

# Three

## Sacred Sleep: Scientific Contributions to the Study of Religiously Significant Dreaming

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Sarah Dunne and Aaron Waxman both contributed substantially to the collection and early analysis of the dreams discussed here, and to them (and to the dream participants as well), I extend my utmost gratitude and appreciation. G. William Domhoff and Adam Schneider also provided valuable advice and support.

### INTRODUCTION

Any attempt to develop a broad, empirically based understanding of the world's religions must account for the geographic and historical universality of dreaming. Abundant evidence from anthropology, ethnography, and psychology shows that dreams are a widely distributed and historically pervasive phenomenon of human religiosity. Dreams have played a variety of significant roles in virtually every known religious tradition, from global faiths like Christianity, Islam, Buddhism, Judaism, and Hinduism to the local spiritualities of Africa, Oceania, and the Americas (Irwin, 1994; Jedrej & Shaw, 1992; O'Flaherty, 1984; Ong, 1985; Shulman & Stroumsa, 1999; Szpakowska, 2001; Tedlock, 1987; Trompf, 1990; Von Grunebaum & Callois, 1966; Young, 1999). In recent years the research literature on dreams and religion has grown to substantial proportions, and we are now in a better position than ever to develop a comparative analysis and evaluation of the dynamic interaction between religion and dreaming. Unfortunately, progress in this direction has been blocked by a strong bias against comparison in contemporary religious studies. This is due in large part to a generational backlash

against the grandiose theories of past giants like J. G. Frazer, Emile Durkheim, Sigmund Freud, C. G. Jung, Mircea Eliade, and Joseph Campbell, all of whom employed theoretical frameworks that later scholarship revealed to be empirically deficient, quasi-imperialistic, and distorting of lived human experience. In light of this criticism, any effort at comparative religious research appears automatically suspect, a morally questionable throwback to outmoded approaches to religion.

Here, I believe, is where the new sciences of dreaming take on unexpected significance: they provide the basis for a fresh approach to the comparative study of religion. We now know, with much greater certainty than ever before, that dreaming is a natural outgrowth of the evolved neurophysiology of the human brain. It reflects an easily observed and widely distributed feature of normal, healthy brain-mind functioning. By any reasonable standard, sleep and dreaming are true universals of human experience, reported by people in all places and times. Many features of sleep and dreams remain mysteries, but over the past half-century a solid, empirically grounded foundation of knowledge has been developed regarding many of their basic features. It is upon this foundation that future comparative research in religion can be made with a clean intellectual and moral conscience. Tellingly, none of the citations mentioned above make any sustained reference to the last fifty years of scientific dream research. No wonder religious studies scholars are so suspicious of comparison—they have lost touch with the scientific resources that can give comparative analyses their substance and strength.

The psychologist of religion John McDargh of Boston College once told me that he often scribbles “WILL?” in the margins of books he’s reading—“What would it look like?” It’s fine for an author to propose novel syntheses and creative solutions, but what would it look like *in practice*, in future research, in the actual world? With that kind of pragmatic curiosity in mind, the remainder of this chapter will be devoted to an illustration of how exactly the new sciences of dreaming can contribute to the study of religiously significant dreams. Specifically, I will report on a research project that focused on identifying recurrent patterns in highly memorable dreams, combining religious studies perspectives with the insights of cognitive neuroscience, content analysis, and evolutionary psychology. These three scientific fields offer vital new resources for the study of religion and dreaming. Thanks to breakthrough developments in lesion studies and brain imaging technology, neuroscientists have provided a preliminary portrait of the common physiological substrate of dreaming experience. The key finding so far is that during rapid eye movement (REM) sleep, when most (but not all) dreaming seems to occur, the dorsolateral prefrontal cortex of the brain (where the “executive functions” of selective attention and decision-making

are centered) is relatively deactivated, while areas in the limbic system (implicated in emotional arousal) are relatively activated REM sleep (Balkin et al., 2002; Braun et al., 1997, 1998; Nofzinger, Mintum, Wiseman, Kupfer, & Moore, 1997; Nofzinger et al., 2002; Maquet, 2000; Maquet et al., 1996). Since many dream reports show evidence of diminished executive control and heightened emotionality, this finding suggests at least some degree of correlation between neural processes during REM and the form and content of dreaming. This, in turn, encourages further efforts to correlate dream phenomenology with neural functioning.

Strong correlations in another direction appear in light of findings from the quantitative content analysis of dream reports. 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 (Domhoff, 2001, 2003; Hall, 1966, 1984; Hall & Van de Castle, 1966). Humans generally dream about people they know, in familiar places, engaged in ordinary activities. Dream content is largely continuous with waking life, providing an accurate reflection of people’s social relations, emotional concerns, and, most significantly for our purposes, religious and spiritual outlook.

Evolutionary psychologists, meanwhile, have used advances in genetics, comparative anatomy, and experimental psychology to argue that religion is shaped by innate mental predispositions that are programmed into the human brain by the selective pressures of evolution. Research on religion from the evolutionary psychology perspective has largely revolved around the ties between ritual and memory, the concept of counterintuitive agents, and the development of social cognition (Boyer, 2001; Lawson & McCauley, 1990, 2002; Pinker, 1997; Pyysiäinen, 2001; Whitehouse, 2004). Some of the sweeping explanations offered by evolutionary psychology are open to question, but the efforts of these researchers to (re)infuse the comparative study of religion with an evolutionary spirit and promote the use of empirical methods has great positive potential. In light of the facts that dreaming is a universal human experience *and* a pervasive feature of religion, the evolutionary psychology approach offers a powerful new resource for its study.

To date, little effort has been made to consider what these different fields might have to say to each other. Humanistic scholars who study the historical and cross-cultural variability of dreams are rarely familiar with the relevant scientific literature. Neuroscientists usually have little or no knowledge of religion. The same is true of content analysts, while the few evolutionary psychologists who do focus on religion have largely ignored the phenomenology of dreaming. The aim here is to start a conversation among these different research communities, drawing their resources together to generate

new knowledge about the religion-dreaming connection. The conversation will be initiated by a detailed analysis of forty-two “memorable dream questionnaires” gathered from a group of female American college students. At one level these are garden-variety data, nothing but handwritten reports from a general population with no special religious expertise. Yet when the dreams are considered in light of the new sciences of dreaming, they display several patterns that correspond very closely to prominent dream reports in religious history. Recognizing these deep correspondences should encourage future efforts at large-scale comparison across different religious traditions—not in order to reduce all traditions to some single putative essence, but rather to illuminate a natural wellspring of spirituality from which each tradition has, in its own ways, drawn energy and sustenance.

## METHOD

One of the earliest and most widely replicated findings of sleep laboratory research is that the human brain-mind system is active all through the sleep cycle (Aserinsky & Kleitman, 1953, 1955; Dement, 1972; Kryger, Roth, & Dement, 2005). In a very real sense, we are dreaming in some form or other all night long. This implies, of course, that people routinely *forget* the vast majority of their dreams, a fact that challenges any simple claims about the value of dreaming. If dreams are so valuable, why do we remember so few of them? What has not received much attention from researchers, however, is another key fact of dream phenomenology: A certain percentage of dreams are intensely memorable, burning themselves into the individual’s waking awareness in ways that cannot be immediately forgotten. 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 performed important investigative work on what they variously term “intensified dreams” (Hunt, 1989), “impactful dreams” (Kuiken & Sikora, 1993), “highly significant dreams” (Knudson, 2001), “apex dreaming” (Nielsen 2000), and “extraordinary dreams” (Krippner, Bogzaran, & de Carvalho, 2002). These studies, while different in focus and approach, are united in showing that highly memorable dreams offer a promising means of discovering the deeper functionality and purposefulness of dreaming as a whole. If there is any value to the conscious remembrance of dreams, it is most likely to appear in those dreams that are remembered with greatest intensity, by the widest variety of people, from many different historical eras.

The study I conducted (with the valuable assistance of Sarah Dunne and Aaron Waxman) was focused on identifying the recurrent features of these

exceptional kinds of dreams. Forty-two female undergraduates at a public university in California volunteered to fill out a written questionnaire asking whether they ever had a dream in which they experienced:

- Feelings of happiness or joy (HA)
- Feelings of great sadness (SD)
- Feelings of great guilt (GU)
- Feelings of great confusion (CO)
- Feelings of great shock (SH)
- Feelings of great anger (AN)
- Feelings of great fear or apprehension (AP)
- Special powers or miraculous abilities (SPMA)
- Mystical or religious experience (MYS)
- The solution to a waking problem (SOL)
- The inspiration to create a work of art (ART)
- A metaphorical meaning (MET)
- Anything else significant not covered by the preceding questions (X)

In this way, a total of 316 dream reports were gathered. For each type of dream described, the participants were asked a series of additional questions about their waking reactions to the dream, whether it was recurrent, and whether they discussed it with anyone or did anything differently the next day because of it. The dreams were then coded using a simplified version of the Hall and Van de Castle (HVDC) system of content analysis (Bulkeley, 2004; Domhoff, 1996, 2001; Hall & Van de Castle, 1966), specifically the categories for characters, social interactions, emotions, settings, misfortunes, good fortunes, and descriptive modifiers. A team of six coders read through the 316 dreams in different combinations, with each dream being analyzed by at least three coders. A test of intercoder reliability on all the categories yielded an agreement rate of 88 percent, and differences were resolved by appeal to the HVDC rules and to other coders. Simple frequencies and *p* values were provided by the DreamSAT program ([www.dreamresearch.net](http://www.dreamresearch.net)). The dream narratives were also evaluated in terms of their chronological distribution in three groups: dreams from childhood, early teens, and late teens/early twenties.

## FINDINGS: OVERVIEW

Table 3.1 gives the number of reports from each participant for each type of dream.

**TABLE 3.1**  
Number of Reports Per Type of Dream

Total participants	42
Happiness	35
Sadness	35
Fear	33
Special powers	32
Guilt	29
Shock	22
Metaphorical	21
Confusion	21
Solution to problem	20
Mystical	19
Anger	19
Artistic	14

The most reports from any participant was thirteen (from P30), the fewest reports was two (from P6), with an average of 7.5 reports per participant. The most reports for any dream type was thirty-five (for HA and SD), the fewest reports was fourteen (for ART and X), with an average of twenty-four reports (that is, from about half of all participants) per type of dream.

The first significant finding is that all the major emotions are represented in these dreams. The "basic emotions" recognized by most cognitive scientists (for example, Ekman, 1992) are present abundantly. Although the questionnaire had more questions seeking reports of dreams with negative emotions, every participant described at least one memorable dream with extremely positive affect (either HA, SPMA, or MYS). The dreaming process is clearly capable of generating, at maximal intensity, the full spectrum of human emotionality. Whatever else may be said about the executive functions of selective attention and logical thinking in dreams, the brain-mind systems devoted to emotion are fully operational and engaged. Considering recent arguments that emotions are a crucial but underappreciated factor in human reasoning (Damasio, 1994, 1999; LeDoux, 1996), this raises the possibility that dreaming cognition is not deficient or impoverished as some researchers have claimed (Freud, 1900/1965; Hobson, 1999), but rather is operating in a different but no less sophisticated mode, under different conditions of neural organization. The strong and varied emotions in some dreams may be signs of novel functional complexity, not diminished mental capacity.

Table 3.2 gives the content analysis frequency data for each of the dream types (except for X). The first column provides data from the HVDC "female norm dreams," a set of 500 dream reports from American college

**TABLE 3.2**  
Content Analysis Frequencies for Memorable Dream Types

Category	Norms	AP	HA	GU	MYS	CO	AN	SD	SH	SPMA	ART	MET	SOL
Male/Female	48	65	53	57	57	48	38	51	47	50	50	38	67
Familiarity	58	54	84	64	67	61	56	67	73	49	31	60	75
Friends	37	26	54	43	17	39	37	31	43	20	19	24	50
Family	19	27	24	21	17	20	20	37	30	22	0	28	25
Dead/imag	1	3	7	2	34	6	0	5	16	11	12	11	0
Animal	4	5	2	3	14	9	2	7	3	11	6	7	3
Aggression	51	72	3	74	7	48	84	49	56	57	50	54	33
Befriender	47	53	25	78	0	36	38	68	63	50	0	33	30
Aggressor	33	3	0	43	100	54	51	19	13	46	0	25	20
Physical	34	69	0	44	100	43	40	57	71	79	100	67	43
aggression													
Indoor	61	50	42	55	45	45	63	50	57	22	46	36	33
Familiar	79	39	44	50	40	14	33	50	64	45	6	38	50
Negative	80	100	9	83	33	89	100	86	88	47	100	70	62
emotion													
At least one													
Aggressive	44	76	6	62	5	38	90	43	43	31	7	54	30
Friendly	42	36	64	34	58	38	30	49	33	25	14	38	55
Sexual	4	3	14	52	0	19	15	9	19	3	0	15	5
Misfortune	33	61	8	21	16	43	30	57	57	9	14	31	25
Good	10	27	81	7	63	29	10	40	19	100	43	38	20
fortune													

students. The content analysis frequencies from these dreams have been widely employed (along with the 500 "male norm dreams") as a comparative standard to identify basic patterns in ordinary dream content. Because the HVDC norm dreams were gathered by asking for the students' most recent dreams over a two-week period, they almost certainly underrepresent the unusual types of dreams being considered here. Thus, data from the norm dreams best serves as a point of contrast with the highly memorable dreams, analogous to Jung's contrast between "little" and "big" dreams (Jung, 1974/1990).

The total number of dream reports in this study is small enough that the frequencies in Table 3.2 should not be taken as conclusive. The content analysis data remain suggestive only, at least when viewed in isolation. The rest of this chapter will be devoted to elaborating on those suggestive findings, building up a sturdier explanatory framework with the aid of comparative religion, cognitive neuroscience, and evolutionary psychology.

Looking at the broadest patterns in Table 3.2, several features stand out. The character frequencies of the highly memorable dreams are generally in

line with the HVDC norms. The approximately 50 percent male/female percent for women (that is, half their dream characters are male, half are female) is one of the most consistent findings of several decades of content analysis research (Domhoff, 2003; Hall, 1984), and six of the highly memorable dream types hover right at that balanced male to female ratio (HA, CO, SD, SH, SPMA, ART). The types with the smallest proportion of men to women are AN and MET, and the type with the highest proportion is AP, to be discussed in more detail later. The presence of familiar characters in the highly memorable dreams is somewhat elevated above the norms, with only one type (ART) containing more unknown than known characters. The HVDC norm dreams contain few instances of dead, imaginary, and/or dead characters, and most of the highly memorable dream types (AP, HA, GU, CO, AN, SD, SOL) likewise have single-digit frequencies of such non-human figures. Three other types (SH, SPMA, MET) have somewhat higher proportions of these unusual characters, though never close the frequency with which friends and family appear. The biggest exceptions are MYS and ART, with the lowest friends and family frequencies and, in the case of MYS, the highest dead, imaginary, and animal frequencies.

Overall, the content analysis findings on characters suggest that highly memorable dreams are similar to other "normal" dreams in being populated by mostly familiar characters, evenly split between males and females who are actual figures in the dreamer's waking social world.

The data on the social interactions between characters presents a more complex picture. The HVDC system codes for three forms of social interaction (aggression, friendliness, and sexuality) and directionality (initiated, received, and mutual). The female norm dreams have about the same proportion of aggressive and friendly acts, very little reported sexuality, less physical than verbal aggression, and more instances of the dreamer receiving rather than initiating aggression. This profile roughly fits the CO, SD, and SH types of highly memorable dreams, though each of them has more physical aggression and sexuality than the norms. Not surprisingly, the AP, AN, and GU types all have much more aggressiveness than friendliness, while the reverse is true for the HA, MYS, and SOL types. Sexual interactions are in general more frequent in the highly memorable dreams, with the largest proportion by far in the GU type. Most of these dreams involved narratives of illicit/taboo sexual activity, which led to (waking, not always dreaming) feelings of guilt and remorse.

Regarding the settings, all the highly memorable dream types are less likely than the HVDC norm dreams to take place inside a house, building, or other human structure, and much less likely to portray a familiar setting. Across the board, highly memorable dreams tend in the direction of

locations that are outdoors and unfamiliar. While the character and social interaction frequencies may be fairly consistent with the norm dreams, the settings are markedly farther removed from the sphere of known human habitation. The highly memorable dreams are less homey; they are wilder.

The emotions reported in the HVDC norm dreams are primarily negative, although that is at least partly because of the negative skew of the coding categories (anger, fear, sadness, confusion, and happiness). Some researchers using different coding systems have also found a preponderance of negative emotions in dreams (Merritt, 1994; Snyder, 1970; Strauch & Meier, 1996), but others have provided contrary data (Kahn, Pace-Schott, & Hobson, 2002; McNamara, McLaren, Smith, Brown, & Stickgold, 2005; Schredl & Doll, 1998). As noted above, the initial finding of this study is that all emotions, positive and negative, are represented in the highly memorable dreams. A closer look at the content analysis data shows a trend towards purity in the different types. There are no positive emotions whatsoever in the dreams of great fear (AP), anger (AN), and, strangely, artistic creativity (ART), and scarcely any positive emotions in dreams of guilt (GU), confusion (CO), sadness (SD), and shock (SH). By contrast, the dreams of happiness (HA) are almost devoid of negative emotions, and mystical (MYS) and special powers (SPMA) dreams have far fewer negative emotion than the norms. As our participants reported them, these dreams generate all different emotions with remarkable intensity and vividness, but usually only one strong emotional valence (positive or negative) at a time.

The misfortune and good fortune codings focus on chance occurrences not caused by another character's intentional actions. The HVDC female norm dreams contain many more instances of misfortune than good fortune—unexpected bad things happen to dream characters more often than unexpected good things. This is not the case in the highly memorable dreams, in which misfortune frequencies are often much lower than the norms and good fortunes far more likely to occur. The dreams with the most good fortunes (HA, MYS, SPMA) are also the dreams with the most positive emotions, while the dreams with the most misfortunes (AP, CO, SD, SH) also had almost entirely negative emotions.

The study of dream content has much room for development, and independent studies in the future will hopefully provide additional data to support or refute the interpretations offered here. With that consideration in mind, the highly memorable dreams in this study display the following patterns:

- Mostly familiar characters (friends and family)
- Frequent social interactions of all types (aggressive, friendly, sexual)

- Mostly unfamiliar, outdoor settings
- Intense experience of all emotions, either positive or negative but rarely both
- Fewer misfortunes and many more good fortunes

### DREAMS OF GREAT FEAR (AP)

Now the analysis moves to a focus on the narrative details of two particular types of memorable dream, nightmares (AP) and mystical dreams (MYS). These two types have special significance for the study of religion, the first because of the primal existential awareness disclosed in nightmares, the second because of the striking similarities between these contemporary American women's dreams and the revelatory dreams reported by other people in a wide variety of different religious and historical contexts. We start with the AP dreams because, even though they are not overtly religious or spiritual, they provide an excellent means of gaining insight into the fundamental processes of the dreaming imagination, and this knowledge will enable us to shed new light on the MYS dreams that *are* explicitly religious.

The thirty-three "dream of great fear" reports gathered in this study portray a variety of threats to the dreamer, her family, and her friends. Some of the threats involve abandonment and social isolation: "I was at school in a long black robe and veil. Every inch of my body was covered except my eyes. No person at all would speak to me. In general, they tried not to even look at me. I wanted to cry out. I felt completely alone. The people who would look at me seemed to fear, despise, or to be in a great position to laugh at me." (P1-9, age 12-13, recurrent) Most of the dreams involved threats of physical aggression and deadly violence: "A large bear is trying to break down a front door to the room I'm in. . . . I can clearly recall the horrible feeling of seeing the bear's fur on his back moving past the windows as he walked toward the entrance. I was usually with family and friends and felt a sense of terror which I've never experienced before. As the bear reaches the door, he stands on his hind legs and growls, and then I wake up." (P21-13, age 11, recurrent) A few of the dreams envision violence suffered by larger groups of people (for example, in concentration camps, earthquakes) and attacks on humankind in general (by hordes of vampires, monsters). The longest and most elaborate narrative of the AP dreams opens with an apocalyptic setting: "It was after an Armageddon or some other event that wiped out nearly the entire human race. . . . The city where I live had become a ghost town and we all lived in this one hotel and traveled around in a camping car. . . ." (P42-19, age 17, recurrent)

The age distribution of the dreams, and more specifically the changing content from childhood through adolescence and into adulthood, highlights

the way dreaming tracks psychosocial development (Foulkes, 1999). Nine of thirty-three AP dreams occur in children age twelve or younger, and seven of those involve physical aggression against the dreamer's family, with the attacking characters being animals, monsters, or robots. Among the other twenty-four dreams from teenage and adult years, none have any animals, fewer than half the dreams involve family members, and several include friends as aggressors and/or victims. In addition to the fear of physical violence and abandonment, new fears enter the dreams of teenagers and adults: worries about rape, pregnancy, drugs, and school requirements. The older narratives become more imaginative, with a greater variety of settings and scenarios, although the villains are now humans rather than animals and mythical figures. These changing content patterns are consistent with a basic developmental shift from a family-centered social orientation in childhood to a more peer-centered orientation in adolescence. They also reflect an expanding and increasingly accurate sense of the range of possible dangers in their world—much more legitimately threatening than wild animals and monsters are the depredations of other human beings.

These findings give measured support to the Threat Simulation Theory (TST) of Antti Revonsuo (Revonsuo, 2000; Valli et al., 2005), which proposes that dreaming is an evolved cognitive capacity enabling humans to simulate threatening situations while asleep as a means of enhancing the individual's reaction to similar threats in waking life. Revonsuo's theory builds on research in evolutionary psychology to argue that dreaming serves as a kind of sentinel or alarm function, preparing people for possible dangers in the waking world (Revonsuo does not credit those who developed this same idea many years before he did, including Jones, 1978; Jung, 1974/1990; Taylor, 1983; Ullman & Zimmerman, 1979). Dreams anticipate waking world dangers, create vivid simulations of them, and allow the dreamer to envision effective, survival-enhancing responses. Considering the evolutionary origins of dreaming in the ancestral history of the human species, the TST predicts that intensely memorable nightmares are a universal psychological phenomenon whose content is biased toward the worst threats commonly found in the early ancestral environment, namely wild animals and unknown males. The TST further predicts that such nightmares will be more prevalent in childhood, when one's physical vulnerability is most acute (Valli et al., 2005).

As noted, the AP dreams in this study include several childhood reports of physical attacks by animals, in keeping with the expectations of TST. The AP dreams also affirm the TST's prediction about the prevalence of aggressive males in dream content. The percentage of male characters in the AP dreams is the highest of all the different types, and several of the AP

dreams involve vivid narratives of physical attacks by males, both unknown and known: "I was sleeping in my dream and a man came in our house. I woke up and could hear him walking around, and I knew he was looking for me. I heard him walking from room to room, trying to find me." (P4-15, age 5) "My dad opened the door and told me he was molesting the two girls and if I interfered he was going to kill me." (P25-15, age 18, recurrent)

This is a finding worth emphasizing. Even in modern urban environments, far removed temporally and geographically from the world of our species' early evolution, children's nightmares are predisposed to simulate ancestral human fears of attack by animals and human males. What this means in terms of basic cognitive architecture is that the "being attacked" nightmare constitutes a prototypical expression of the dreaming imagination. The fact that almost half the AP reports (16 of 33) are recurrent nightmares is further indication that the developing human mind is innately predisposed to dream about these primal threats.

Recent findings in cognitive neuroscience have given new insight into the anatomical substrate of dreaming, adding further evidence to support the idea that intensely memorable nightmares have their roots in the core processes of brain-mind development. As already noted, brain imaging studies have shown that REM sleep is characterized by diminished activity in the dorsolateral prefrontal cortex and heightened activity in the limbic system. These studies confirm what Mark Solms, using brain lesion research, found to be the primary neural regions involved in dreaming: the limbic system (associated with negative emotions), the medial occipito-temporal cortex (visual representation), the inferior parietal convexity (spatial representation), and the basal forebrain pathways (appetitive desire). By contrast, the prefrontal convexity (source of logical coherence, prepositional structure, volitional purpose) seems to play no essential role in normal dream formation. More specifically to our purposes, Solms found in clinical patients suffering from recurring nightmares a pattern of seizure activity in the temporal-limbic region. This connects the nightmares to epilepsy (and its complex historical association with religious experience). Solms also points out that other patients reporting intense recurrent nightmares had suffered focal damage to the frontal-limbic region of the brain, which is responsible for distinguishing dreaming from waking reality. It appears that dreams may turn into nightmares when a person's customary ability to monitor reality is impaired, that is, when you can no longer be sure if you've woken up for real or are still dreaming.

Looking at the AP dreams in light of neuroscientific research, the subjective reports of the participants are remarkably consistent with Solms's neural

portrait of the formation of nightmares. The dominant emotion of fear clearly reflects heightened limbic activation, and the unusually vivid images (recall P21-13, "I can clearly recall the horrible feeling of seeing the bear's fur on his back moving past the windows as he walked toward the entrance") corresponds to Solms's findings on the importance of brain regions devoted to secondary visual processing. The diversity of settings and abundance of energetic movements make sense in connection with a heightened activation of the neural systems supporting spatial representation. Regarding the brain processes underlying what Solms calls appetitive desire, this is reflected in the AP reports in the dreamer's vigorous efforts at self-defense. The dreamer is rarely a passive recipient of attack, but almost always struggles hard to preserve her own life and the life of her family and friends. The diminished neuropsychological ability to distinguish dreaming from waking appears in the AP reports as an overwhelming physiological carryover effect, by which the dreamer awakens in great physical distress: "I had a dream that a man stole my mom's and my car. When me and my mom got home, the man was there, he had a speech impediment and looked really creepy. He was chasing us around the house. In my dream I woke up, I thought I was awake, but the man was still there. When I finally did wake up I was screaming for my mother and I sat straight up in bed. My heart was racing." (P14-11, age 19)

Solms's research did not involve any systematic investigation of dream content, but his findings are compatible with the TST of Revonsuo and the content analysis research of Hall, Van de Castle, and Domhoff. Recurrent nightmares are a foundational expression of human psychology, with deep evolutionary roots and direct relevance to basic features of brain-mind development. Consider one more example: "I dreamt that I was being chased by a man with a knife. Somehow in my dream I was a good fighter and kicked this guy's butt but it was a long fight and I was still fighting him when I woke up." (P39-13, age 22) The dreamer added that when she awoke she felt "frightened but confident that I knew what I was doing," and she changed her subsequent waking behavior because of the dream: "I was very careful of where I went and I felt that I needed to be safer. I am more cautious now about my safety." Drawing all the foregoing strands of research together, we may say that such a nightmare is the expression of a neurally structured and evolutionarily adaptive capacity to generate highly memorable and intensely frightening dreams, making the individual more aware of, and thus better prepared for, likely threats in the waking world. From the perspective of contemporary science, nightmares are a beneficial, survival-enhancing feature of human nature.

That same conclusion is widely shared by the world's religious traditions. Nightmares are a pervasive phenomenon in sacred texts, in initiatory/

conversion ordeals, in the lives of healers and prophets, and in the nightly experiences of ordinary lay people. Texts from many different cultures have been devoted to the interpretation of dream symbolism, and they always include numerous references to intensely frightening dreams (Covitz, 1990; Lamoreaux, 2002; Noegel, 2001; Oberhelman, 1991; Ong, 1985; Oppenheim, 1956; Shafton, 2002; Wayman, 1967; White, 1975). The people reading and using these dream interpretation manuals are clearly familiar with the experience of intense nightmares, and the manuals offer help in understanding what to do in response to such dreams.

The most prevalent approach toward nightmares in the world's religions is to regard them as warnings from God, the gods, or ancestral spirits. Warning dreams are reported throughout the ancient cultures of India (O'Flaherty, 1984), Egypt (Szpakowska, 2003), Mesopotamia (Noegel, 2001), and Greece (Dodds, 1951). In the Hebrew Bible's Book of Job, a friend of the suffering protagonist declares, "For God speaks in one way, and in two, though man does not perceive it. In a dream, in a vision of the night, when deep sleep falls upon men, while they slumber on their beds, then He opens the ears of men, and terrifies them with warnings, that He may turn man aside from his deed, and cut off pride from man; He keeps back his soul from the Pit, his life from perishing by the sword" (Job 33:12–18). Warning dreams are also reported in many traditions where ancestor worship is a major element in religious practice—deceased ancestors appear in highly memorable and frightening dreams to admonish the dreamer for failing to perform proper rituals and observances (Jedrej & Shaw, 1992; Ong, 1985; Trompf, 1990). Conversion narratives may include a warning dream as crucial turning point in the individual's life history, as in the fourth century CE Christian leader Jerome's dream of God judging and scourging him for his lack of faith (Kelsey, 1991).

The broad historical and cross-cultural recognition of such a type of dream function corresponds almost exactly to the integrated conclusion of Solms's neuroscience, Domhoff's content analysis, and Revonsuo's TST. The evolutionary account of nightmares as threat simulations aimed at improving waking adaptation is remarkably consistent with the religious view that nightmares function as spiritual alarms alerting people to dangers in their waking lives. At a minimum, this means that a higher degree of scholarly trust may be given to dream reports from religious contexts. Although such reports are inevitably filtered by linguistic, conceptual, and rhetorical influences, they are manifestly recognizable human experiences whose psychophysiological contours are increasingly well understood by contemporary science.

The implications go beyond that. Historical and cross-cultural religious dream reports offer insights into the crucial question that scientific

researchers have repeatedly raised, but failed to answer—the question of how the innate potential of dreaming may be further cultivated. Revonsuo thinks threat simulation is pretty useless outside of the early ancestral environment, Domhoff is wary of all functional theory, and Solms clings to Freud's sleep preservation model of dreaming. This is where further research in the world's religions can shed new light on the various ways humans have developed the adaptive, creative, life-enhancing potential of their dreams. Considering the warning dreams discussed so far, the main feature that distinguishes the scientific and religious views is that in religious contexts what is threatened in nightmares isn't simply one's physical body, but one's spirit or soul. The focus of concern is no longer just individual survival, but one's relationship to a broader faith community that usually includes a variety of nonhuman agencies (deities, spirits, natural forces). What this suggests is that the world's religious traditions have been actively engaged in a process of cultivating the innate human capacity for nightmares in ways that have expanded people's sphere of relationship and deepened their self-understanding. The psychosocial trajectory identified in the AP dreams (from family-centered threats in childhood to peer-centered threats in adolescence, and then to wider threats against humankind) may be a developmental expression of what religious traditions seek to shape, namely the capacity of nightmares to broaden (painfully but beneficially) people's moral and existential horizons. In this view, nightmares can become agents of religious and ethical idealism.

#### **DREAMS OF MYSTICAL OR RELIGIOUS EXPERIENCE (MYS)**

The connection between the nightmares gathered in this study and those reported in religious contexts lies in a sharing of recurrent themes, emotions, and carryover effects, not in any specifically "religious" characters, settings, or objects. None of the participants explicitly described their AP dreams as religious or spiritual. In the MYS dreams, however, the dreamers themselves identify the connections to religion, and their reports include numerous references to traditional Christian religious figures (in keeping with the American cultural context in which the dreams were gathered). Several other dream types also have explicit religious references (especially SPMA, HA, SD, MET, ART). Although just under half the participants reported a MYS dream, most of the other participants also described dreams of transcendent flying, meeting a deceased loved one, or discovering a deep existential insight. In short, almost all participants reported at least one highly memorable dream with mystical, religious, and/or spiritual qualities. The overall frequency of these dreams seems somewhat less than the AP dreams, though

how much less is uncertain. MYS dreams may not be as pervasive as nightmares, but they are still a widely distributed phenomenon.

The content analysis profile of MYS dreams reveals them as extremely positive, with an abundance of friendly social interactions, happy emotions, and good fortunes. The dreams have far fewer negative elements than the other types, with diminished aggression, unpleasant emotions, and misfortunes. The most telling content analysis details are the high frequency of dead and imaginary characters and the nonexistent befriender percent (meaning that the dreamer is always on the receiving end of a friendly act). This suggests the prototypical MYS dream involves a spiritual being acting in a caring, helpful way toward the dreamer, who feels happiness as a result.

Looking at the age distribution, only four reports came from childhood. One of those reports included no other characters, just the dreamer opening her eyes in the clouds and "feeling like I enter into my soul and I experience an increasing and incredible feeling hard to explain (ineffable?) sense of high exhilaration for being alive" (P33-9, age 10, recurrent). The characters in the other three childhood dreams are all divine in some way (spirits, angels, deceased relatives), and there is no aggression, sexuality, or physical contact of any kind. All the participants reported feeling good upon awakening.

The nine adolescent MYS dreams are overtly religious in terms of imagery and narrative themes (going to heaven, being saved by the Holy Spirit, hearing the voice of God, and so on). Like the childhood dreams, the adolescent ones have virtually no physical contact and no aggression or sexuality. All reports indicate positive carryover effects in the form of happy feelings upon awakening, and most participants said the dreams intensified their faith in God and religion. For example

I was walking down a long, dusty road just passing a sign that pointed ahead of my [*sic*] and said eternity. I was dressed in tan, worn, travelers clothing, dusty, and a heavy matching knapsack. I was so, so very weary. Finally I sank to my knees. I felt a warm hand on my shoulder but when I looked up, no one was there. There was, however, fresh blood on my shirt. One brilliant white star above me caught my eye as a shower of radiant white light poured down on me. I heard a voice say "You are forgiven. You are not a child anymore, but I am your eternal Father." Suddenly, I could rise to my feet. I was still tired, but I could go on. I woke up as I walked down the road. (P9-7, age 16)

The participant said she gave money to homeless people in gratitude for the dream, which "strengthened my belief in God greatly." A second example

I was jumping over a fence with some guy. Then I was flying or floating upwards. Suddenly I was at the place which was like the waiting room into

Heaven. There was a dog and a cat floating about and the room looked like a theater. Then this voice of an old man came to me—I think it was God's voice and he said I could either die right now and enter Heaven or go back to earth and live again. I chose earth and floated back down. (P42-9, age 15, recurrent)

This participant said that upon awakening, "I was glad that I was still alive but also felt like I got a glimpse of what was to come. . . . These dreams have made me a more religious person."

The five adult MYS dreams are somewhat different in being described in more spiritual terms, with fewer references to traditional religious figures and a greater depth of personal experience. For example:

I was standing in a room with no windows or doors, and my only sensation was one of light. A room may not be the best description . . . it was almost like a sphere or a capsule made of bright, glowing light. I was not only encompassed by this light, I was also involved in it. I remember just standing there for a very long time, feeling very alive. I didn't want to move for fear of losing the feeling of perfection, so I didn't. Eventually the light itself began to move, slowly gliding around, taking me with it. There was sound, too, an indescribable music that matched the light perfectly . . . there were no other people anywhere, but that was okay. (P4-1, age 18, recurrent)

When she woke up, "I was wowed and somehow at the same time I was at peace. . . . I believe it was very spiritual. Somehow I tapped into the spiritual world."

No neuropsychological research has ever directly focused on MYS-type dreams. This may be because of the avowed disdain a few prominent neuroscientists proclaim toward religion (Crick, 1994; Pinker, 1997), but it is more crucially the result of limitations in dream research technology. Dream reports gathered in a sleep laboratory are homogenized by the experimental context, with fewer nightmares, less aggression, and persistent awareness of the lab setting (Hartmann, 1984; Spoormaker, Schreuder, & Kamphuisen, 2004; for partially contrary data, see Domhoff & Schneider, 1999). Moreover, the current generation of brain imaging technology requires subjects either to remain absolutely motionless while passing through a magnetic field (fMRI) or to submit to invasive injections of radioactive isotopes into the bloodstream (PET, SPECT)—conditions that are not conducive to the appearance of rare, extraordinary types of dreaming. Until subtler technologies are developed, neuroscience can only provide indirect assistance to the study of MYS dreams.

That being said, two neuroscientists, Solms and Tore Nielsen, are doing work that does point in potentially fruitful directions.

In his study of brain-damaged patients, Solms (1997) identified a particular clinical syndrome he called "excessive dreaming" or *anoneirognosis*. This syndrome involves people experiencing intensely emotional and hyperrealistic dreams, often with unusual characters and other content features. Although as noted Solms takes no interest in the content dreams, his case studies of the ten patients who had this syndrome include dream reports of being dead and appearing before "the pearly gates" (178), visiting a very beautiful place (183), meeting deceased loved ones (185–186), and having a black snake crawl into the dreamer's vagina (192). Both in their intensified form and fantastic content, these anoneirognostic dreams are quite similar to the memorable dreams reported in the present study and to religious dream reports from various cultural and historical settings. Although Solms's patients would probably be happy to give up their hypervivid dreams if they could just regain normal brain/mind functioning again, the experiential similarities of their dreams to the types of dreams most frequently reported in the world's religions is significant. Put most simply, anoneirognosis may be a pathological variant of a healthy dream type identified here as MYS. If Solms is right that frontal limbic lesions are the primary cause of this syndrome, this may be a key region of the brain to study in connection with the religiously oriented dream experiences.

A second neuroscientific resource that can help develop a better understanding of MYS dreams is the work of Tore Nielsen, who has argued in a major review paper (Nielsen, 2000) that the rhythms of cognitive activity in sleep may be conceptualized in terms of four levels of specificity: preconscious cognitive processing, sleep mentation, dreaming, and apex dreaming. Of the latter, Nielsen says

the term "apex" dreaming is adopted to refer to a subcategory of dreaming that is distinguished by exceptional vividness, intensity, or complexity.... Apex dreaming [is] the most vivid, intense, and complex forms of dreaming: e.g., nightmare, sexual, archetypal, transcendental, titanic, existential, lucid.... The fact that such vivid dreaming occurs frequently during REM sleep but rarely during NREM sleep has led many to propose a qualitative difference between REM and NREM mentation. (p. 853)

The main thrust of Nielsen's paper is to argue for a "2-gen" model by which REM and NREM mentation are generated by two different brain/mind systems, leading to the conclusion that dreaming is properly a product of REM sleep, not NREM sleep. While I question Nielsen's bias toward REM sleep (vivid dreams are often reported from NREM sleep [Kahan, 2000]), his recognition of "apex" types of dreams is worthy of our attention.

Nielsen, like Solms, does not focus on dream content, thus he does not consider the question of what apex dreams look like in terms of recurrent patterns of character, emotion, setting, social interaction. Nevertheless, I would propose, as a testable hypothesis, that MYS dreams are a recurrent human phenomenon that qualify as a type of apex dreaming insofar as they reflect an unusually strong and positive activation of the dreaming imagination (whether in REM or NREM sleep). The extraordinary combination in MYS dreams of bodily sensation, visual stimulation (especially bright light), positive emotional arousal, and cognitive structure points to a remarkably complex and sophisticated process at work in the sleeping brain/mind system.

This should encourage future neuropsychological research to look for a pattern of unusually heightened activation in those neural systems devoted to secondary visual processing (parietal lobe), social relationality (prefrontal cortex), and positive emotions/reward (ventral tegmental dopamine system, nucleus accumbens), with an unusual deactivation of systems devoted to fear/aggression (amygdala, limbic region) and reality monitoring (anterior cingulate gyrus, other frontal-limbic structures). Such an activation pattern would, I suggest, constitute a healthy anoneirognosis in Solms's terms, and a recurrent type of apex dreaming in Nielsen's terms.

The images, sensations, and narrative themes of the MYS dreams are of course clearly mirrored in dream reports from various religious traditions around the world. Consider, for example, this dream from an eleventh century CE Japanese Buddhist woman, written in her diary

I dreamt that Amida Buddha was standing in the far end of our garden. I could not see him clearly, for a layer of mist seemed to separate us, but when I peered through the mist I saw that he was about six foot tall and that the lotus pedestal on which he stood was about four feet off the ground. He glowed with a golden light, and one of his hands was stretched out, while the other formed a magical sign. He was invisible to everyone but me. I had been greatly impressed but greatly frightened and did not dare move near my blinds to get a clearer view of him. He had said, "I shall leave now, but later I shall return to fetch you." And it was only I who could hear his voice. (Morris, 1971)

The woman said that for many years after, "it was on this dream alone that I set my hopes for salvation."

And this example, from a twelve-year-old African boy growing up in contemporary Jamaica

I dreamt one night that I saw a man. He was not a white man, and he was not a very dark man. But he came and he took me from my father's home,

down a glade, underneath a white coco tree. Reaching the white coco tree, he asked me if I knew who he was. I told him, "no." He asked me a second time, and then a third time, and I remember that I have said to him, "if I knew who you were, I would have told you." He said, "My name is the Lord Jesus Christ," and he took a bottle from his pocket, about the length of my hand, and he anointed me from my head down to my foot. And then he said I was to go and tell the Nations, my mother and also my father, that he, Jesus, was in need of them. (Lanternari, 1975)

The boy later became a prophet and the founder of an Afro-Christian movement that attracted many followers.

Dreams like these, and the waking life context from which they spring, are inevitably colored by language, personal motivation, religious education, cultural dynamics, social expectations, and reporting conditions. An ideal interpretation of such dreams (which this chapter does not provide) would include careful reflection on each of these factors. Future research in religious studies can make significant contributions to that end. As just these two examples show, the capacity of MYS-type dreams to envision a positive, impactful interaction with a divine figure can take entirely different religious forms—the Buddha for the Japanese woman, Jesus Christ for the African-Jamaican boy. There is no fixed religious or spiritual content to these dreams; they are experienced within the life context of the dreamer's cultural environment, and thus are understood in terms of the native language(s) of that environment. What the MYS type of dream reflects is an innate capacity to envision positive interactions with benevolent supernatural beings (often in beautiful, otherworldly settings). This does not constitute the essence of religion, but it does point to what may be fairly characterized as a primal wellspring of human religious experience. The emotional power, strong carryover effects, and high degree of memorability make MYS dreams eminently useful as agents of intensified spiritual belief and revitalized religious practice. Based on the findings of this study, it makes good scientific sense that virtually all the world's religious traditions have tried to incorporate such dreams into their understanding of human-divine relations.

## CONCLUSION

The recurrent patterns in highly memorable dreams, particularly in nightmares and mystical dreams, are significant for the comparative study of religion insofar as such dreams are widely reported and valued in nearly every known religious tradition. Using the insights of the new sciences of dreaming, the patterns identified in these dreams can be understood as products of the extraordinary activation of innate brain-mind capacities whose

evolved function is to strengthen waking consciousness and behavioral adaptability. If nightmares may (at one level) serve as threat simulations warning people of waking life dangers, then mystical dreams may (at another level) serve as "spirit simulations" provoking greater awareness of nonhuman beings and powers with whom humans may form beneficial relationships.

## REFERENCES

- Aserinsky, E., & Kleitman, N. (1953). Regularly occurring periods of eye motility, and concomitant phenomena, during sleep. *Science*, *118*, 273–274.
- Aserinsky, E., & Kleitman, N. (1955). Two types of ocular motility occurring in sleep. *Journal of Applied Physiology*, *8*, 1–10.
- Balkin, T. J., Braun, A. R., Wesensten, N. J., Jeffries, K., Varga, M., Baldwin, P., et al. (2002). The process of awakening: A PET study of regional brain activity patterns mediating the re-establishment of alertness and consciousness. *Brain*, *125*, 2308–2319.
- Boyer, P. (2001). *Religion explained: The evolutionary origins of religious thought*. New York: Basic Books.
- Braun, A. R., Balkin, T. J., Wesensten, N. J., Carson, R. E., Varga, M., Baldwin, P., et al. (1997). Regional cerebral blood flow throughout the sleep-wake cycle. *Brain*, *120*, 1173–1197.
- Braun, A. R., Balkin, T. J., Wesensten, N. J., Gwady, F., Carson, R. E., Varga, M., et al. (1998). Dissociated pattern of activity in visual cortices and their projections during human rapid eye-movement sleep. *Science*, *279*, 91–95.
- Bulkeley, K. (2004, June). Revision of the Good Fortune Scale: A new tool for the study of "Big Dreams." Paper presented at the International Association for the Study of Dreams, at Copenhagen.
- Covitz, J. (1990). *Visions of the night: A study of Jewish dream interpretation*. Boston: Shambhala.
- Crick, F. (1994). *The astonishing hypothesis: The scientific search for the soul*. New York: Touchstone.
- Damasio, A. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Quill.
- Damasio, A. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. San Diego, CA: Harcourt.
- Dement, W. (1972). *Some must watch while some must sleep: Exploring the world of sleep*. New York: W.W. Norton.
- Dodds, E. R. (1951). *The Greeks and the irrational*. Berkeley, CA: University of California Press.
- Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach*. New York: Plenum.
- Domhoff, G. W. (2001). Using content analysis to study dreams: Applications and implications for the humanities. In K. Bulkeley (Ed.), *Dreams: A reader on the religious, cultural, and psychological dimensions of dreaming* (pp. 307–319). New York: Palgrave.

- Domhoff, G. W. (2003). *The scientific study of dreams: Neural networks, cognitive development, and content analysis*. Washington, DC: American Psychological Association.
- Domhoff, G. W., & Schneider, A. (1999). Much ado about very little: The small effect sizes when home and laboratory collected dreams are compared. *Dreaming, 9*, 139–151.
- Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotion, 6*, 169–200.
- Foulkes, D. (1999). *Children's dreaming and the development of consciousness*. Cambridge, MA: Harvard University Press.
- Freud, S. (1965). *The interpretation of dreams* (J. Strachey, Trans.). New York: Avon Books. (Original work published 1900)
- Hall, C. (1966). *The meaning of dreams*. New York: McGraw Hill.
- Hall, C. (1984). A ubiquitous sex difference in dreams, revisited. *Journal of Personality & Social Psychology, 46*, 1109–1117.
- Hall, C., & Van de Castle, R. (1966). *The content analysis of dreams*. New York: Appleton-Century-Crofts.
- Hartmann, E. (1984). *The nightmare: The psychology and biology of terrifying dreams*. New York: Basic Books.
- Hobson, J. A. (1999). *Dreaming as delirium: How the brain goes out of its mind*. Cambridge, MA: MIT Press.
- Hunt, H. (1989). *The multiplicity of dreams: Memory, imagination, and consciousness*. New Haven, CT: Yale University Press.
- Irwin, L. (1994). *The dream seekers: Native American visionary traditions of the Great Plains*. Norman, OK: University of Oklahoma Press.
- Jedrej, M. C., Shaw, R. (Eds.). (1992). *Dreaming, religion, and society in Africa*. Leiden, Netherlands: E. J. Brill.
- Jones, R. M. (1978). *The new psychology of dreaming*. New York: Penguin Books.
- Jung, C. G. (1990). *Dreams*. (R. F. C. Hull, Trans.). From Bollingen series XX: The collected works of C. G. Jung, Vols. 4, 8, 12, 16. Princeton, NJ: Princeton University Press. (Original work published 1974)
- Kahan, T. L. (2000). The “problem” of dreaming in NREM sleep continues to challenge reductionist (2-Gen) models of dream generation [commentary]. *Behavioral & Brain Sciences, 23*, 956–958.
- Kahn, D., Pace-Schott, P., & Hobson, J. A. (2002). Emotion and cognition: Feeling and character identification in dreaming. *Consciousness & Cognition, 11*, 34–50.
- Kelsey, M. (1991). *God, dreams, and revelation: A Christian interpretation of dreams*. Minneapolis, MN: Augsburg Publishing.
- Knudson, R. (2001). Significant dreams: Bizarre or beautiful? *Dreaming, 11*, 167–178.
- Krippner, S., Bogzaran, F., & de Carvalho, A. P. (2002). *Extraordinary dreams and how to work with them*. Albany, NY: State University of New York Press.
- Kryger, M. H., Roth, T., & Dement, W. C. (Eds.). (2005). *Principles and practices of sleep medicine* (4th ed.). Philadelphia: Elsevier Saunders.
- Kuiken, D., & Sikora, S. (1993). The impact of dreams on waking thoughts and feelings. In A. Moffitt, M. Kramer, & R. Hoffmann (Eds.), *The functions of dreaming* (pp. 419–475). Albany, NY: State University of New York Press.
- Lamoreaux, J. C. (2002). *The early Muslim tradition of dream interpretation*. Albany, NY: State University of New York Press.
- Lanternari, V. (1975). Dreams as charismatic significant: Their bearing on the rise of new religious movements. In T. R. Williams (Ed.), *Psychological anthropology* (pp. 221–236). Paris: Mouton.
- Lawson, E. T., & McCauley, R. N. (1990). *Rethinking religion: Connecting cognition and culture*. Cambridge, MA: Cambridge University Press.
- Lawson, E. T., & McCauley, R. N. (2002). *Bringing ritual to mind: Psychological foundations of cultural forms*. Cambridge, MA: Cambridge University Press.
- LeDoux, J. (1996). *The emotional brain: The mysterious underpinnings of emotional life*. New York: Touchstone.
- Maquet, P. (2000). Functional neuroimaging of normal human sleep by positron emission tomography. *Journal of Sleep Research, 9*, 207–231.
- Maquet, P., Peteres, J. M., Aerts, J., Delfiore, G., Degueldre, C., Luxen, A., et al. (1996). Functional neuroanatomy of human rapid-eye-movement sleep and dreaming. *Nature, 383*, 163.
- McNamara, P., McLaren, D., Smith, D., Brown, A., & Stickgold, R. (2005). A “Jekyll and Hyde” within: Aggressive versus friendly interactions in REM and non-REM dreams. *Psychological Science, 16*, 130–136.
- Merritt, J., Stickgold, R., Pace-Schott, E., Williams, J., & Hobson, J. A. (1994). Emotion profiles in the dreams of men and women. *Consciousness & Cognition, 3*, 46–60.
- Morris, I. (Trans.) (1971). *As I crossed a bridge of dreams*. London: Penguin Books.
- Nielsen, T. (2000). Cognition in REM and NREM sleep: A review and possible reconciliation of two models of sleep mentation. *Behavioral & Brain Science, 23*, 851–866.
- Noegel, S. (2001). Dreams and dream interpreters in Mesopotamia and in the Hebrew Bible (Old Testament). In K. Bulkeley (Ed.), *Dreams: A reader on the religious, cultural, and psychological dimensions of dreaming* (pp. 45–71). New York: Palgrave.
- Nofzinger, E. A., Buysse, D. J., Miewald, J. M., Meltzer, C. C., Price, J. C., Sembrat, R. C., et al. (2002). Human regional cerebral glucose metabolism during non-rapid eye movement sleep in relation to waking. *Brain, 125*(Pt 5), 1105–1115.
- Nofzinger, E. A., Mintun, M. A., Wiseman, M. B., Kupfer, D. J., & Moore, R. Y. (1997). Forebrain activation in REM sleep: An FDG PET study. *Brain Research, 770*, 192–201.
- Oberhelman, S. M. (1991). *Oneirocriticon of Achmet: A Medieval Greek and Arabic treatise on the interpretation of dreams*. Lubbock, TX: Texas Tech University Press.
- O'Flaherty, W. D. (1984). *Dreams, illusion, and other realities*. Chicago: University of Chicago Press.
- Ong, R. K. (1985). *The interpretation of dreams in ancient China*. Bochum, Germany: Studienverlag Brockmeyer.
- Oppenheim, A. L. (1956). The interpretation of dreams in the Ancient Near East with a translation of an Assyrian dream-book. *Transactions of the American Philosophical Society, 46*, 179–343.
- Pinker, S. (1997). *How the mind works*. New York: W. W. Norton.
- Pyysiäinen, I. (2001). *How religion works: Towards a new cognitive science of religion*. Leiden, Netherlands: Brill.
- Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioral & Brain Sciences, 23*, 877–901.

- Schredl, M., & Doll, E. (1998). Emotions in dream diaries. *Consciousness & Cognition*, 7, 634–646.
- Shafton, A. (2002). *Dream-singers: The African American way with dreams*. New York: John Wiley & Sons.
- Shulman, D., & Stroumsa, D. (Eds.). (1999). *Dream cultures: Explorations in the comparative history of dreaming*. New York: Oxford University Press.
- Snyder, F. (1970). The phenomenology of dreaming. In L. Madow & L. H. Snow (Eds.), *The psychodynamic implications of the physiological studies on dreams* (pp. 124–151). Springfield, IL: Charles S. Thomas.
- Solms, M. (1997). *The neuropsychology of dreams: A clinico-anatomical study*. Mahway, NJ: Lawrence Erlbaum.
- Spoornaker, V. I., Schreuder, B., Kamphuisen, H. A. C., & Kleijn, W. C. (2004). Polysomnography of posttraumatic nightmares and its influence on frequency. Retrieved on October 20, 2006, from [http://www.asdreams.org/2004/2004\\_Program\\_5-19.pdf](http://www.asdreams.org/2004/2004_Program_5-19.pdf)
- Strauch, I., & Meier, B. (1996). *In search of dreams: Results of experimental dream research*. Albany, NY: State University of New York Press.
- Szpakowska, K. (2001). Through the looking glass: Dreams in Pharaonic Egypt. In K. Bulkeley (Ed.), *Dreams: A reader on the religious, cultural, and psychological dimensions of dreaming* (pp. 97–109). New York: Palgrave.
- Szpakowska, K. (2003). *Behind closed eyes: Dreams and nightmares in ancient Egypt*. Swansea: The Classical Press of Wales.
- Taylor, J. (1983). *Dream work*. Mahwah: Paulist Press.
- Tedlock, B. (Ed.). (1987). *Dreaming: Anthropological and psychological interpretations*. New York: Cambridge University Press.
- Trompf, G. W. (1990). *Melanesian religion*. Cambridge, UK: Cambridge University Press.
- Ullman, M., & Zimmerman, N. (1979). *Working with dreams*. Los Angeles, CA: Jeremy Tarcher.
- Valli, K., Revonsuo, A., Palkas, O., Ismail, K. H., Ali, K. J., & Punamäki, R.-L. (2005). The threat simulation theory of the evolutionary function of dreaming: Evidence from dreams of traumatized children. *Consciousness & Cognition*, 14, 188–218.
- Von Grunebaum, G. E., & Callois, R. (Eds.). (1966). *The dream and human societies*. Berkeley, CA: University of California Press.
- Wayman, A. (1967). Significance of dreams in India and Tibet. *History of Religions*, 7, 1–12.
- White, R. J. (1975). *The interpretation of dreams: Oneirocritica by Artemidorus*. Park Ridge, NJ: Noyes Press.
- Whitehouse, H. (2004). *Modes of religiosity: A cognitive theory of religious transmission*. Walnut Creek, CA: Altamira Press.
- Young, S. (1999). *Dreaming in the lotus: Buddhist dream narrative, imagery, and practice*. Boston: Wisdom Publications.