

Response to Pascal Michael's “Commentary on *After: A Doctor Explores What Near-Death Experiences Reveal About Life and Beyond*”

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ABSTRACT: Pascal Michael presented a cogent commentary on my recent book, *After*, focusing on the similarities between near-death experiences (NDEs) and psychedelic experiences. In doing so, he suggested that I did not acknowledge the substantial explanatory value of a psychedelic framework in understanding NDEs. I agree that I may have understated the role that endogenous psychedelic molecules may play in mediating some NDEs or NDE-like experiences, but I maintain that that such mediation does not imply causation of, or even inevitable correlation with, NDEs. I suggest that those NDE features that are not explained by neurochemical mediation are critical elements in understanding the origins, mechanisms, and meaning of NDEs.

KEYWORDS: near-death experience, psychedelics, psychopharmacological model, neural correlates

I thank Pascal Michael (2021) for his careful reading of, and kind words about, my book, *After: A Doctor Explores What Near-Death Experiences Reveal About Life and Beyond* (Greyson, 2021a), and for revisiting the intriguing question of the relationship of psychedelic drug experiences and near-death experiences (NDEs). I also appreciate Michael's open-minded skeptical approach, suggesting that mediation of NDEs by endogenous neurotransmitters is likely, but acknowledging

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that some NDE dimension may not be fully explained by such a reductionist paradigm and that the ‘hard problem of consciousness’ remains unresolved; and his acknowledgment that a psychedelic model for mediation of NDEs does not necessarily imply a reductionistic physicalist interpretation but may also be consistent with a “transmission” model in which the brain is a transmitter rather than creator of consciousness.

Michael (2021) chided me for not taking a neurochemical explanation for NDEs as seriously as he does. I have received a fair number of complaints from proponents of different explanatory models for NDEs, each complaining that I failed to recognize the full explanatory value of his or her favorite hypothesis. I wrote quite clearly—I thought, at least—in the Introduction to *After* that I did not intend the book to be an encyclopedic compilation of everything that has ever been speculated about NDEs—which would have taken several volumes—but, rather, intended it to be a summary of my current thinking about NDEs and the evidence that led me to those ideas. I agree with Michael that the possible role of neurochemicals in NDEs deserves further investigation, but I disagree with his assessment of the explanatory value of the evidence accumulated so far. Nevertheless, I thank Michael for providing me this opportunity to elaborate on my assessment of the neurochemical hypotheses.

Michael (2021) started by suggesting that Alexander Ogston’s near-death out-of-body experience (OBE) might have been due to putative endogenous psychedelic molecules, a plausible speculation for illusions of out-of-body travel. However, Ogston’s OBE included corroborated visual perceptions of another patient in a different part of the hospital, of whom he had not been aware, dying and being carried out by the hospital staff after they had removed their shoes, so clearly Ogston’s OBE was not an illusion. Michael mentioned the similarity I noted between Ogston’s OBE and that of a patient with seizures, in that both were pulled back into the body when it was jarred. But he did not mention the many ways those experiences differed, such as the seizure patient’s terror at being out of the body, her concern to protect the body she vacated, her lack of curiosity about the experience, and her desire to forget it and not repeat it.

The Case for a Psychedelic Mechanism in Near-Death Experiences

There are indeed similarities between NDEs and mystical experiences that occur under other circumstances, such as meditation, sensory deprivation, ritualized dancing and drumming, visualization, and the use of psychedelic drugs. Similar to coming close to death, all of these circumstances can lead to mystical experiences but do not always do so. Whether NDEs are qualitatively different from other mystical states is still a matter for debate and further research.

Many of Michael's (2021) arguments for the role of endogenous neurotransmitters in NDEs have a sound empirical basis. For example, it is true, as he wrote, that we now have the technology to assay neurotransmitters in the brain. He cited as evidence one study demonstrating transient elevation of brain neurotransmitters in asphyxiated rats and another demonstrating that inducing cardiac arrest in rats can increase levels of the psychedelic dimethyltryptamine (DMT) in the brain. But these studies in rats have questionable relevance to NDEs. My point in *After* about the improbability of such studies in people was not that they are theoretically impossible but that it would not be feasible to carry out such a complicated study in the midst of a patient's near-death crisis when efforts are focused on resuscitating the patient.

Michael (2021) also noted parenthetically that I had written that Justin, an 18-year-old student, had an NDE when he stopped breathing after taking "3 tablets" of LSD. Michael noted correctly that LSD (usually) comes in the form of blotter paper rather than tablets and that physiological overdose is impossible with LSD (alone). I admit that, in the interest of brevity, I had quoted a shortened version of Justin's NDE account. What Justin had said in his longer narrative was, "I was given 3 tablets of what they called 4-way white lightning acid, a mixture of speed and LSD." In fact, "4-way white lightning acid" was LSD mixed with various amphetamines or cocaine to intensify and prolong the effect, and in 1971, the date of Justin's experience, it was administered not only on blotter paper but was also sprinkled on sugar cubes or bread or included in tablets.

Michael (2021) presented a forceful summary of the evidence suggesting a connection between psychedelic drugs and NDEs. Some of his evidence stands up well to scrutiny, like a sturdy oak.

Other data are more like willows that can be bent in different di-

rections by disparate interpretive winds. And still others are still saplings, too new to tell what they will grow into. Michael marshaled an impressive number of these varied trees, but I fear he has missed the forest for the trees. He is of course aware of the varying reliability of different data he presented, but at times he appeared to treat speculation about mechanisms as if they were facts, such as the role of endogenous psychedelic neurotransmitters released near death. Two issues that complicate the interpretation of the relationship of NDEs to psychedelic drugs—or to blood gases, or to electrical surges in the brain, or to REM intrusion, and so on—involve (a) linguistic precision of critical terms, and (b) confusion between correlation and causation.

Linguistic Precision

In comparing descriptions of experiences across different bodies of literature, it is important to be precise about our definitions. As Etzel Cardeña and David Marcusson-Clavertz (2012) noted, scholars from one discipline often use labels such as “mystical experience” differently from scholars in another. The limits of language often confound our attempts at comparing experiences. The term “bright light,” for example, might refer in different circumstances to an electric light bulb, the moon, the sun, or a seemingly sentient “being of light” in an NDE. Just comparing verbal descriptions of differing experiences does not always permit conclusions about their underlying similarity. Someone describing the sights, sounds, and emotions of watching a war movie might use the same words as someone describing being in actual military combat—but no one would equate or confuse the two experiences.

Michael (2021) cited a multinational research project, in which I participated, that analyzed language usage and language structure in 625 accounts of NDEs and compared them to almost 15,000 accounts of unusual experiences of people taking any of 165 different drugs (Martial et al., 2019). We found that the drug states most similar to NDEs were those associated with ketamine. However, we noted that the lexical similarities between psychedelic experiences and NDEs likely reflected the departure from ordinary conscious perception characteristic of these drugs and NDEs rather than the specific content of the experiences, and we concluded: “It is nevertheless certain that these laboratory-induced NDEs may be a mere ‘reflection’ of ‘authentic’ NDEs” (p. 65), rather than a duplication of the actual experience.

Michael (2021) suggested further that Ogston's experience and that of the patient with seizures referenced above may have resulted from the release of hypothesized endogenous psychedelic molecules near death. It is certainly plausible that psychedelic agents may be secreted in the brain under stress, as we know that endorphins and other neurotransmitters can be. But it is difficult to understand how a hallucination, elicited either by endogenous or ingested psychedelics, could produce veridical out-of-body perceptions that can be corroborated by independent witnesses, as were 92% of the cases that Jan Holden (2009) reviewed.

I believe the suggestion that psychedelic compounds may produce or at least mediate out-of-body experiences (OBEs) derives in part from an imprecise use of the label "OBE," exactly the type of semantic confusion described by Cardena and Marcusson-Clavertz (2012). We should be cautious about drawing analogies between induced feelings of disembodiment and spontaneous OBEs. That they may have similar neurochemical triggers is a plausible hypothesis, but it is an untested one. In fact, there are important differences between induced and spontaneous OBEs that may be critical in understanding their origins and mechanisms.

For example, the illusion of disembodiment induced by neurochemical—or electrical—stimulation is limited to a fixed location; those in whom this experience is induced continue to perceive the environment from the visual perspective of the physical body, and they retrospectively usually—but not always—perceive the event as illusory. Spontaneous OBEs, as occur in NDEs, often involve accurate perception of the environment—including the physical body—from an extracorporeal visual perspective; the disembodied center of consciousness may seem to move about independently of the physical body, and those who have such a spontaneous experience usually perceive the event as profoundly real (Alvarado, 2000; Gabbard & Twemlow, 1984). Given the differences in phenomenology and in psychological aftereffects for those who have the experience, it is premature to assume that the mechanism of an induced sense of disembodiment also applies to spontaneous experiences.

This imprecise use of the term "OBE" applies also to the purported link between electrical stimulation of the temporo-parietal junction (TPJ) and OBEs, which Michael (2021) invoked to explain Stephen's NDE, in which he claimed to have left his body and, along with it, the hallucinations he was experiencing while in his opioid-influenced

body. However, researchers who claim to have induced OBEs with electrical stimulation of the TPJ used the term OBE to refer to a wide variety of vestibular and complex somatosensory responses such as bizarre body image distortions, such as legs growing shorter or longer, which have no similarity to naturally-occurring OBEs or NDEs (Greyson et al., 2008). Electrical stimulation at most produces only a sense of perception of things visible from the physical position of the individual's eyes, and those perceptions disappear when the eyes are closed or the person loses consciousness. Electrical brain stimulation has never produced accurate perception of anything not visible to the physical eyes, or that persists when the eyes are closed, or that is from an out-of-body perspective—all typical features of spontaneous OBEs (Giesler-Petersen, 2008; Holden et al., 2006). In fact, the vast majority of subjective experiences elicited by external stimulation of the temporal lobes bear no resemblance to NDEs (Horowitz & Adams, 1970), and the vast majority of patients with temporal lobe seizures do not report out-of-body experiences (Devinsky et al., 1989). An epileptologist who himself experienced an NDE noted bluntly: "In spite of having seen hundreds of patients with temporal lobe seizures during three decades of professional life, I have never come across that symptomatology as part of a seizure" (Rodin, 1989, p. 256). Furthermore, the TPJ in the studies Michael cited was identified only as a region of "mean overlap" of individual regions distributed much more widely across the brain. In fact, different researchers have claimed that OBEs were associated with a wide variety of different sites in the brain, including the right temporal lobe, the left temporal lobe, the frontal lobe—primarily the prefrontal cortex, the parietal lobe, the thalamus, the hypothalamus, the amygdala, and the hippocampus (Greyson, 2021b).

Michael (2021) correctly noted that separation of consciousness from the body is not the only possible explanation for accurate OBE perception. He suggested an alternative interpretation, that such accurate perceptions indicate a "perspectival" extrasensory process that would not necessarily involve permanent postmortem survival. However, a physiological mechanism for extrasensory processes remains as elusive as a mechanism for postmortem survival. Furthermore, there are other features of some NDEs that are even more suggestive of long-term survival, such as apparent visitations with and communications from individuals who have been deceased for many years, as well as revealing communications from deceased individuals not yet known to have died.

Correlation Versus Causation

William James (1898), the father of American psychology, wrote that the mind being a function of the brain can be interpreted in two very different ways. On the one hand, it can mean that the brain produces thought, the way a teakettle produces steam or a waterfall produces power. If that were the case with the brain and consciousness, then it would be perfectly plausible that psychedelic drugs could directly *cause* NDEs. But on the other hand, James wrote, the mind can also be a function of the brain the way the keys of an organ make music, by opening the various pipes to let the wind escape in various ways. The organ does not produce the wind or the music; rather, it removes the obstacle holding the wind back. In that interpretation, psychedelic drugs can *facilitate* the production of NDEs, but they do not cause it directly. More than a century after James clarified this distinction, the confusion still bedevils us.

In the multinational research project in which I participated that Michael (2021) cited, showing that NDE accounts were most similar to ketamine-induced experiences, we were careful to note that many of the common effects of ketamine do not appear in NDEs, suggesting that NDEs are not simply an effect of the drug. Karl Jansen, the neuroscientist who has most fiercely promoted the ketamine model for NDEs, concluded after 12 years of research that “drugs and psychological disciplines such as meditation and yoga may render certain ‘states’ more accessible . . . [I see] drugs as just another door to a space, and not as actually producing that space. . . . Ketamine is a door to a place we cannot normally get to; it is definitely not evidence that such a place does not exist” (1997, pp. 94–95).

The same confusion between correlation and causation crops up in discussions of the relationship of brain electrical activity and NDEs. Resuscitation expert Sam Parnia, noting the disinhibition in brain activity during the dying process, recently suggested:

This disinhibition of these areas then seems to give people access to dimensions of reality that they would ordinarily not have access to in day-to-day life. . . . So, in short, it is not so much that the brain is creating these experiences as a hallucination or illusion but rather that the brain is enabling access to aspects of reality and a person’s own consciousness, including the totality of a person’s conscious experience throughout the entirety of their lives, real and correct memories of their own interactions with others in life and the meaning of those actions, thoughts, and intentions. (Levine, 2022, pp. 5–6)

Neurosurgeon Wilder Penfield was the first person to map out the brain, indicating which areas controlled movements of the patient's fingers, lips, and so on. He also identified discrete brain areas associated with various sensations when they were stimulated, like feelings of heat or cold, or a certain smell, or hearing a sound like a certain song, or seeing scenes from the past as though the patients were watching a movie. But when Penfield stimulated the part of the brain that made his patients' arms and legs move, they didn't think that they were moving their limbs. Instead, they reported that they felt as if Penfield was forcing their limbs to move, against their will. Penfield summed this up at the end of his career: "When I have caused a conscious patient to move his hand by applying an electrode to the motor cortex of one hemisphere, I have often asked him about it. Invariably his response was: 'I didn't do that. You did.' When I caused him to vocalize, he said: 'I didn't make that sound. You pulled it out of me. . . .' There is no place in the cerebral cortex where electrical stimulation will cause a patient to believe or to decide" (1975, pp. 76–77).

Saying that psychedelic drugs produce NDEs—and other mystical experiences—is like saying that musical instruments produce music. Musical instruments do indeed produce musical sounds, but not by themselves. It takes something outside the instrument—a musician—to decide what sound to make and to cause the instrument produce that sound. Philosophy professor Alva Noë (2009) broadened this distinction to any brain changes and consciousness: "Instruments don't make music or produce sounds. They enable people to make music or generate sounds. . . . The idea that consciousness is a phenomenon of the brain, the way digestion is a phenomenon of the stomach—is as fantastic as the idea of a self-playing orchestra" (p. 64).

This is essentially the "hard problem of consciousness," the question of why physical processes in the body should be accompanied by subjective experience, and how electrochemical changes in the brain can give rise to experience, conscious thought, and feelings (Chalmers, 1995, 1996). As Noë put it: "After decades of concerted effort on the part of neuroscientists, psychologists, and philosophers, only one proposition about how the brain makes us conscious—how it gives rise to sensation, feeling, subjectivity—has emerged unchallenged: we don't have a clue" (2009, p.xi). Quantum physicist Nick Herbert agreed: "Science's biggest mystery is the nature of consciousness. It is not that we possess bad or imperfect theories of human awareness; we simply have no such theories at all" (1985, p. 249). And after a half century of research mapping various brain sites to their functions,

Penfield conceded defeat when it came to consciousness: “I worked as a scientist trying to prove that the brain accounted for the mind and demonstrating as many brain-mechanisms as possible hoping to show how the brain did so. . . . In the end I conclude that there is no good evidence, in spite of new methods, such as the employment of stimulating electrodes, the study of conscious patients and the analysis of epileptic attacks, that the brain alone can carry out the work that the mind does. I conclude that it is easier to rationalize man’s being on the basis of two elements than on the basis of one” (1975, pp. 113–114).

Michael (2021) was, of course, well aware of the “hard problem” of how consciousness derives from neuronal function, but he appeared to hold out hope that this problem is not a fatal flaw but rather a conundrum that neuroscience will someday resolve. However, the accumulating evidence from NDEs, from terminal lucidity, from severe hydrocephalus, from discrepancies between drastic disorders of brain structure and cognitive functioning, and even from recent studies of neuroimaging of psychedelic experiences all cast doubt on the theory that consciousness is generated solely by the brain (Nahm et al., 2017). I am not claiming that the alternative dualistic model that the brain and the mind collaborate on manifesting consciousness is not problematic as well. As Michael correctly noted, we have no empirical evidence bearing on where a “mind” or consciousness could be, if not in the brain. Some dualists—and idealists—argue that seeking a physical location for a discarnate consciousness is irrational, because nonphysical entities cannot be located in physical space. Furthermore, if there is a nonphysical mind, we currently have no adequate explanation of how it and a physical brain could interact with each other. But my current interpretation of the empirical evidence, always subject to revision as new data accumulate, is that the preponderance of the data is more compatible with dualism than with monistic materialism.

Conclusion

I agree with Michael (2021) that hallucinations mimicking NDEs may be mediated by endogenous neurotransmitters and that there are many similarities between psychedelic and near-death experiences, including their respective aftereffects. But I do not see how psychedelic chemicals can account for genuine NDEs with veridical elements. As Michael acknowledged, some NDE dimensions may not be explained by a reductionist paradigm but may require some association of psychedelics and non-local awareness. I see that as a serious

and possibly insurmountable flaw in the psychedelic model of NDEs, whereas Michael appeared to regard it as temporary challenge that may someday be overcome.

Psychedelics, which have too long been demonized for their irresponsible recreational use, may prove to be not only valuable therapeutic agents, but also keys to unlocking the brain mechanisms associated with NDEs and other mystical experiences. A key step in understanding NDEs is recognizing that we don't yet have a complete explanation. The fields of near-death research and of psychedelic research are still too young to permit definitive answers. I thank Michael and his colleagues for all the creative research they are doing to explore the fascinating field of neurochemical mediation of extraordinary experiences, and I look forward to its further developments.

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