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A mind to go out of: Reflections on primary and secondary consciousness ☆

Allan Hobson [a,*], Ursula Voss [b]

[a] Beth Israel Deaconness Medical Center and Harvard Medical School, Boston, MA, USA
[b] Johann Wolfgang Goethe-Universität Frankfurt and Rheinische Friedrich-Wilhelms-Universität Bonn, Germany

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ABSTRACT

Dreaming and waking are two brain-mind states, which are characterized by shared and differentiated properties at the levels of brain and consciousness. As part of our effort to capitalize on a comparison of these two states we have applied Edelman's distinction between primary and secondary consciousness, which we link to dreaming and waking respectively. In this paper we examine the implications of this contrastive analysis for theories of mental illness. We conclude that while dreaming is an almost perfect model of organic psychosis, it is less so for schizophrenia and major affective disorder where it must serve a primarily heuristic role helping us to model hallucinations and delusions but not the diseases themselves.

1. Introduction

We have recently adopted Edelman's (2005) distinction between primary and secondary consciousness as part of our attempt to formulate a theory, which recognizes the bimodality of dreaming and waking as complementary states of consciousness (Hobson & Voss, 2010). In this paper we examine some features of this bimodality, which bear heavily on our concept of mental illness.

In summary, we examine the thesis that only those higher order animals, which possess the capability of secondary consciousness suffer from psychosis. This thesis leads us to consider the possibility that humans, and only humans evince fully developed secondary consciousness and, therefore, humans and only humans have minds that can become dysfunctional in ways that we call psychotic. In other words an animal needs to have a highly developed mind in order to go out of it.

Our discussion of this theory looks at a variety of paradoxical implications, in an attempt to answer the following four questions: (1) If dreaming is akin to psychosis (and we accept the assertion that it is) then why cannot subhuman animals become schizophrenic, for example? (2) Does the apparent sparing of subhuman animals of the indignity of schizophrenia mean that their dreaming is so unlike ours as to be an unacceptably poor model for psychosis? And (3) If it is true that subhuman animals are incapable of schizophrenia, what is the scientist in search of an animal model for the most debilitating of all human diseases to do? In short, is dreaming really a good model for psychosis? In particular must we give up the fond hope that by studying REM sleep in an animal model, we might gain valuable insights into the brain basis of such major symptoms as hallucinations and delusions? (4) Finally, we wonder why animals, which are afflicted by schizophrenia have survived in a Darwinian sense. Does psychotic potential imply adaptation in some subtle, unexpected way?

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* Corressponding author. Address: 138 High Street, Brookline, MA 02445, USA. Fax: +1 617 734 3812.
E-mail address: allan_hobson@hms.harvard.edu (A. Hobson).

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2. Primary and secondary consciousness defined

At the risk of oversimplification, the fundamental difference between the two levels of consciousness is concreteness (for primary consciousness) and abstraction (for secondary consciousness). Animals, which are capable of primary consciousness make faithful copies of the world (perception), react to the world and project onto it feelings (emotions) and adjust their behaviors according to experience (learning). To those animals with primary consciousness we grant the probability of low levels of conscious awareness. We also insist that primary aspects are retained by animals, which enjoy some or all of the features of secondary consciousness. These secondary features lead ultimately, to the abstraction of language and to the highest level of abstraction, which is awareness of awareness.

Consciousness is a continuously graded process and there is no sharp dividing line between phylogenetically and developmentally primitive (primary) consciousness and highly evolved and mature (secondary) forms of consciousness. There are, however, almost qualitative distinctions which are signaled by the primary–secondary concept. These distinctions are phenomenological, physiological and even anatomical. Dreaming and waking, like psychosis and sanity, are quite different despite their similarities. REM sleep signs like PGO waves, are largely contained in sleep, but can be less easily observed in waking. Frontal lobe function, so dominant in waking, is greatly diminished in sleep. Protoconsciousness theory attempts to make sense of this almost discontinuous continuity between what it calls primary as against secondary forms of consciousness.

One reason that this primary–secondary distinction appeals so much to us is that it seems to capture well what Allan Rechtschaffen (1978) has called the single-mindedness of dreams. Echoing that simple phrase, we propose that dreaming is like primary consciousness and we emphasize that many of the aspects of secondary consciousness are lost in dreaming. The lost functions include awareness of awareness (and the correct assessment of one's own true state of mind). Language functions are among the secondary consciousness features that are retained in dreaming. Adult human dreaming has a distinctly scenario-like structure that gives dreaming itself, as well as our reports of it, a language-based narrative character. Do cats, or even birds and monkeys do that? We doubt it.

Considerations such as these begin to foreshadow answers to the four questions that we attempt to answer in this essay. These questions illustrate the problems of simplistic modeling of dreaming and psychosis. We need to take seriously the idea that it is really language that sets us humans apart from other animals and that our dreams and our propensity for madness are language dependent functions of our minds. Adherents of language talents in monkeys and birds take notice: We may have a litmus test for your claims to subhuman language fame. Does your favorite animal dream and can it go insane? Obviously we are on the thin ice of speculation here but the thought experiment is nonetheless seductive.

Before trying to answer those four questions we must make one other important general point. When we claim that human dreaming conspicuously lacks some secondary consciousness features and shows an exaggeration of primary state features, we risk obscuring our conviction that in all animals that have REM sleep there is an enhancement of primary consciousness features. In others words, we assume that it is as useful for a cat as it is for a human to maximally exploit its perceptual, emotional and mnemonic brain capacities in sleep. In that sense the hypothesis that REM sleep provides a virtual reality proving ground for the brain-mind is entirely comfortable whether the subjective experience of that state, the dream, is qualitatively the same or different across species. When we speak of language, we refer to semantic abstractions, not to the mere communication of states that serve important social functions through the vocalizations of lower animals.

This caveat admits that the conscious experience of REM sleep brain activation may not be critical in determining whether or not REM sleep is universally useful (and we assume that is) or whether or not its study may be heuristically valuable to psychiatry (and, again, we assume that it is). Our position is that even if REM sleep is not associated with dreaming, (and we assume that it is) REM sleep is indispensible to the elaboration and maintenance of waking consciousness, be that consciousness primary or secondary or both.

3. The four questions

Question 1: why cannot subhuman animals become schizophrenic - do subhuman animals have a mind to go out of?

This apparently facetious query is deadly serious. Even posing it makes us stop and think. What is the mind? Is it all the information in the brain? Is consciousness, as Giulio Tononi (2008) would have us believe, the amount of information that is processed by the brain? Tononi's famous phi is seductively appealing because it is so quantitative and so simple, but surely we do not believe it. Tononi has attempted to create a mathematical model (or definition) of consciousness which is based on information theory. He asserts that consciousness must integrate a virtually infinite number of states and his measure, PHI, estimates this function. By means of his diode metaphor, he shows how the brain might exceed the capability of a digital camera which, despite its vast repertoire of states, could not possibly be conscious because of its failure to integrate those states. The thalamocortical system can accomplish this integration, Tononi argues, because of its connectivity. It is a far more likely substrate of consciousness than the cerebellum which, like the camera, captures a multitude of states but does not integrate them.

So far, so good, but Tononi cannot say how consciousness could arise in any physical system. This is the famous "hard problem" of David Chalmers and it is not solved by computing PHI or by nominating the thalamocortical system as a more likely brain structure for the mediation of consciousness than the cerebellum.