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The Subjective Side of Lucid Dream Research

Commentary on "The neurobiology of consciousness: Lucid dreaming wakes up" by J. Allan Hobson, with notes on other commentaries

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1. Introduction

We would like to thank Allan Hobson for inviting us to write our own commentary to his paper (Hobson 2009) and to respond to a few points from other commentaries as well. Hobson has long championed a close study of subjective dream reports in conjunction with careful science. In our own case, he has encouraged our efforts as lucid dreamers since Jay first contacted him in 1992. He read our letters and accounts with interest, showed enthusiasm for the book we were writing and even contributed a foreword to it himself. More recently he has mentioned our work to the audiences of his many lectures.

To introduce ourselves to those readers unfamiliar with us, Janice developed an interest in lucid dreaming after reading Celia Green's book on the subject (Green 1968) in college, which helped her make sense of the lucid dreams and related phenomena that she had experienced occasionally as a child and teenager. Over the next ten years or so she had thousands of lucid experiences, and even developed certain of them with recurring characters and continuing storylines. Jay learned to induce lucid dreams as an adult with the guidance of Stephen LaBerge's work (LaBerge 1985). Since he was also a practiced journal writer, he recorded all of his approximately 500 lucid accounts during the decade of his peak interest.

Both of us corresponded with a third talented lucid dreamer, Ruth Sacksteder, and together the three of us performed a wide range of experiments in our lucid dreams to try to figure out what they were and how they worked. Our conclusions differed enough from those of our contemporaries both in kind and in scope to inspire us to spend a decade thinking them through. As a result, we feel we can comment – if not with scholarly authority, then at least with informed opinion – on several of the important issues concerning the study of lucid dreaming. We will discuss Hobson's article and several of the commentaries about it, attempt to reconcile Hobson's approach with traditional viewpoints, address some important caveats to the concept of lucidity, and finally offer a few remarks about how a closer study of lucid dreaming might improve understanding of dreaming in general.

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2. Hobson's article

For many years, Hobson has maintained that ordinary dreaming is delusory and hallucinatory (Hobson 1988, Hobson 1999). Such terms may seem off-putting at first because of their psychopathological implications. But consider that the majority of the time, people dream without any concurrent understanding that they are dreaming. They mistakenly think that their dreams are somehow real, and respond to them accordingly. Hence, they are fooled by convincing illusory perceptions. This means that delusions and hallucinations are a standard part of ordinary sleeping experience, entirely normal in that context, which effectively defuses the negative connotations of the words.

Initially Hobson discussed the characteristics of dreams largely in terms of how they relate to the neurophysiological underpinnings of REM sleep, such as the preponderance of cholinergic and corresponding dearth of aminergic compounds in the dreaming brain. Later he took note of newer physiological data retrieved by such means as PET imaging (Braun et al., 1997), which revealed that the brain undergoes significant state-dependent changes in the relative activation and deactivation of its various regions. The confusion, disorientation, confabulation, and lack of insight regarding one's true state in dreams could now be seen as the result not just of a shift in the brain's neurochemical balance, but of fundamental differences in its processing capabilities in dreaming as opposed to waking (Hobson et al., 1998). In particular, the sleep-specific inactivity of the dorsolateral prefrontal cortex, an area which evidently plays a role in attention, working memory and self-reflective awareness, might contribute to the amnesia and other cognitive deficiencies typical of ordinary dreaming.

Lucid dreamers often report having critical thinking ability and memory access while dreaming that can at least approximate what they are used to in waking (Brooks & Vogelsong, 2000). Such observations dovetail nicely with Hobson's perspective. The qualitative improvements associated with lucidity suggest that lucid dreaming involves an alteration in the neurophysiological status quo, such as a partial reactivation of the dorsolateral prefrontal cortex during REM – a prediction of Hobson's that appears to have been borne out by the recent EEG study headed by Ursula Voss (Voss et al., 2009). Similarly, if an aminergic deficit underlies the usual reduction in cognitive capabilities during dreaming, then dream lucidity could be expected to require at least a partial increase in the availability of aminergic neurotransmitters. Our own case histories offer some support for this idea. Janice was an unusually light sleeper who awakened frequently and slept at irregular times; Jay induced his lucid

dreams by using an alarm clock to wake himself up, staying up for awhile then going back to bed (the so-called "napping technique"); and Ruth was prone to insomnia. Interludes of waking may therefore have modified our brain chemistry in a way that promoted lucid dreaming upon returning to sleep.

Due to its mixture of waking and dreaming features, in his current article Hobson interprets lucid dreaming as a hybrid state in which some brain systems operate much as they would in waking while others function in their REM mode. Hence, lucid dreamers can enjoy a heightened degree of awareness while remaining subject to the sensory input gating, motor output inhibition, and fictive perceptions characteristic of REM sleep. Hobson draws parallels to other anomalous experiences that mix and match elements from different states, such as sleep walking and sleep paralysis. Such experiences, lucid dreaming included, are significant to all students of the mind because they demonstrate that states of consciousness are not necessarily as discrete as one might like to imagine; they can commingle in various intriguing ways.

3. Reactions to selected commentaries on Hobson's article

Being non-professionals, we are not equipped to evaluate the wealth of technical material in the published commentaries to Hobson's original article. Therefore we will limit our responses to a few points of general interest.

As comparatively accomplished lucid dreamers, we find Andrew Brylowski's (Brylowski 2010) assertion that lucid dreamers do not control the plot in their dreams, but only choose how to respond to what is presented to them, rather puzzling. We controlled the plots, settings, objects and characters of our dreams on innumerable occasions, even conjuring entire scenes from scratch. Of course, some lucid dreamers feel that it is preferable to control one's reactions in a dream rather than to try to control the dream itself (LaBerge 1985), but that is another matter, and a stance that we consider problematic. In fact, we maintain (Brooks & Vogelsong, 2000) that controlling one's responses to dream content will itself influence that content. Deciding to treat a potential dream enemy like a friend will tend to make it to behave like a friend, with or without any concurrent mental effort. Even simply paying attention to something in a dream for an extended period of time can make it morph or multiply. In its broadest sense, then, dream control is not only commonplace, it is virtually unavoidable.

On the other hand, we will certainly admit that the degree to which one can intentionally direct dream content varies widely from attempt to attempt. Additionally – and in keeping with Ahmed Karim's speculation in another of the commentaries (Karim 2010) – Janice found that even her well-honed dream control ability drastically diminished during a period of several months when she suffered from anxiety and depression. As her unbalanced psychological state gradually righted itself, so too did her former facility return.

For this reason we fear that although dream lucidity and the improved control that it enables can be helpful in coping with disturbing dream content that occurs sporadically, it may prove to be of limited utility as a therapeutic tool in cases involving severe emotional disturbance and chronic nightmares (c.f. Gavie & Revonuso, 2010). Similarly, because of the unreliability of dream control, the inherent instability of imagery, and the infrequency with which most people even have lucid dreams, we have to question the degree to which lucid dreaming is really a practical solution for rehearsing waking skills (c.f. Erlacher & Chapin, 2010). Some individuals may find dream practice useful, of course, but others may find it downright misleading. In our own lucid efforts we sometimes performed activities ludicrously poorly, whereas other times we could easily execute stunts that would be way beyond our waking capabilities, or for that matter the limits of waking physics.

At the current stage of scientific understanding, speculations regarding the potential applications of dreaming lucidly may be somewhat premature. Before deciding how lucid dreaming may be useful, it seems sensible to establish first what exactly lucid dreaming is – a goal that would be better served by engaging in further quantitative studies. Of course, this is not to deny the importance of previous empirical work in the field such as that undertaken by Stephen LaBerge at Stanford in the 1980s (LaBerge 1988).

4. Unifying divergent views of lucid REM

In his own response to Hobson's article (LaBerge 2010), LaBerge raises a number of important criticisms and cautions. His reluctance to embrace Hobson's view of lucid dreaming as a hybrid state is understandable, since he and his colleagues took pains to demonstrate to a skeptical scientific world that lucid dreams do take place in REM sleep. Of course, that was REM sleep as identified by the characteristics that were known and measurable at the time. Now that a more detailed picture of the activity of the sleeping brain is beginning to develop, it may be useful at least to consider refining currently favored views of lucid dreaming as part of the process of integrating the new information. Even just practically speaking, it makes a certain sense to describe lucid dreaming as blending elements of the sleeping and waking states like Hobson suggests; dreaming lucidly is after all "being awake in your dreams," to borrow a phrase from the cover of LaBerge's first book (LaBerge 1985). Hobson's hybrid state notion simply extends this useful concept from the metaphorical to the physiological level.

We have argued (Brooks & Vogelsong, 2000) that lucid dreaming is not really an altered state in its own right but a type of dreaming. If lucid dreaming is still dreaming, albeit with the addition of self-reflective awareness and comparative mental clarity, then it would follow that lucid REM is still REM, with the addition of such elements as increased prefrontal activation. Perhaps the best way, then, to reconcile Hobson's perspective with LaBerge's is to think of lucid dreaming as indeed occurring in REM, but an atypical variant of REM. Looking at it from this angle, REM can support reflective consciousness, as LaBerge maintains, if it is modified to some extent by changes in brain chemistry and prefrontal cortical arousal, as Hobson maintains. Hobson is not so much contradicting LaBerge's contention as validating it by explaining how it may work.

Naturally, though, if multiple physiological differences between lucid and nonlucid REM eventually emerge it may well become pertinent to start thinking of lucid dreaming as occurring in a state that is no longer meaningfully considered REM at all. If one just adds a little lemon juice to a glass of water, the resulting liquid can be called lemon-flavored water; yet stir some sugar into the mixture as well and one ends up with another beverage altogether. But we will leave that issue for minds more qualified than ours to debate.

5. Refining the concept of lucidity

We were pleasantly surprised to read the commentary by Valdas Noreika and his colleagues (Noreika et al., 2010), not merely because it contains references to our own work, but because its excellent analysis of the varieties of lucidity that can be inferred from both lucid and nonlucid dream accounts highlights a number of easily overlooked yet important observations. Not only is lucidity potentially unstable, easily coming and going during the course of a dream, it varies dramatically in quality, ranging from a vague sense that the dream situation is unreal to a much fuller understanding of that fact coupled with the ability to manipulate imagery and a clarity of awareness rivaling that of the waking state. Partial lucidity was common in our own experiences; we might grasp only selected implications of the fact that we were dreaming, such as thinking that it was possible to jump out the window and fly but worrying about a pet potentially following and falling to its death. Sometimes we found ourselves only tacitly lucid, acting as if we knew we were dreaming when really we did not. On a few occasions, our dream characters actually appeared be more lucid than we were.

Defining a lucid dream simply as a dream in which one knows that one is dreaming, then, does not do justice to the true complexity of the phenomenon. As Noreika et al. rightly point out, reconceptualizing the experience as a dream is just one of several aspects of lucidity, which only rarely all occur together. A dreamer may realize that he or she is dreaming and yet nevertheless be unable to control the dream as desired or to shake an emotional reaction or behavior that is no longer appropriate to the circumstances. Conversely, even a nominally nonlucid dreamer can occasionally evince clarity of thought while dreaming, deliberately influence various dream elements, or feel no fear in the face of a dream threat (Brooks & Vogelsong, 2000).

To add to the muddle, there are those who have vivid episodes while sleeping in which they think coherently, have good access to memories, and recognize that they are no longer in waking reality, yet elect to interpret what is happening as psychic visions, out-of-body experiences, or visits to alternate worlds rather than dreams. Janice herself fell into this category before her own observations began to demonstrate the untenability of such fancies. Even people who do call a dream a dream may have notions about what is possible in dreaming that will conflict with what a rationalistic researcher would consider lucid thinking.

All this implies that some people may experience the shift in brain activation that allows for lucidity without actually thinking they are dreaming and hence becoming lucid by its most common definition. Others may realize that they are dreaming without any appreciable improvement in the quality of their awareness, which might not be accompanied by a significant increase in activation. The fact that cognitive improvements and identifying what is going on as a dream do not always go hand in hand may complicate matters for the neuroscientist hoping to demonstrate a clear correlation between dream lucidity and specific physiological variables, but it is nevertheless a phenomenon worthy of investigation in its own right.

Quantifying the finer points of lucidity would have its own challenges, though, since it would seem to require a level of quality not typically found in first-person dream accounts, or at least those we have seen. Even otherwise talented dreamers can be highly selective, picking out their most fascinating and memorable dream adventures to record and mixing speculations and idiosyncratic terminology in with their descriptions. This may be fine when one's goal in writing the accounts is mainly personal or social, but it is less than ideal for the purposes of science. Preferably, accounts should include all the details one can remember, including one's thoughts and emotions while dreaming as well as descriptions of images and events, but with questionable convictions clearly noted as such instead of incorporated as embedded assumptions. If more lucid dreamers would take such an approach, it could go a long way towards removing both the mystique and the stigma such unusual experiences typically garner.

6. The world-modeling theory of dreaming

We are in essential agreement with LaBerge's statements regarding the role of world modeling in dream generation (LaBerge 2010). In fact, what we describe in our book as the "suggestion theory" of dreaming could equally well be called the "world-modeling theory" of dreaming. According to this premise, even in waking people interact with reality using mental models. Our conceptions of who we are, where we are, what we perceive, and what is happening are built up from past experience and modified as necessary based on new information. Decoupled from both sensory input and orienting memories, the dreaming brain constructs the best models it can and reflexively applies them even to internally generated perceptions. Whatever seems to appear in the resulting unstable replica of the world will be influenced by various sources of suggestion, including thoughts, emotions, expectations, and habits.

To take one example, lucid dreamers seem to have far more false awakenings, or experiences in which one thinks one has awakened while in fact remaining asleep, than ordinary dreamers do. In Jay's case, nearly one in six of his recorded accounts included a report of a false awakening. From our perspective, the explanation for this is simple. Jay was in the habit of waking to record his lucid dreams on a handheld tape recorder as soon as they ended. His lucid dreams often contained discontinuities or blank spots between scenes, and when these occurred he would frequently assume that he was waking. This erroneous assumption produced dreams about waking up to tape his accounts. If it did happen to dawn on him that he was in fact still dreaming, he had the regrettable habit of trying to wake himself for real rather than continuing with what could have become another lucid dream, like Janice or Ruth would typically do. This effort would sometimes itself engender further false awakenings.

In any case, the false awakenings were not produced by Jay's lucidity, nor by any purely random process of image generation, but by the incorrect belief that he was waking up. This momentary lack of lucidity resulted in new, full-blown dream scenes of his bedroom and his attempts to document his dreams. Not all lucid dreamers record their dreams, of course, but they do generally understand that they are asleep and therefore anticipate waking up, which presumably leads to an increase in deceptive dreams that seemingly fulfil that expectation.

Since all dreams, whether lucid, nonlucid or somewhere in between, presumably engage the reflexive world-modeling ability of the brain, the observations of lucid dreamers remain relevant to the study of ordinary dreams and how they unfold. In our experience, dreams so readily respond

both to deliberative efforts at altering their content and to such incidental factors as stray thoughts and associations that even nonlucid dreamers may be said to control them to an extent, however unintentionally. Lucid dreamers simply take greater charge of the process and learn to shape the intrinsically mutable nature of dreams to their own ends; they have increased flexibility thanks to increased appreciation of their true situation.

7. Looking forward: What might be learned from lucid dreaming

We agree, then, with Hobson's conclusion that lucid dreaming holds important implications for consciousness studies and psychology. The hybrid state concept may prove especially fruitful in this regard. Much as lucid dreaming can be viewed as the injection of waking consciousness into dreaming, at least some kinds of hallucinations can be viewed as the injection of dream perceptions into waking. Janice's mother, for one, sometimes sees dream people standing in her room for a few moments when she first wakes up.

Janice herself began to hear voices from time to time in waking after training herself to listen for them in the hypnagogic state as part of her lucid dream induction efforts. During her depression these became so persistent as to be disruptive. Reasoning that they were probably being generated by whatever mechanism normally creates the speech of dream characters, she decided to try to get them under control by employing a simple autosuggestion trick: asking a roomful of people in a lucid dream if they would please keep their voices down and stop disturbing her when she was awake. After this the babble gratifyingly diminished to next to nothing. We would not expect this novel approach to work for everyone in her situation, obviously – if indeed it really was the reason for the improvement – but it is certainly intriguing.

Conceptualizing such phenomena in terms of the blending of dreaming and waking consciousness could provide considerable comfort to those who fear an hallucinatory manifestation that might in fact be a benign anomaly rather than something necessarily pathological. In a similar vein, Janice has eased the fears of people alarmed by sleep paralysis experiences by assuring them that, due to parts of the brain switching states out of synch with one another, they become incongruously aware of the loss of muscle tone that normally accompanies REM sleep. Her attempts to persuade people that their brains might be generating convincing illusions during assumed out-of-body excursions despite their impressions of being awake unfortunately met with more resistance.

Although we no longer have the time or the inclination to pursue lucid dreaming ourselves, we do hope that the present debate will spark a resurgence of enthusiasm for lucid dream research among serious investigators. Laboratory studies with trained subjects capable of signaling when specific events occur in their dreams could pursue many interesting avenues of inquiry. We personally would very much like to know if the commonly reported inability to turn on the lights in dark dreams (Worsley 1988) correlates with lower levels of activity in the visual cortex, if there is any observable difference in regional activation patterns in cases when attempting other forms of dream control is easy versus when it is difficult, and if the temporary imageless periods that often interrupted our lucid dreams take place during interludes of tonic rather than phasic REM. The study of lucid dreaming may provide the answers to such specific questions as well as offer insights into many broader issues concerning consciousness and its contents. This is especially so now that the technology is available to analyze the intricacies of brain physiology and subjective experiences in parallel.

References

Braun, A. R., Balkin, T. J., Wesensten, N. J., Carson, R. E., Varga, M., Baldwin, P., Selbie, S., Belenky, G., & Herscovitch, P. (1997). Regional cerebral blood flow throughout the sleep-wake cycle: An H215O PET Study. Brain, 120, 1173-1197.

Brooks, J. E., & Vogelsong, J. A. (2000). The Conscious Exploration of Dreaming: Discovering How We Create and Control Our Dreams. Bloomington, Indiana: 1stBooks.

Brylowski, A. (2010). Neuropsychiatric perspective and recommendations. International Journal of Dream Research, 3(1), 3-6.

Erlacher, D. & Chapin, H. (2010). Lucid dreaming: Neural virtual reality as a mechanism for performance enhancement. International Journal of Dream Research, 3(1), 7-10.

Gavie, J. & Revonsuo, A. (2010). The future of lucid dreaming treatment. International Journal of Dream Research, 3(1), 13-15.

Green, C. (1968). Lucid Dreams. Oxford: Institute for Psychophysical Research.

Hobson, J. A. (1988). The Dreaming Brain. New York: Basic Books.

Hobson, J. A. (1999). Dreaming as Delirium. Cambridge, Massachusetts: The MIT Press.

Hobson, J. A. (2009). The neurobiology of consciousness: Lucid dreaming wakes up. International Journal of Dream Research, 2(2), 41-44.

Hobson, J. A., Stickgold, R., & Pace-Schott, E. F. (1998). The neuropsychology of REM sleep dreaming. NeuroReport 9(3), R1–R14.

Karim, A. (2010). Transcranial cortex stimulation as a novel approach for probing the neurobiology of dreams: Clinical and neuroethical implications. International Journal of Dream Research, 3(1), 17-20.

LaBerge, S. (1985). Lucid Dreaming: The Power of Being Awake and Aware in Your Dreams. Los Angeles: Jeremy P. Tarcher.

LaBerge, S. (1988). The psychophysiology of lucid dreaming. In Gackenbach, J. & LaBerge, S. (Eds.). Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming (135-153). New York: Plenum Press.

LaBerge, S. (2010). Signal-verified lucid dreaming proves that REM sleep can support reflective consciousness. International Journal of Dream Research, 3(1), 26-27.

Noreika, V., Windt, J., Lenggenhager, B., & Karim, A. (2010). New perspectives for the study of lucid dreaming: From brain stimulation to philosophical theories of self-consciousness. International Journal of Dream Research, 3(1), 36-45.

Voss, U., Holzmann, R., Tuin, I., & Hobson, J. A. (2009). Lucid dreaming: A state of consciousness with features of both waking and non-lucid dreaming. Sleep, 32, 1191-1200.

Worsley, A. (1988). Personal experiences in lucid dreaming. In Gackenbach, J. & LaBerge, S. (Eds.). Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming (321-341). New York: Plenum Press.