion, a sense of dying, disembodiment, a tunnel, a powerful, teaching entity, translocation elsewhere, other humanoid evolved beings, bright white light, and light-dark/outer-space-like environment. In approaching the experiences in this way, contrasted to allusions above of lack of similarity, e.g., by lower content analysis overlap or subjective ratings, all these changa elements are remarkably evocative of NDEs—even if not the specific NDEs each case presented with. With this lens, changa, as constituting an NDE-like condition, at least in these two cases may have especially high fidelity to classical NDEs—not necessarily more than *N,N*-DMT, but in a comparable way to the few cases of *N,N*-DMT experiences in the comparative study with classic NDEs (Michael et al., *in review*) specifically highlighted as being “expressly NDE-like.”

Other than the obvious sense of dying aforementioned, the threshold and life review may be especially associable with NDEs (Greyson 2014; Michael et al., *in review*), the commonest features have been found to be disembodiment, bright light, and mystical beings (Charland-Verville et al. 2014), and there seems to be an emphasis on the tunnel phenomenon across NDEs after the NDE's popularization in 1975 (Athappilly et al., 2006; Moody, 1975). Even regarding the general sequencing, e.g., from a tunnel through a life review

to a threshold (*SR's* changa)—or a tunnel to a white light amongst another world (*DA's* changa)—is essentially the arc of the prototypical NDE. While no temporality of NDEs was strictly evidenced, a comparable, general progression has been noted from the experience of light, followed by the main narrative structure such as entity encounters, and finally border and return (Martial et al. 2017).

The following two sections now turn to a focus on the differences between the changa and NDE states. The *N,N*-DMT experience may consistently reproduce the basic features of an NDE, where the nuances of the content represent a fork in the road of comparison where the two experiences diverge (Michael et al., *in review*)—and the 5MeO-DMT experience may dependably generate the classical mystical dimensions of experience, yet is itself content-free (or maximally content-rich, which may be synonymous) and may not exhibit the rich “interactive-relational” (Strassman, 2014) dimensions of an NDE (Michael et al., 2023). However, regarding changa and the findings presented here, conclusions as to the precise way this experience may represent an NDE are more ambiguous.

As delineated, it is critical to note that all but a handful of features from the changa reports are locatable across near-death experiences in general. However, more central to the present study, a notable proportion of elements of the content are comparable to the case's *own* NDEs, but a great deal, in fact *more*, is not. This may, in large part, be owing to the main inclusion criteria for participants being to report an NDE as a result of at least some degree of physiological stress, which does not constitute the classical definition of one occurring in a state posing threat to life. *SR's*, though still owing to transient brain hypoxia, was relatively shallow, as illustrated by the transcript summary (despite the NDE scale's suggesting otherwise), as well as *DA's*, perhaps ultimately representing more of an “NDE-like” experience (Martial et al. 2018), i.e., with comparable phenomenology yet without clearly life-threatening conditions. *DA's* was peculiar and evidently complex in that—though it was indeed initially triggered by an allergic reaction and physiological symptoms—it in fact spanned a number of weeks, and seemed exacerbated by a

ketamine trip (itself a well-established NDE-like state: Corazza, 2008; Jansen, 2000; Martial et al., 2019b), and demonstrated some symptomatic overlap with Cotard's syndrome (in turn characterised by a conviction of being dead; Mobbs & Watt, 2011).

This is a key limitation of this study, as it could be speculated that if the NDEs of the present case studies were of more of a "breakthrough" nature, or more canonically life-threatening, such as by heart attack or coma, the comparative analysis would be less ambiguous between strictly classical NDEs and the NDE-like experience of changa, where the comparability drawn by the present study may have been more dramatic, suggested by higher proximity to death resulting in higher NDE scale scores (Martial et al. 2019b). This said, as per DA, Cotard's syndrome and other drug states were included as one of the NDE-like experiences compared against classic NDEs which found no phenomenological differences (Charland-Verville et al., 2014). This itself is versus the evident non-typical content of DA's NDE, suggesting that the content may still be different between NDEs and NDE-like states which is not acknowledged in Charland-Verville et al.'s study.

Both participants' changa reports may have shared most features with NDEs at large (83%), but echoed the qualitative content in an idiosyncratic way, and thus mirrors the NDE in a similar way to how *N,N*-DMT does—and as such, a preliminary conclusion may be that changa may be just as representative of NDEs as *N,N*-DMT alone (Michael et al., *in review*). Naturally, the main limitation to the present article is the reliance on only two case studies, which makes any final interpretations premature and constrains the generalisability of any findings substantially. Yet, changa's effects being vastly due to the presence of *N,N*-DMT (where the harmala alkaloids may prolong/enhance effects, though normally only if in extracted form), meaning a near-chemical equivalence, bolsters this conclusion. A caveat is that the proportions of DMT-MOAI in the participants' changa is not known or well quantified, which could usefully inform the rationale behind identified experiential similarities/differences, a limitation of this study.

As mentioned, several features in the present changa reports are not found amongst general NDE reports. For SR, this entailed a rush, pixelation, synaesthesia, whereas for DA, a rush, synaesthesia, carnival surroundings, a playpen, and transforming, sentient toys. These are all classical of DMT phenomenology (not that of NDEs), where the motifs of a carnival-like environ, playpens and toy-like objects in flux appearing alive have been reported multitudinous times (McKenna, 1993; Michael et al., 2021; Strassman, 2001). Turning from the presence/absence of features toward the qualitative content, that is, the subjective variation of each such basic element, SR's tunnel was described as being composed of geometry, his sense of empathising with others was in a synaesthetic form, and his life review was graphically represented in a type of code. For DA, the tunnel was a portal, the original entity he met was a menacing joker character, and he reported a rather ineffable "alien feeling" about one part of the trip. In this way, the content in both cases manifested as idiosyncratically DMT-like, and thus was dramatically divergent from that typical of NDEs. This was similarly the case with two *N,N*-DMT participants in Michael et al. (*in review*).

One intriguing point to consider when investigating individuals having had both psychedelic drug and near-death experiences is the timing of each, as this may have therapeutic implications. In the case of DA, his changa experience was prior to his NDE; however, in both the case of SR, and another case (Michael et al., 2023), the drug experience was subsequent to the NDE. In the latter 5MeO case, the participant said that the purpose of the psychedelic experience was to attempt to "return" to the world they had penetrated during their NDE and to try to engender the same transformative effects, as was already the person's practice via the use of certain musical frequencies. This directly echoes the postulation (Shushan 2009, 2018) that it may have been the near-death experiences of humanity's ancient ancestors, which, owing to their evidentially personally salutatory and collectively prosocial influences (e.g., Lake, 2019), led to communities deliberately seeking to reproduce them through inductive techniques ("archaic techniques of

ecstasy;" Eliade, 1951). These would often include the use of entheogenic substances (as well as music, drumming, dancing, physical injuries, austerities, such as food and sensory deprivation), which also confer such adaptive community-binding effects (e.g. Dupuis, 2021), and in so doing, led to the development of the initiations and rituals that result in "soul flight" into the "other world" characteristic of shamanic societies (Winkelman, 2019).

While this motivational progression from NDE to psychedelic journey emerged in the 5MeO case (Michael et al., 2023), it should be acknowledged that DA is a regular psychedelic user and has undergone further journeys since his NDE (which, unlike SR, came after his here reported changa trip), and both mentioned that using such mind-altering substances to experience another altered state with possible implications for their NDE was one driver of using them (*DA, SR personal communication*)—and, more speculatively, when returning to, in order to reanimate, the original NDE may similarly be part of this motivation. In this way, in future work researching NDEs and psychedelic experiences in single individuals, attention should be paid to their chronology and the specific intentions of the participants to evaluate the above inferences. This is especially given that the NDE may be experienced as highly challenging by some (Cassol et al., 2019), and the integration thereof may also be distressing even in positive NDEs—and so NDErs may be attracted to psychedelics to aid in integrating the experience via a partial re-induction of it, which could be mimicked if psychedelics were available clinically, for instance, for the trauma that some NDEs may bring. This is akin to the employment of other inducible altered states, to return to or help integrate a previous altered state of consciousness, such as hypnosis in the case of a prior psychedelic experience ("hypnodelia;" Lemerrier et al., 2018). This being so, one limitation to the current study is that if the changa were expressly used with such above intentions after the NDE in SR's case, this may elicit a suggestion effect, and thus be a psychological reason for any identified similarities, and thus such similarities not being uniquely owing to possible neural effects delineated below.

Finally, the matter of state-dependent, or mood-congruent, memory should be addressed, which refers to people's being better able to retrieve memories when in the same neuropsychological state or mood they were in at the time of encoding. The use of psychoactive substances is often employed to induce certain mental states during the learning of information and test recollection in sober and the same altered state, where positive results have been identified for stimulants, such as methylphenidate (in those with attention deficit hyperactivity disorder (ADHD; Swanson & Kinsbourne, 1976), and especially for depressants, such as alcohol (Weingartner et al. 1976)—yet mixed results were produced when evaluating the comparatively more "psychedelic" delta-9-tetrahydrocannabinol (THC, the main psychoactive compound in cannabis; Schoeler & Bhattacharyya, 2013). In a similar way, the case studies entail a state induced by an NDE and then one by a psychedelic agent (or in reverse order), which have already been evidenced to share significant phenomenological overlay and possibly neurobiological, and the main aim of this article is to compare them in a within-subjects manner. This indicates the possibility that the information encoded in the original state, i.e. that of the content of the experience itself, may be better reactivated upon entering the second state. Such reactivation would be a form of remembrance, which in the vivid perceptual state of the NDE or psychedelic episode could manifest as an acute experience. So if indeed the experiences resulted in a very high degree of comparability, this could demonstrate the occurrence of state-dependent memory, potentially on account of the sufficiently similar neural states attributed to both—substantiating the NDEs as mediated by similar neurochemistry as the psychedelic experiences.

The degree to which the results address this is ambiguous. Even though SR's psychometric results were nearly identical between changa and NDE states (though mixed for DA), and the personally rated and articulated comparability of the two (particularly SR) were relatively high, the content analyses, at least within-participants, revealed only a moderate comparability (36–42%),

possibly undermining both the above processes being, at least majorly, in play, and in turn a DMT + monoamine hypothesis of NDE physiology. Future research is encouraged to explore the state-dependent memory effects of classical psychedelics themselves, and also in comparison to NDEs.

Conclusion

The present article offers a novel comparison of a poly-psychopharmacological experience with near-death experiences, as well as uniquely using participants reporting both experience types, with systematic qualitative and quantitative methods, thus significantly improving on the scant investigations thus far and representing a substantial contribution to the overarching, psychedelic-NDE comparative project. Compared to NDEs generally, features of the changa reports were largely consistent with NDEs, where some NDE-associated features (e.g., threshold) were also present in the changa, and chronology is arguably more NDE-congruent; however, when compared with the participants' own NDEs, the changa was markedly divergent, and across all conditions the level of qualitative content was idiosyncratically different (akin to *N,N*-DMT). Future within-participant studies of psychopharmacological modelling of near-death experiences, including with changa, are indicated, and these should include greater sample sizes, ideally with more classical NDEs and measures of MAOI-content to extend the present precedent-setting exploration of possible neural mediations of this important phenomenon.

Author Contributions

Conceptualization involved PM, Data curation involved PM, Methodology involved PM, DL and OR, Formal analysis involved PM, Writing original draft involved PM, Review & editing involved PM, DL and OR, Supervision involved DL and OR, Funding acquisition involved PM and DL

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Conflict of Interest

The authors declare no conflicts of interests

Data Availability

Datasets are available on request: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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About the Authors

Pascal Michael, BSc, MSc, PhD, completed his doctorate in Psychology at the University of Greenwich on a comparative analysis of the neurophenomenology of both DMT (and analogous) experiences and the near-death experience (NDE). He is

currently a lecturer there, teaching and researching neuroscience, psychopathology and counselling, psychedelics, NDEs & other survival research, UFOlogy/abduction, parapsychology and more. Pascal has presented at Breaking Conventions and for the Tyringham Initiative, and published in journals such as *Frontiers*. He is co-leader of the ALEF Trust's certificate in Psychedelics, ASCs and Transpersonal Psychology, and the 2020 recipient of the Schmeidler Outstanding Student Award.

David Luke, PhD, is Associate Professor of Psychology at the University of Greenwich. His research focuses on transpersonal experiences, anomalous phenomena and altered states of consciousness, especially via psychedelics, having published more than 100 academic papers in this area, including thirteen books, including *Otherworlds: Psychedelics and Exceptional Human Experience*. When he is not running clinical drug trials with LSD, conducting DMT field experiments or observing apparent weather control with Mexican shamans he directs the Ecology, Cosmos and Consciousness salon and is a cofounder and trustee of Breaking Convention: International Conference on Psychedelic Consciousness.

Oliver Robinson, PhD, is Associate Professor at the University of Greenwich. His research focuses on life transitions, adult development and psychedelics, and on best practice in qualitative methodology. He has also written a book on the complementary relationship between science and spirituality entitled, *Paths Between Head and Heart*.

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