Review of: "Dreams as Portals to Parallel Realities and Reflections of Self"

Andrzej Brodziak[1]

1 Państwowa Wyższa Szkoła Zawodowa w Nysie

Potential competing interests: No potential competing interests to declare.

In my brief review, I will not focus on formal aspects. I will only express my opinion on the merits of the considerations. The content of the work indeed concerns a fascinating issue. Since in the title of the work, and already in the abstract, there is talk of "portals to parallel realities," I think that to assess the message, the competencies in both neuroscience and physics and cosmology are necessary.

I suspect that the Qeios Editorial Board proposed that I review this article mainly because I relatively recently published a work titled:

"Neural Circuits, Microtubule Processing, Brain's Electromagnetic Field—Components of Self-Awareness." Brain Sci. 2021, 11, 984. https://doi.org/10.3390/brainsci11080984.

This publication of mine contains a significant section concerning dreams. Reading the work by David Leong, Oxana Zinych, I now realize that I should present this supplement to its authors. I do not know if my description of the phenomenon contains only a supplement or some alternative theory describing the reasons and "mechanisms" of dream formation.

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The fragment of the paper "Neural Circuits, Microtubule Processing, Brain's Electromagnetic Field—Components of Self-Awareness":

[" It should be remembered that in order to be self-aware, one needs, among others, to experience embodiment, i.e., the so-called bodily self-consciousness, take into account feelings associated with programming and performing movements and complex activities with observation of their consequences, integrate data about one's past (autobiographical memory), and even form an image of the outside world and remember opinions about oneself. Moreover, the experience of self-awareness requires performing mental operations to put oneself in the perspective of others. The data processing operations listed above take place in different regions of the brain. No wonder, then, that a certain derivative of visual experiences is also necessary at the highest level of integrating data about oneself, which occurs in the prefrontal cortex.

It is a popular simplification, a kind of metaphor, but nonetheless a useful mental shortcut if we say that in the prefrontal lobes, there is an essential part of the "I," the subject, the "homunculus" that looks. This metaphor will seem less bizarre if

we consider what we know about “the neural correlates of dreaming.”

“Francesca Siclari, with colleagues, already in the title of their paper, state that they established the neural correlates of dreaming [71]. Their article is cited by many researchers. However, it is known that Perrine Marie Rub, in a polemical article, states: “… no reliable (neuro) physiological correlates of dreaming have been identified yet, which means that one cannot know whether a sleeper is dreaming or not while she/he is sleeping” and that: “Our only access to dreaming is still dream reports, which are made a posteriori, during wake and which are possibly partial and/or modified by the waking consciousness” [72].

Perrine Marie Rub explains that although there are no precise data on regions active during dreams, it has been established which centers are active after waking up, when people often and efficiently recall and report data on the content of dreams. This author states that “It is known for a long time now that a lesion… in the temporo-parietal junction is associated with a cessation of dream reports [72].”

Serena Scarpelli states, however, that: “… several studies confirmed that the posterior parietal area and prefrontal cortex are responsible for the dream experience” [73].

It seems to us that in the context of the presented theories of consciousness, on the basis of phenomenological considerations, the following remarks can be made, however:

We can deliberate if the person who has vivid dreams is conscious, and if not, what the difference is between the dreaming state and the waking state.

It seems to us that emphasizing the difference will be precise if we introduce the category of the so-called “stories.” It should be noted that people who are awake perceive the sequence of events that occur, which consists of changes in the environment, new situations, and possible own actions. The content of the processed data is mainly perceptions, less imagery. A conscious person has a sense of having control, at least partial control, over the events that occur. Moreover, a conscious person may pause his own actions and formulate “a story about what happened.” A conscious person also has control over his actions and over what he focuses his attention on.

A person in a dream state senses the experiences similar to imagery and has no control over the development of the transformations of subsequent experienced images. A person in the course of such a dream not only cannot act according to his own will but is also unable to focus attention on selected elements of the landscape being experienced. A dreaming person has the impression that someone else is the scriptwriter of the experienced impressions. Only after waking up is it possible to try to consciously formulate a “story about what occurred during the dream.”

So, a question arises that has been bothering people for a long time, namely, who is the author of the dream sequence scenario. A provisional answer to this question comes down to the hypothesis that “this author” is a neural representation of the “personage,” which is in part constituted by the above-discussed structures responsible for comprehension of the word “I.”

It should be noted, however, that while we are awake, these structures consist, as we wrote above, of self-perception and

self-image (imagination of oneself). During sleep, in the absence of sensory perceptions, only the part of this structure that results from “self-image” is active. So it can be said metaphorically that this is a different “personage,” moreover, one that is less embedded in the realities of the world.

This "personage" also manifests itself in those moments when our mind is under the influence of the so-called 'default mode network' (DMN). It is also important to remember that the human mind can generate imaginations not only of objects once seen but also of non-existent yet possible objects.

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I am not sure if my perspective on the processes of dream formation presented here will be useful for the authors of the reviewed article; nevertheless, I submit it for consideration.

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In the second part of my review, I want to refer to such concepts and authors' statements as: "alternative realities," "alternative dimensions," "elevated states of consciousness," and the multiverse theory.

Personally, I would advocate discussing all these concepts (maybe even creating a kind of glossary) and determining their status, whether we refer to concepts in the sense of "post-new-age" terms or to terms recognized in the field of physics and official cosmology.

I will start my remarks with the concept of "alternative dimension" (sometimes we speak in the style of "post-new-age"... another dimension... higher dimension). To seriously treat this concept, I recommend two video presentations by Sabine Hossenfelder.

(1) "Does the Universe have Higher Dimensions? Part 1"
https://www.youtube.com/watch?v=ZS2hJLIN1DM
Its summary is:
The concept of higher dimensions beyond our experienced three (left/right, forward/backward, up/down) is explored, questioning why space is limited to three dimensions and proposing the possibility of more dimensions that we haven't detected.
Historically, the idea of extra dimensions has been studied by physicists for over a century, leading to the development of theories such as Kaluza-Klein theory, which attempted to describe the electromagnetic force using an additional dimension of space.
Higher-dimensional geometry, which allows for the conceptualization of spaces and objects in more than three dimensions, was a significant advancement in mathematics, leading to the abstraction of mathematical thinking and its applications in physics, notably in understanding forces and particles in higher-dimensional spaces.
Kaluza-Klein theory, introduced by Theodor Kaluza and refined by Oskar Klein, suggests that a fourth spatial dimension could explain electromagnetism geometrically, similar to how Einstein's theory of general relativity explains gravity using

the curvature of space-time, with the fourth dimension being compact and too small to notice.
Despite its innovative approach, Kaluza-Klein theory faced challenges such as the inability to directly account for charged particles like electrons, the instability of the extra dimension's size, and difficulties in quantization, leading to its limitation in explaining all fundamental forces and being overshadowed by subsequent theories like string theory.

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(2) Does the Universe have Higher Dimensions? Part 2
https://www.youtube.com/watch?v=UHZam0Zf1FQ
Its summary is:

Physicists and scientists have been exploring the concept of extra dimensions beyond our familiar three-dimensional space, inspired by science fiction and the pursuit of a unified theory of physics. This research is driven by the idea that additional spatial dimensions could explain the fundamental forces of nature geometrically.
The early 1980s saw string theorist Edward Witten exploring the possibility that adding seven extra dimensions to our three could provide a geometric explanation for all fundamental forces, aligning with the concept of supergravity. However, challenges such as the instability of these extra dimensions' radii and the issue of chirality, where particles exist in left-handed and right-handed versions, have yet to be resolved.
String theory proposes that the fundamental building blocks of the universe are not particles, but strings vibrating in multiple dimensions. Initially, string theory suggested the need for 26 dimensions, but with the inclusion of supersymmetry, this requirement was reduced to 10 dimensions: nine of space and one of time.
Extra dimensions, if they exist, are believed to be compactified or curled up into complex geometrical shapes known as Calabi-Yau manifolds, making them difficult to detect at our energy levels. This compactification allows for the theoretical prediction of higher harmonics in string vibrations, which could potentially be observed with sufficient energy, suggesting a way to empirically test for extra dimensions.
Despite theoretical advancements, practical applications such as using extra dimensions for space travel remain scientifically implausible. The Large Hadron Collider has not produced evidence of tiny black holes, which would indicate the presence of large extra dimensions. Furthermore, matter is confined to our three-dimensional "brane," limiting interaction with any extra dimensions. Thus, concepts like hyperdrives remain firmly within the realm of science fiction, with warp drives and wormholes being more scientifically plausible for theoretical faster-than-light travel.

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So, in the field of academic physics, there is essentially no recognition for the realistic existence of these higher dimensions. However, I will add from my side that although I am not a physicist, I believe it is not proven that the space in which we live is merely a three-dimensional sphere, at most enriched by the dimension of time. It may, however, be that we live in a "topological manifold" such as a Klein bottle. The problem, however, is that no one makes efforts to check this.

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In order to clarify …. " A "Klein bottle" is indeed an example of a topological manifold. In topology, a manifold is a topological space that locally resembles Euclidean space near each point. More specifically, a topological manifold is a space that is locally homeomorphic to Euclidean space, meaning each point has a neighborhood that is topologically the

same as an open ball in some Euclidean space. The Klein bottle is a non-orientable surface, which means it cannot be embedded in three-dimensional Euclidean space without intersecting itself. It's a classic example used to illustrate the concept of a non-orientable manifold in higher dimensions."

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And finally ….. the short official opinion about the multiverse theory:

" The multiverse theory posits the existence of multiple, perhaps infinite, universes coexisting alongside our own. Each universe within the multiverse operates with its own set of physical laws and constants. This theory extends from interpretations of quantum mechanics, particularly the many-worlds interpretation, suggesting every quantum event spawns a new universe. Critics argue that the multiverse theory is more philosophical than scientific, as it lacks empirical evidence and testability. It's challenging to validate or falsify because interactions with other universes (if they exist) are not currently observable. The theory, while fascinating, straddles the boundary between science and speculative metaphysics, pushing the limits of our understanding and scientific inquiry".

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Summing up the overall message from my review, I believe that despite my comments, the reviewed article is valuable because it is a great encouragement for further inquiries and research.

Congratulations to the authors

with cordial greetings

Andrzej Brodziak