CHANGING MINDS

Religion and Cognition Through the Ages

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Introduction

My approach to the emerging dialogue between religion and cognitive science is coloured in part by my concern for the uncertain future of the academic field in which I was trained, namely religion and psychological studies. This field was originally fuelled by the early twentieth-century depth psychologies of Sigmund Freud, Carl Jung and William James, but in recent years it seems to have lost its intellectual steam. In an effort to rekindle the creative fires, some of my colleagues have argued that a revised version of Freudian, Jungian and/or Jamesian psychology is the best conceptual tool for new research. Others have turned to anthropology and cultural psychology as the most promising paths to follow. Still others advocate greater use of poststructuralist critique in rethinking what we mean by Western academic categories such as 'religion' and 'psychology'.

Much as I appreciate each of these approaches, I do not believe they are sufficient to rejuvenate the field of religion and psychology and lead it towards a more fruitful and prosperous future. The problem is certainly not lack of data. We are swimming in data regarding both human religiosity and the nature and functioning of the human mind, and more information is pouring in all the time. No, the challenge is not just gathering more facts. Instead, the challenge is to develop conceptually clear, pragmatically useful frameworks that are adequate to the facts in all their complexity. The future prosperity of religion and psychology depends on researchers expanding their disciplinary perspectives, integrating the widest possible range of data, and creating conceptual models that are open and flexible towards new findings and phenomena. In that context, I find cognitive science to be a promising resource. The remarkable discoveries made in recent years regarding the evolved functioning of the brain-mind system make two potentially huge contributions to the study of religion. First, cognitive science provides a wealth of new information about the dynamic processes involved in memory, language, perception, rationality and imagination – all topics of central concern to almost anyone interested in religion. Second, cognitive science

provides a variety of systematic, empirically grounded methods of analysis that can and should be more broadly applied in the study of religion. By incorporating (after due reflection and critique) both the conceptual knowledge and methodological practices of cognitive science, those of us who study religion from a psychological perspective may find a new way forward. Freud, Jung and James would, I suspect, heartily approve.

Wonder

Most of the research so far in applying cognitive science to religion has focused on topics such as ritual performances, positive emotions, beliefs about the soul and the afterlife, categorisations of sacred and profane, contemplative practices and the cultural epidemiology of how religious beliefs are transmitted from person to person. The work I will share in this chapter is relevant to several of these topics but synonymous with none. My theme here is *wonder*. Wonder as a positive emotion, wonder as a religious or spiritual experience generated by contemplative practice, wonder as a natural product of certain patterns of brain-mind activation – this is a phenomenon that is ideally suited for exploration using the twin resources of religious studies and cognitive science.

Wonder, as I understand the term, is the emotion excited by an encounter with something novel and unexpected, something that strikes a person as intensely powerful, real, true and/or beautiful.[1] As discussed in my book on the subject, experiences of wonder have had a significant impact on many of the world's religious, spiritual and philosophical traditions.[2] Wonder occurs with remarkable regularity in the realms of dreaming and visionary experience, sexual desire, aesthetic experience, both visual and auditory, and contemplative practice. To feel wonder in any of these arenas is to experience a sudden *decentring* of the self. Facing something surprisingly new and unexpectedly powerful, one's ordinary sense of personal identity (the psychoanalytic ego) is dramatically altered, leading to new knowledge and understanding that ultimately *recentres* the self. An appreciation of this de-

[1] My usage derives from *The Oxford English Dictionary*, which gives as the first major definition of wonder 'something that causes astonishment', and the second as 'the emotion excited by the perception of something novel and unexpected, or inexplicable; astonishment mingled with perplexity or bewildered curiosity. Also, the state of mind in which this emotion exists'. According to John Ayto's *Dictionary of World Origins*, '*Wonder* is something of a mystery word. It is widespread in the Germanic languages (German *wunder*, Dutch *wonder*, Swedish *undran*, and Danish *undren*), but its ultimate ancestry is unknown'.

[2] K. Bulkeley, *The Wondering Brain: Thinking About Religion With and Beyond Cognitive Neuroscience.*

centring and recentring process led Socrates to make the famous claim in the *Theatetus* that a 'sense of wonder is the mark of the philosopher. Philosophy indeed has no other origin'.[3]

The psychospiritual impact of wonder is evident in both the intense memorability of the experiences and the strong bodily sensations that often accompany them. People speak of being stunned, dazed, breathtaken, overwhelmed, consumed, astonished – all gesturing towards a mode of experience that exceeds ordinary language and thought and yet inspires a yearning to explore, understand and learn. This is where the noun 'wonder' transforms into the verb 'to wonder', when the powerful emotional experience stimulates curiosity and knowledge-seeking behaviour.

If we grant the connection between wonder and various aspects of human religiosity, an opening immediately presents itself to cognitive science, because wonder as an *emotion* may be understood in terms of distinctive, unusually intensified modes of brain-mind activation. This is the opening I wish to explore. Based on current cognitive scientific research, what can we say about the activity of the brain-mind system during experiences of wonder?

Wonder and Dreaming

A particularly good source of evidence for exploring wonder comes from research on dreaming.[4] Dreaming is a naturally occurring, species-wide phenomenon that has much to recommend it as a resource for comparative research. In this chapter I want to argue two related points: first, that dreaming provokes experiences of wonder as a natural consequence of the rhythms of brain-mind activity during the sleep cycle; and second, that these wonder-filled dreams are a primal wellspring of religious and spiritual experience.

Let me begin by outlining three key findings of sleep and dream research over the past several decades.

1. *REM does not equal dreaming.* From the earliest investigations of REM sleep, the widespread assumption has been that REM *is* dreaming. Initial results, gathered from subjects sleeping in a laboratory setting while attached to an EEG, indicated that people awakened during REM usually remembered a dream, while awakenings from NREM produced little or no dream recall. Later research muddied the picture somewhat, with evidence that a) REM is not always accompanied by the recall of a dream and

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[3] Plato, *Theaetetus*, p. 860.

[4] K. Bulkeley, *The Wilderness of Dreams* and *Dreaming in the World's Religions*.

b) dreamlike mental activity may be recalled from many stages of sleep other than REM, especially from NREM stage 2 towards the end of the sleep cycle. Current estimates put recall from REM awakenings at 80 percent, and recall from NREM awakenings at 43 percent.[5] At present, the best we can say is that REM seems to be the part of the sleep cycle most reliably connected to dream recall, even though the human brain-mind system seems to be dreaming in some way or other *throughout* the sleep cycle. In a very real sense we are dreaming all night long.[6]

2. *Dreaming-Waking Continuity*. Despite the common assumption that dream content is bizarre and unintelligible, numerous studies have shown that dreams are in fact meaningfully structured by the thoughts, feelings and activities of the individual in waking life.[7] Humans generally dream about people they know, in familiar places, engaged in ordinary activities. Dream content is in many ways continuous with waking life, providing an accurate reflection of people's primary social relationships and emotional concerns. This research is significant because it refutes the idea (fashionable in some scientific circles) that dreams are simply random neural nonsense, the products of deficient mental functioning with no meaningful structure whatsoever. It also refutes a simplistic Freudian notion that the manifest content of dreams is a useless shell, and it undercuts any simplistic Jungian claim that all dreams are compensations for the imbalances of the waking psyche. Now that we have a more systematic and detailed knowledge of actual dream content than was possessed by Freud or Jung, we can see how thoroughly dreaming is intertwined with a person's thoughts, feelings and activities in waking life. Dreaming is poorly understood if it is regarded as deficient or degraded as compared to waking consciousness. It is better to view dreaming simply as a different but related mode of brain-mind activation, with its own characteristic properties, constraints and functionality.[8]

3. *The Impact of 'Big Dreams'*. Some of the best insights into the distinctive qualities of dreaming consciousness come from the study of so-called 'big

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[5] T. Nielsen, 'Cognition in REM and NREM Sleep: A Review and Possible Reconciliation of Two Models of Sleep Mentation'.

[6] See E. Aserinsky and N. Kleitman, 'Regularly Occurring Periods of Eye Motility, and Concomitant Phenomena, during Sleep' and 'Two Types of Ocular Motility Occurring During Sleep'; M. H. Kryger, Th. Roth and W. C. Dement, *Principles and Practices of Sleep Medicine*.

[7] G. W. Domhoff, *Finding Meaning in Dreams* and *The Scientific Study of Dreams*; C. Hall and R. Van de Castle, *The Content Analysis of Dreams*; C. Hall, *The Meaning of Dreams.*

[8] A. Moffitt, M. Kramer and R. Hoffmann, *The Functions of Dreaming*.

dreams'. Combining unusually vivid imagery, extreme emotional arousal and strong physiological carry-over effects, such dreams are widely reported in both historical and contemporary contexts. In recent years a handful of psychological researchers have done important investigative work on what they variously term 'intensified dreams',[9] 'impactful dreams',[10] 'highly significant dreams',[11] 'apex dreaming',[12] and 'extraordinary dreams',[13] all in some way following the 'big dreams' of Jung.[14] These studies, while different in focus and approach, point in the same basic direction, showing that highly memorable dreams offer a promising means of discovering the deeper functionality and purposefulness of dreaming as a whole. Two widely reported types of 'big dream' have to do with flying and visitations from the dead. The former involve flying or floating under one's own power, defying the laws of gravity. The latter involve someone who is dead appearing alive, defying the laws of biology. Flying and visitation dreams are regularly described in terms of wonder – a mingling of surprise, amazement, intense mindfulness and hyperrealism, with a strong and lasting impression on waking awareness. Such dreams tend to be rare in the general nature of dream content, but they are unusually intense and exceptionably memorable when they do occur. Large numbers of people have experienced one or the other at some point in their lives and can still remember the dream quite clearly whenever prompted. Other types of big dreaming (perhaps we should consider calling them *prototypical* dreams, in Eleanor Rosch's sense of that term)[15] also elicit feelings of wonder with notable frequency. Dreams of tremendous beauty, dreams of a mystical encounter with a god, spirit, or angel, dreams of 'lucidity' or metacognitive awareness – these too are rare in frequency of occurrence, yet they have an extraordinary impact on people's minds and they naturally occur to large portions of every population that Western researchers have studied. Whatever influence the cultural environment may have on the content and frequency of people's dream recall, the evidence from cognitive science is showing very clearly an innate human predisposition to generate certain prototypical dream forms, which in turn become spontaneous occasions for deeply felt, long-remembered feelings of wonder.

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[9] H. Hunt, *The Multiplicity of Dreams.*

[10] D. Kuiken and Sh. Sikora, 'The Impact of Dreams on Waking Thoughts and Feelings'.

[11] R. Knudson, 'Significant Dreams: Bizarre or Beautiful?'.

[12] Nielsen, 'Cognition in REM and NREM Sleep'.

[13] S. Krippner, F. Bogzaran and A. P. de Carvalho, *Extraordinary Dreams and How to Work with Them.*

[14] C. G. Jung, *Dreams*.

[15] E. H. Rosch, 'Natural Categories'.

Wonder, Dreaming and Religion

If anything deserves to be considered a universal feature of religion, it should probably be dreaming. This is not the place to document the full extent of the multiple roles of dreaming in the world's religions, but two highlights can be mentioned to illuminate several important aspects of the phenomenology of dreaming wonder.

First, there is the dream as theophany. Jacob's dream of the heavenly ladder is the classic Biblical example. It comes in Genesis 28, after Jacob has tricked his blind father Isaac into giving him the blessing that should have gone to his older brother, Esau. Enraged at this trickery, Esau makes a vow to kill Jacob. However, their mother, Rebekah, overhears Esau, and she arranges for Jacob to visit relatives in a distant village, giving him the opportunity to escape before his brother can find and murder him. So away Jacob goes, away from his home in Beersheeba, out into the wilderness. One night during his solitary journey through the deserts of ancient Canaan, Jacob lay down, placed a stone under his head for a pillow, and went to sleep.

> And he dreamed that there was a ladder set up on the earth, and the top of it reached to heaven; and behold, the angels of God were ascending and descending on it! And behold, the Lord stood above it, and said, 'I am the Lord, the God of Abraham your father and the God of Isaac. The land on which you lie I will give to you and to your descendents; and your descendents shall be like the dust of the earth, and you shall spread abroad to the west and to the east and to the north and to the south; and by you and your descendents shall all the families of the earth bless themselves. Behold, I am with you and will keep you wherever you go, and will bring you back to this land; for I will not leave you until I have done that of which I have spoken to you.[16]

Jacob awoke from the dream filled with wonder, surprise and fear. 'Surely the Lord is in this place; and I did not know it', he says to himself. 'How awesome is this place! This is none other than the house of God, and this is the gate of heaven'. At a time of deep personal uncertainty, with his life in danger and his future totally unknown, an overwhelming dream vision appears to him, with the reassuring words of God to soothe his fears and rouse his procreative energies. Whether or not there was really a man named Jacob who actually had this dream, we can recognise in this text an early awareness of the wonder-working power of dreaming.[17]

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[16] Genesis 28:12-15. Revised Standard Version.

[17] For more on the interpretation of dreams in literary texts, see C. Schreier Rup-

Second, there is dreaming itself as an occasion for metaphysical wonder. The classic Chinese example of this is the early Daoist philosopher Zhuangzi's playful, multilayered poetic text known as the 'Inner Chapters', in which the experience of dreaming is discussed as a natural means of realising one's innate spiritual freedom:

> Long ago, a certain Zhuangzi dreamt he was a butterfly—a butterfly fluttering here and there on a whim, happy and carefree, knowing nothing of Zhuangzi. Then all of a sudden he woke up to find that he was, beyond all doubt, Zhuangzi. Who knows if it was Zhuangzi dreaming a butterfly, or a butterfly dreaming Zhuangzi? Zhuangzi and butterfly: clearly there's a difference. This is called *the transformation of things.*[18]

To dream of a butterfly is, of course, to imagine a life of *flying*, a life of freedom from gravity and blissful ignorance of all things human. Zhuangzi's evocation of such a happy dream feeling grows out of his intuitive recognition of the experiential power of people's actual dreams of flying. To this widely experienced and deeply felt dream theme, Zhuangzi adds the specific figure of the butterfly, a creature whose life cycle involves a radical transformation of physical structure, from larva to chrysalis to butterfly. Dreaming of this particular creature not only means the power to fly, it means the experience of transformation itself, life moving effortlessly from one mode of being to another, the *Dao* made manifest. The ultimate awakening leads beyond the question human-or-butterfly to a joyful surrender to the eternal flow of dreaming and waking, reality and unreality, living and dying.

Such historical and cross-cultural references could be multiplied many times over, but those are enough, I hope, for readers to accept the basic idea that a capacity for intensified, wonder-provoking dreaming is a widespread religious and spiritual phenomenon.

Wonder, Dreaming and Neuroscience

A great deal of work has been done recently on the neuroscience of sleep and dreaming. Although many mysteries remain about their ultimate nature, we now have a better understanding than ever before of what happens in the brain-mind system when humans go to sleep and dream. This new scientific knowledge indicates that the reports of wonder-provoking dreams from various religious traditions are plausibly real (though never finally verifiable)

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precht, *The Dream and the Text*.

[18] C. Tzu, *The Inner Chapters*, pp. 34-35.

experiences grounded in well-understood neuropsychological processes. The details become somewhat technical, but I believe it is crucial for religious studies scholars to recognise the significance of the latest findings in this area.

Perhaps the most surprising finding in the early years of research on REM and NREM sleep was the intensity of activation in the brain during REM. Contrary to expectations that sleep was a time of quiescence, researchers found that in fact the brain is designed to engage in a cyclical pattern of highly complex and dynamic activities, whose intensity is often greater than that of brain functioning during wakefulness. 'If we were not able to observe that a subject is behaviourally awake in the first case and sleeping in the second, the EEG alone would not be capable of indicating whether the subject is awake or [in REM sleep]'.[19] Much of this intense neural activity can be attributed to the phasic discharge of PGO (ponto-geniculo-occipatal) waves that spread throughout the brain. 'PGO waves represent unbridled brain-cell electricity. "Brain-stem lightning bolts" is hyperbolic but to the point'.[20]

One of the most influential neuroscientific theories regarding the relationship between REM sleep and dreaming comes from J. Allan Hobson, whose Activation-Synthesis model portrays an essentially unidirectional, bottom-up process of dream formation.[21] In this view dreaming is 'activated' by the neurochemical processes of REM sleep originating in the brainstem (a relatively primitive part of the brain) that, as an accidental by-product, lead to the activation of random sensations, images and memories in the sleeping mind. These arbitrary bits of mental content are 'synthesised' by higher mental functions in the forebrain (a relatively new part of the brain) that struggle to make sense of them, leading to the imposition of meaning on what is fundamentally nonsensical material. As Hobson and McCarley say in their 1977 paper, '[T]he forebrain may be making the best of a bad job in producing even partially coherent dream imagery from the relatively noisy signals sent up to it from the brain stem'.[22]

We have already noted research on the occurrence of dreaming in NREM sleep, so there is good reason to be suspicious of Hobson's strong physicalist reductionism on that score alone. More recently, the Activation-Synthesis model has been challenged by Mark Solms, a psychoanalytically trained clinical neurologist at London Hospital Medical College who stud-

[19] J. A. Hobson, *The Dreaming Brain: How the Brain Creates both the Sense and Nonsense of Dreams.*
[20] J. A. Hobson, *Dreaming and Delirium: How The Brain Goes Out of Its Mind.*
[21] First articulated in J. A. Hobson and R. McCarley, 'The Brain as a Dream State Generator: An Activation-Synthesis Hypothesis of the Dream Process'.
[22] Hobson and McCarley, p. 1347.

ied the dreams of 361 patients suffering a variety of brain lesions.[23] Solms found that almost all of the patients suffered one of four distinct 'syndromes' or patterns of disrupted dreaming.[24] Based on his analysis of these syndromes in relation to localisation of brain damage, Solms proposed a model of the normal dream process in which several particular brain regions make functional contributions: basal forebrain pathways, which contribute 'a factor of appetitive interest' in terms of curiosity, exploration and expectation; the medial occipito-temporal structures, which contribute visual representability; the inferior parietal region, which contributes spatial cognition; the frontal-limbic region, which adds 'a factor of mental selectivity' in separating dreaming from waking (damage to this region leads to reality-monitoring problems in waking); and temporal-limbic structures, which contribute 'a factor of affective arousal' and may, in their seizure-like behaviour during sleep, be the ultimate source of dream generation.[25] Solms claims his neuropsychological findings refute Hobson's Activation-Synthesis theory:

> [T]he neural mechanisms that produce REM are neither necessary nor sufficient for the conscious experience of dreaming. (...) [N]ormal dreaming is impossible without the active contribution of some of the highest regulatory and inhibitory mechanisms of the mind. These conclusions cast doubt on the prevalent notion – based on simple generalizations from the mechanism of REM sleep – that 'the primary motivating force for dreaming is not psychological but physiological'. If *psychological forces* are equated with *higher cortical functions*, it is difficult to reconcile the notion that dreams are random physiological events generated by primitive brainstem mechanisms, with our observation that global anoneira [total loss of dreaming] is associated not with brainstem lesions resulting in basic arousal disorders, but rather with parietal and frontal lesions resulting in spatial-symbolic and motivational-inhibitory disorders. These observations suggest that dreams are both generated and represented by some of the highest mental mechanisms.[26]

Solms' findings are significant not just for dreaming, but for the study of the human imagination more generally. Solms has identified a double disso-

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[23] Mark Solms, *The Neuropsychology of Dreams.*

[24] These are 'global anoneira', a total loss of dreaming; 'visual anoneira', cessation or restriction of visual dream imagery; 'anoneirgnosis', increased frequency and vivacity of dreaming, with confusion between dreaming and reality; and 'recurring nightmares', an increase in the frequency and intensity of emotionally disturbing dreams.

[25] Solms, *The Neuropsychology of Dreams*, pp. 239-244.

[26] *Ibid.*, pp. 153, 241-242, italics in original.

ciation between primary visual processing in the brain (i.e., the neural systems that receive the initial perceptual signals from the eyes) and the experience of visual dreaming. People with damage to the primary visual processing area of the brain continue to have dreams with normal visual imagery, while people with damage to other brain areas can lose all visual dreaming, even though their primary visual processing area remains healthy. Thus blind people regularly experience visual dreams, while people whose external eyesight is fine may have no visual experience in their dreams. Although Solms (a diehard psychoanalyst) does not put it in these terms, his findings suggest that *imagery is not the same as imagination*. He also found that normal visual dreaming is relatively independent from the executive systems of the prefrontal cortex (suspending our ordinary sense of volition and conscious identity) and is also independent from the REM-generating processes of the brainstem. The key neural regions, he found, were those involved in secondary visual processing and multi-sensory association, along with limbic systems responsible for emotional arousal and instinctual responses.

Autonomous Visionary Capacity

Drawing all these findings together, we begin to understand that humans are born not only with tremendous powers of external visual perception, but also with an *autonomous visionary capacity* capable of creating a seemingly limitless variety of vividly realistic scenarios. This visionary capacity is part and parcel of the dreaming process, and it enables the kind of wonder-provoking experiences so widely reported in the world's religious traditions in both sleeping and waking. According to the research of Solms and others,[27] the capacity for spontaneous emergences of intense imaginal experience appears to be a natural feature of the human brain-mind system.

This insight opens up a vast realm of inquiry. Visual experience is a central feature in nearly all religious and spiritual traditions – think of neolithic cave paintings, Tibetan Buddhist mandalas, Christian stained-glass windows, Native American vision quests. Each case displays an effort to stimulate a visually mediated religious experience of wonder, which correlates with the intensified activation of what I have been calling the autonomous visionary capacity. When other sensory perceptions are filtered out, and when the mind is focused on specific patterns, images and colours, what seems to happen is that the neural system responsible for the imagina-

[27] A. R. Braun et al., 'Regional Cerebral Blood Flow Throughout the Sleep-Wake Cycle'.

tion comes to life and begins to generate a wonder-working stream of spontaneous visionary experience.

Of course, religious traditions always have their ideological interests that influence what should and should not be seen in such experiences. However, critical attention to those interests should not obscure our appreciation for the unpredictable, surprising and sometimes frightening independence of this visionary capacity. Even in traditions that advocate transcending all visual perception (e.g., Buddhism), the experience of spontaneous dreams and visions continues to be a vibrant source of wonder in people's actual religious lives.[28]

Conclusion

This chapter has advanced two arguments: 1) dreaming provokes experiences of wonder as a natural consequence of the rhythms of brain-mind activity during the sleep cycle, and 2) these wonder-filled dreams are a primal wellspring of religious and spiritual experience. I believe the empirical evidence from cognitive science and religious studies is overwhelmingly in favour of both these claims, even if we still do not have a satisfactory explanation for the ultimate cause of human dreaming. Although many religious traditions teach that dreams are sent by divine beings, I see more scientific merit in approaching dreaming as a self-organising process in which complex meanings spontaneously emerge without the involvement of any external, supernatural agent.[29] Such a view prompts the testable hypothesis that experiences of dreaming wonder represent signals of this self-organising process in motion, that is, the consciously felt components of a healthily functioning brain-mind system. Much more research needs to be done to clarify and validate this hypothesis, particularly its implications for understanding religious experience, and my hope is that investigators from both cognitive science and religious studies will contribute their insights towards that goal.

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[28] Serinity Young, *Dreaming in the Lotus: Buddhist Dream Narrative, Imagery, and Practice.*

[29] David Kahn, 'From Chaos to Self-Organization: The Brain, Dreaming, and Religious Experience'.