

The Science of Dreaming

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INTRODUCTION

It is exciting to think that dreams might have some “meaning” for us that can help us better understand and transform our lives. Although many of us have experienced the therapeutic value of dreams when applying solid dreamwork principles, there is still controversy over whether dreams are meaningful or even have a function. It would perhaps be a failure of understanding and imagination if we relegate dreams to the babble of a sleeping mind, simply because we are unable to understand the language of the dreaming brain.

You will learn in this document that we dream every night, in stages all through the night and that much our brain remains active when we dream, including centers that process emotion, memory, imagery, association, analogical problem resolution and learning - all of which can be associated with our waking life situations and contributes to the inner modeling of our world view.

If you are interested in understanding and working with your dreams, click on the Dreamwork or Psychology of Dreaming link on this site. There you will find a number of proven tools and approaches for group and individual dreamwork. Understanding the dream in relation to your life is only the very first step so this you will be introduced to tools for exploring the underlying emotional issues the dream is dealing with and how to recognize how the dream is attempting to find resolution and closure.

SECTION 1- SLEEP AND DREAMING

Sleep is by no means an inactive state for the nervous system – Ernest Hartmann

What are Dreams?

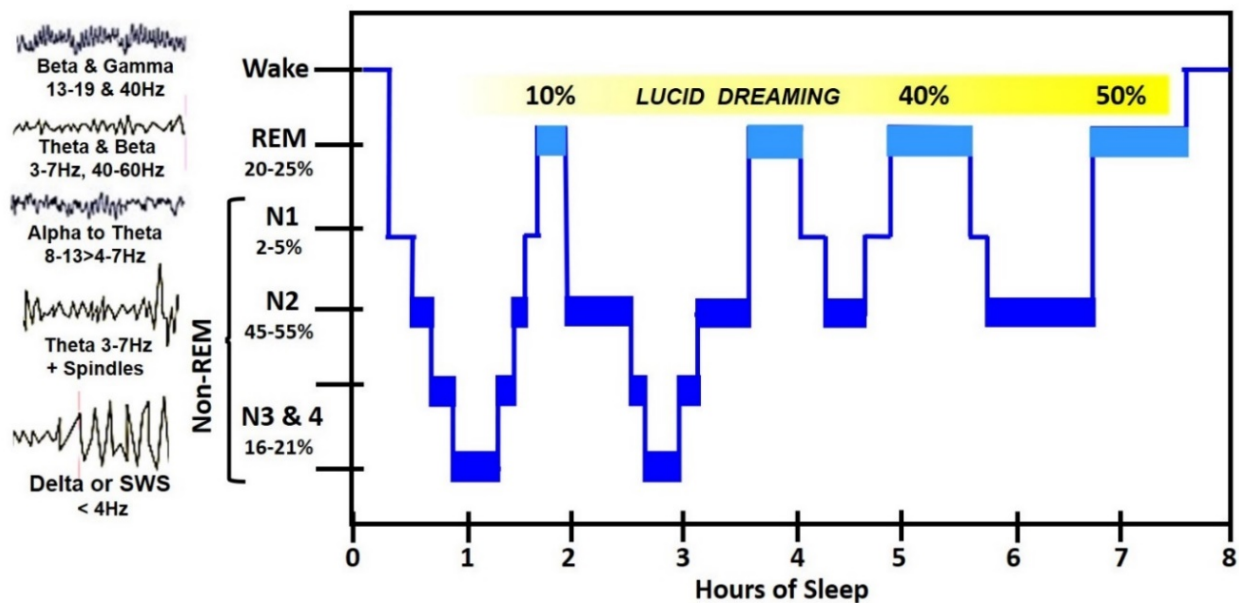
In the simplest terms a dream is the state of consciousness we achieve in the sleep state. Among researchers there is still come controversy over the definition of a dream; whether dreams are the vivid emotionally charged story-like dreams we generally recall when we wake, or can it be any form of mentation (thoughts, fleeting images, mental impressions) that are taking place as we sleep. For the most part dreams are generally accepted as any sort of visual or simply thought like activity that might be recalled when we wake from sleep. Researcher Bill Domhoff (2005) states that there are four conditions required for dreaming: 1) an intact fully mature neural network for dreaming; 2) a mechanism for activating the dream; 3) exclusion of external stimulus; and [aside from lucid dreaming], 4) loss of self-control or deactivation of the “cognitive system”

Early thought was that dreaming was primarily a REM sleep phenomenon. However, the dream or dreamlike state is now known to also occur during all states of sleep; at onset and during various stages of NREM and of course REM. Dream content differs between the stages and is reported to a lesser degree in NREM, as discussed below.

When Do We Dream?

Figure 1-1 illustrates the or common cycles of human sleep or “sleep architecture” that occurs every night. The diagram and information herein is compiled from many sources, however a good single source for further reading is *Dreaming: Understanding the Biology, Psychology and Culture* Vol.1 (Hoss, Valli, Gongloff, 2019). The horizontal scale is sleep time in hours, and the vertical the stages of sleep. In simple terms, it shows that we cycle between various sleep stages multiple times each night: NREM sleep stages (deep stage 3 and 4, and lighter stage 2 – sometimes called S sleep for synchronized sleep) as well as the REM stage (also known as *paradoxical* or D, for desynchronized).

Figure 1-1
Sleep Architecture



The REM cycles continue throughout the night, in approximate 90-minute periods. Although shown as sharp distinctions the transitions can be more fluid than the diagram implies. We typically go through four to six dream periods in an eight-hour night, with mental activity or visual dreams occurring to different degrees in parts of all stages, which might be surprising since we are often unable to recall even one of the dreams. In adults, REM sleep takes up about 20–25 % of the night; the NREM stage 1 (N1), about 2–5%; the NREM stage 2, (N2), approximately 45–55%; and slow wave sleep or NREM stages 3 and 4, (N3 & 4) approximately 20 percent. When dreams are considered to be recall of mental content from sleep, lab research has demonstrated of from 80% to 95% dream recall after awakening from REM sleep and 40% to 60% recall after awakenings from NREM sleep (Nielsen, 2000; Schredl et al., 2009, 2013; Schredl, Hoffmann et al., 2014), higher percentages among young adults.

Sleep & Dream Stages

As a reference the material above and below comes from various generally available sources (some noted), however a thorough discussion can be found in *Dreams: Understanding the Biology, Psychology and Culture* (Hoss, Valli, Gongloff, 2019) with particular reference to a section by Michelle Carr and Elizaveta Solomonova, “Dream Recall and Content in Different Sleep Stages”

Awake State

The waking state is characterized by relatively unsynchronized beta and gamma brain waves (12-30 Hz and 25-100 Hz respectively). We are awake, alert, and our thinking rational and self-reflective.

Stage 1 (NREM1 or N1)

Stage 1 (N1) sleep is the stage of falling asleep during which we may feel drowsy or if awakened often believe we never slept. Typically, this stage represents only about 5% of the total sleep time. Brain wave activity gradually slows down and transition from relatively desynchronized to more synchronized but slower alpha waves with a frequency of 8-13 Hz, and then to theta waves with a frequency of 4-7 Hz. Our muscles are still active and eyes move, breathing gradually becomes more regular and the heart rate begins to slow.

Hypnagogic sleep: Often at sleep onset we awake with a jerk, sometimes recalling some dream-like images. This is known as a period of *hypnagogic* sleep, or light sleep where both Alpha and Theta brain waves are observed. Various studies show (Nielsen, 2000) that between 31-76% of stage N1 sleep reports contain dream imagery. The content or images are often brief and strange and might contain sound, sometimes snippets of a day's event, sometimes an *element* that might appear as a theme later in the night's dreams. At times there may be sensory feelings or a feeling of levitation or moving in space or floating above the bed. At times creative thoughts arise; artists often use the images in this state for inspiration.

Stage 2 (NREM2 or N2)

Stage 2 (N2) is a stage during which muscle activity decreases still further and conscious awareness of the outside world begins to diminish completely. If any sounds are heard, the sleeper is not able to understand their content at this point. Brain waves during N2 are mainly in the theta wave range (as in stage 1 sleep), but in addition N2 is also characterized by two distinguishing phenomena: sleep spindles (short half second bursts of brain activity about 12-14 Hz) and K-complexes (short 1 to 2 min complex spikes and waveforms). These are thought to suppress response to outside stimuli and aid in memory consolidation and information processing. We pass through N2 stage several times during the night, so we spend more in N2 sleep than in any other single stage, about 45%-50% of total sleep time for adults.

The percentage of mentation or dreaming from N2 awakenings is reported to be about 60% to 70%. N2 dreams in relation to REM dreams tend to contain more fragments of recent waking life episodes and be: less frequent and shorter; less emotional; less perceived content (dream figures, places, actions); less personally involving; less bizarre; more thought-like. On the other hand, some N2 dreams have been found to be somewhat indistinguishable from REM dream reports.

Stage 3 (NREM3 or N3)

Stage 3 (once known as 3 & 4) is also known as deep or slow-wave sleep (SWS) or Synchronized sleep since the brain waves are more regular and lower frequency characterized by delta brain waves with a frequency of around 0.5-4 Hz, along with some sleep spindles, (although much fewer than in stage 2). Normally at sleep onset there is a rapid movement from stage 1 sleep to stage 3 and during this stage the we are even less responsive to the outside environment, unaware of any sounds or other stimuli. Stage 3 sleep periods are longer and present during the first half of the night, particularly during the first two sleep cycles and represents around 15%-20% of total adult sleep time. What is now described as stage 3 was once split into 3 and 4 (stage 4 when delta waves exceeded 50% and when brain temperature, breathing and heart rate and blood pressure was lowest). Pulse, respiration rate and blood pressure are lowered and no eye, facial or body movements are noted. Muscles relax, although body jerks may occur. It becomes more difficult to arouse the person and if awakened, and if awakened they often feel groggy and take some time before attaining normal mental performance. This is also the stage during which parasomnias like night terrors, sleep-walking, sleep-talking and bedwetting occur.

Dream reports or mental activity from N3 are less frequent than in REM at around 50% to 65% (Cavallero, 1992) versus 80% to 95% from REM as noted earlier. In relation to REM the dream reports did contained imagery, emotion and self-perception, but were found to be much shorter. Some studies showed average dream-like recall rates from N3 to be higher than what was once characterized as N4 (56% versus 38%) however recall of cognitive type activity from either state was about the same. Neuroimaging and behavioral studies have found that slow wave sleep may, as is REM, involved in processes of memory consolidation and cognitive enhancement (particularly of the *declarative* memory and task learning).

REM (Rapid Eye Movement)

REM sleep, also known as paradoxical sleep, occurs in cycles of about 90-120 minutes throughout the night, and it accounts for up to 20-25% of total sleep time in adult humans (see figure 1-1). About 90 minutes after sleep onset the sleeper will begin REM sleep. An EEG reading called a PGO spike often marks the onset of REM and many of these spikes appear during REM. REM dominates the latter half of the sleep period, and the REM component of each sleep cycle typically increases as the night goes on. Although most people do not tend to wake after each cycle of REM sleep, we are more likely to wake from REM sleep than from non-REM sleep. Often “micro-awakenings” occur for a few seconds and the sleeper does not normally remember them. REM is characterized by low-amplitude mixed-frequency brain waves, similar to those experienced during the waking state – theta, alpha and even high frequency beta waves typical of high-level active concentration and thinking. The REM sleep stage is characterized by: eye movement, small movement in the muscles of the face, faster and more irregular pulse and respiration, higher blood pressure, very high oxygen and energy consumption by the brain (often higher than when awake and working on a complex problem). The resting muscle potential is almost non-existent (muscles become paralyzed a condition known as atonia) due to the signals controlling movement being inhibited in an area of the brainstem. Experiments by Michel Jovet demonstrated that this may protect us from acting out our dreams.

Dream reports when woken from REM states occur roughly 80% to 95% of the time. They are typically longer, more vivid, more animated, more emotionally charged, have more dream *elements* in them and are less like waking life events than NREM reports. A study by Stickgold and colleagues (1994) found that dream report length shortest at the beginning (0–15 minutes) and at the end (45–60 minutes) of a REM period, and longer in the middle of the REM period (15–45 minutes). NREM sleep dream reports show the opposite pattern, with dream length decreasing into the middle of the period before increasing again when nearing an oncoming REM period.

REM sleep appears to be important. REM deprivation has been shown to impair learning of complex tasks. Such a learning function may be why during early childhood development REM sleep makes up a much larger percentage of total sleep (figure 1-1). If REM sleep is repeatedly interrupted or shortened, then longer REM “rebound sleep” tends to occur at the next opportunity the sleeper may slip quickly into REM sleep, rather than into NREM stages, and stays there longer than usual. There are differences in brain activity observed between stage NREM and REM sleep (see Section 2). The medulla of the brain appears to regulate NREM sleep, whereas the pontine brain stem is thought to regulate REM. (Hartmann, 1973) Single neurons in the brain have been seen to reduce their activity during NREM sleep and then increase during REM to a level as high or higher than in waking. During REM, a section of the forebrain is in a state similar to that of alert waking, and high levels of activity are found in the visual associative cortex and parts of the brain responsible for processing emotion. The central brain is also active, suggesting learning and memory processing. Some studies suggest that we replay and learn new tasks and facts during NREM and complete the learning during REM by weaving the new information into existing memory systems and develop new inner models or procedures for dealing with future like situations in the process.

Lucid Dreaming

Lucid dreaming is a dream in which you become aware that you are in a dream, become more self-aware and are better able to influence your own actions in the dream and in a limited manner parts of the dream itself. The degrees of lucidity and dream experiences vary from just being vaguely aware that it is a dream and not acting on it to acting at will, communicating with dream figures or the dream itself, to self-healing and exploring fantastical realms of consciousness (see Lucid Dreaming in Sections 2 and 4). It occurs when parts of the brain that are normally relatively inactive during sleep become active – as will be discussed in more detail in Section 2. Areas in the pre-frontal cortex and precuneus involved in self-reflection, a sense of conscious awareness and willful control become active. Occipital and parietal areas involved in visual imagery and spatial processing, form and color become more active, giving the dream a more vivid visual and spatial experience. Lucid dreaming is characterized by a mixture of brain wave (EEG) features of REM sleep and waking and many of the physiological characteristics of REM sleep (eye movements, increases in respiration, heart rate and skin potential). It is therefore considered a “hybrid” state of sleep and dreaming (LaBerge et al., 1986).

Lucidity has been found to occur mostly (72%) from within a dream, 90% from REM sleep; lesser percentages during stage N2 sleep, at times induced at sleep onset (N1), but not observed during deep sleep (N3). They occur more frequently in the later REM stages of sleep, roughly 10% in the initial stages and 50% in the later stages. Others are known to occur from the sleep onset stage or after awakening and falling back into sleep while retaining a degree of consciousness (called Wake Induced Lucid Dreams or WILD). (LaBerge et al., 1986)

Hypnopompic Imagery

Hypnagogic imagery are visual, tactile, auditory, olfactory or other sensory events, usually brief but occasionally prolonged, that occur at the transition from sleep to wakefulness. The dreamer may perceive oddities or nightmarish images like other persons or non-physical entities in the room or next to him or her. Technically, our muscles are under partial paralysis during the REM dreaming stage so the hypnopompic imagery may include a sleep paralysis episode where the dreamer perceives they are awake but cannot move – which can become quite frightening. It is usually not serious and may have to do with the centers of the brain becoming out of sync with the normal awakening sequence. This stage usually only lasts a short period and the person awakens normally. Dreams do not occur only when we awaken, as some early speculation suggested. Dreams occur roughly over the time period we recall them having occurred. The

measured length of the REM period has been correlated with both the dream report word count and the estimated length of the dream by the dreamer (Hobson, 2003).

Changes in Dream Characteristics Across the Night

The existence of dream generation and recall from all stages of REM and NREM sleep is now understood by most researchers. Dreams from all stages of sleep become more “dreamlike” as the night goes on. NREM dreams are considered more ‘dream-like’ when collected from shorter as opposed to longer NREM sleep periods, as well as being more ‘dream-like’ collected in close proximity to a neighboring REM period. N2 reports are more like REM dreaming than are N3. The differences between REM dream content and NREM dream content depends on what NREM stage is being measured as well as when (earlier versus later cycles). Both circadian rhythms and ultradian rhythms exert some influence on dream content, and while late REM dream reports continue to be more emotionally intense and vivid than late NREM dream reports, both REM and NREM dream reports are more bizarre, dreamlike, and longer later in the night.

In general, certain dream features remain significantly different between REM and NREM sleep. REM dreams are more self-reflective, bizarre, visual, and emotional and have more self-involvement and more narrative quality than do NREM dreams, whereas most NREM dreams are more brief, “thought-like” and mundane than REM dreams.

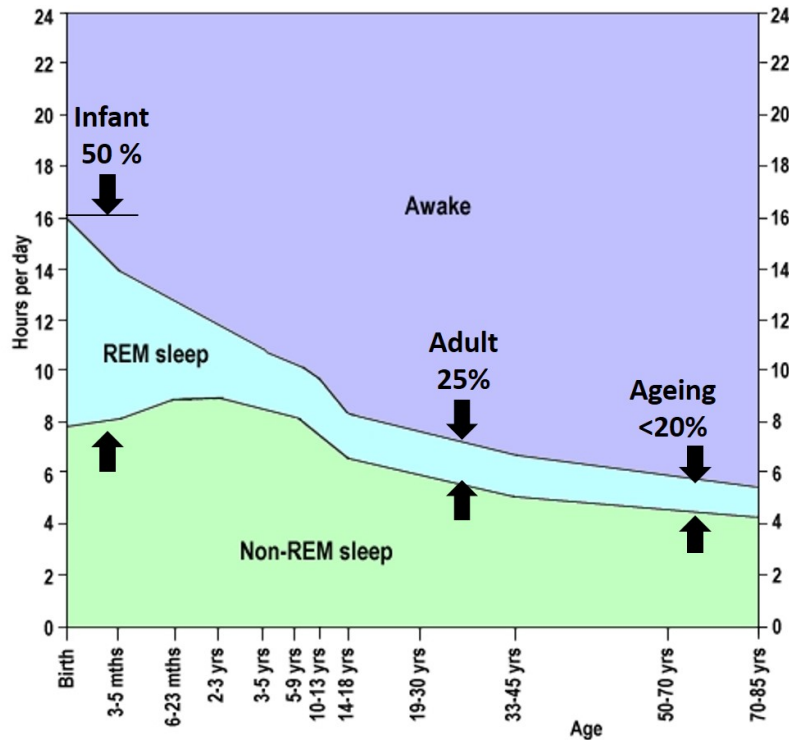
Emotion as well as associated factors such as motivation and social interactions differs for REM and NREM dreams, perhaps reflecting the differences in brain state – the limbic areas being more active in REM stages and somewhat diminished in NREM stages. Smith et al. (2004) found that motivation in REM dreams was significantly greater than motivation in NREM dreams and that total emotion was more intense in REM than in NREM with negative emotions significantly more intense in REM than NREM. McNamara et. al. (2005) found that: a) REM reports were more likely to involve social interactions than NREM reports; b) aggressive interactions were twice as likely to occur in a REM dream as a NREM dream (and 3 times as likely than in a waking reports); b) REM dreams involved significantly more self-initiated aggression than friendliness while NREM dreams involved significantly more self-initiated friendliness than aggression (the dreamer was never the aggressor in the NREM reports).

There is also evidence that dreaming across the night exhibits some continuity in thematic content; for example, dreams sampled from different stages and across a single night may all carry an overarching theme related to work or occupational concerns, even if the perceptual or emotional quality and specific details of the dream report change. This suggests there is some continuum of dreaming processes occurring across the night. Dream content has also been found to evolve over the night, relating more to prior day events during the first REM cycles and gradually including events from recent months then the dreamers more distant past toward the end of the night. This learning process is discussed more thoroughly in Section 5.

Do We All Dream?

Research has shown that all humans, birds and mammals, with minor exceptions or due to abnormalities, exhibit REM sleep (Hartmann, 1973). It is known that humans dream during the REM stage because when awakened during REM sleep, laboratory subjects reported dreams or dream-like experiences roughly 80% to 95% of the time as noted above. Also as noted, mentation or dreaming is also reported from 50% to 70% or more during NREM stage awakenings as well. It is uncertain, however, what animals experience during the REM or any other stage, since the “network for dreaming” in the animal brain is uncertain and they can’t tell us what they are dreaming – although when mice were instrumented with micro probes (Louie & Wilson, 2001) neurons fired in their visual cortexes in the same sequence as when the mouse was exploring a maze before sleep – suggesting visual dreaming.

**Figure 1-2 Sleep and REM dreaming as we Age
(plot from Roffwang, Muzio, Dement. *Science* 1966)**



The time spent in dream sleep varies with age as shown in figure 1-2 (Roffwang, et al., 1966). Adults spend about 25% of their sleep time in REM, children about 50%, and in premature infants it has been reported to be as high as 70% to 80% (Van De Castle, 1994). In older persons, REM sleep may reduce to about 15%. Not shown is that children and young adults tend to have more slow-wave non-REM stage 3 sleep than adults, and the elderly may experience little or no stage 3 sleep at all. While shorter dreams and lower dream recall can be partly explained by the fact that memory no longer functions as well as it used to, research into aging and dream recall has shown that there are other factors involved since the largest drop-off in dream recall occurs at a relatively young age, around 26, especially among males (Giambra, 1996).

Why do we Sleep and Dream?

Although much controversy remains in an attempt to answer this question, research to date suggests that sleep and dreaming are linked to mood control, learning and repair of the body and mind (Hartmann, 1973).

What Happens When we Don't Dream?

If we deprive ourselves of dream or REM sleep, it has been observed that sleep and dream deprivation causes effects such as: waking dreams (visual and auditory hallucinations); interference with memory and learning; a loosening of associations; impaired waking ability to do tasks requiring focused attention; or difficulty maintaining a straight line of thought, creating irritability and suspiciousness. Milton Kramer (2011) found that even one night of sleep loss effected post-sleep mood, increasing anxiety and decreasing clear thinking. It has therefore been suggested that dream sleep (in particular REM sleep) is associated with learning, long term memory consolidation, and restoring mental well-being.

Are We Learning in Our Dreams?

Alan Hobson (2003) at the Massachusetts Mental Health Center, shows that dreaming rehearses memory patterns, either to harden them into long-term memory or to keep fading connections alive (based on brain wave activity in the hippocampus). For example, one study demonstrated that the exact neuronal firing patterns present when rats explored a maze were repeated precisely when the rats were in the dream sleep. In NREM sleep they appeared to rehearse the maze just experienced, and in REM traces of earlier maze experiences were observed, suggesting an integration of the learning from the present with like past experiences (Louie & Wilson, 2001). In Israel, researchers at the Weizmann Institute found that consistently interrupting dream sleep in a night completely blocked learning, whereas just as frequently interrupting non-dream sleep did not (Gelbard-Sagiv 2008).

Some research supports the hypothesis that dreams help us adapt to stressful waking events by activating habitual defense mechanisms, and by integrating the stress situation with earlier solutions to a similar problem (Stewart & Koulak, 1993). A critical step in this process is matches representations of new experiences with the representations of closely related past experiences – a process observed to take place during dreaming (Palombo, 1978). It is as if the dreams are helping us adjust to new threats and experiences, by comparing them to an inner model of how we see the world and our role in it and making slight adjustments to help us better accommodate life.

Both REM and NREM stages appear to be involved progressively over the night in such activities as problem resolution, learning and mood control - weaving new experiences into existing memory systems and storing or consolidating experiences or memory patterns into long-term memory. You can observe evidence of this in your own dreams. On the occasions when you recall multiple dreams from the same night, you might find a similar theme running through each dream segment, but that each segment approaches that theme with a slightly different storyline or set of characters and outcome. How often have you gone to sleep angry about something and awoke the next morning feeling less concerned? Thus the old saying, “better sleep on it.”

Do Dreams Have a Purposeful Function?

The discussion above suggests that sleep and perhaps dreaming itself might have a natural function. Dreams have long been understood to be a valuable tool in psychotherapy for gaining insights or therapeutic benefit by working with the dream in some manner – but does the dream itself, however, serve an important internal restorative or therapeutic function, and if so does it do this whether the dream is recalled or not?

In 1900 Sigmund Freud stated that the function of dreams was to disguise disturbing and harmful unconscious urges and impulses in order to preserve sleep and perhaps prevent the dreamer from waking up and being shocked by the true content of one's desires. While dreaming may perform an emotional regulation function (see Mood Regulation and emotional processing below) that might play a role in preserving sleep, much richer and broader roles for dreaming have been suggested. One of Freud's colleagues Carl Jung (the Swiss psychoanalyst that founded Analytical Psychology) stated that the function of dreams is to restore our psychological balance which is more in-line with today's thinking. Robert Stickgold (2009) considers sleep as a time when the brain can search for and identify useful associations between recently formed emotional memories and older ones, helping to place them in a more useful context, from which their resolution may become more readily apparent. This not only happens within to dream to various extents, but the process appears to involve the complete dream-to-waking continuum (Ernest Hartmann, 2011) working with the unfinished business the day before as well as the act of remembering dreams in the morning and trying to understand or gain insight from the associations between the dream and waking life issues.

In Section 3 you will learn how dream sleep has been linked to various biological and psychological functions that influence a person's feelings, perceptions, thinking, learning and behavior:

- **Memory Processing** - processing and integrating new information into existing memory nets.
 - Reactivating memories – typically emotionally impactful daily episodes and past memory associations;
 - Memory “triage” – emotion as a marker for which information is to be selectively processed;
 - Extracting the ‘gist’ or meaning from those memories
 - Long-term memory consolidation and/or re-consolidation
 - Developing an *inner model* of self and reality
- **Emotional Processing** – dealing with unresolved or impactful emotional issues of the day.
 - Stress Reduction and Mood Control
 - Fear Extinction
 - Emotional Problem Resolution
- **Learning** – something new evolves from the dream experience.
 - Enhancing Knowledge and Skills (declarative and procedural learning)
 - Creative – revealing creative solutions to problems and inspiring artistic creation
 - Restorative – accommodating or changing perception in order to restore psychological balance
 - Adaptive – simulating scenarios from which we learn to better adapt to a waking situation
 - Transcendent – changing your inner model and your viewpoint and attitude

Why Can't We Understand Our Dreams?

So if dreams provide an important learning, adaption and problem-solving capability, why can't we understand our dreams? This is because the “language” of the dream is primarily that of *metaphor* or *picture-metaphor*– a symbolic representation of the association between emotions, memories, concepts and processes taking place as the dream attempts to express and resolve a problem. In Section 2 you will learn that dream imagery is formed in the “associative cortex” of the brain – an area that forms associations between a visual image and memory, emotion, or concept. Thus what you see and experience in a dream is simply a picture of an association, a picture analogy of a memory or feeling or concept - what Sigmund Freud and Carl Jung called a *symbol*. As Carl Jung (1964) put it, “the *unconscious* aspect of any event is revealed to us in dreams where it appears not as a rational thought but as a symbolic image”...”an emotionally charged pictorial language” (see the Psychology of Dreams sections).

William Domhoff (2003) metaphors provide a cross-modal mapping of well-understood basic experiences (such as warmth) to more difficult concepts (such as friendship). “We had a warm relationship” is a simpler way for us humans to understand the nature of the friendship than a complex explanation of the specifics. They also map physiological processes (e.g., sweetness) to more complex emotional experiences (e.g., pleasure), for example “what a sweet deal that was!” We learn a system metaphors as a result of repeated experiences in childhood as we comprehend the process of comparison or inclusion—comparing one object as like another or as included in the same conceptual category. Ernest Hartmann (2011) agrees adding that it is an essential way our minds make connections—a language of meaningful similarity, that directly connects seemingly unrelated subjects, describing a first entity as being or being equal to or resembling a second entity in some way.

For example, if you dream of an old green door with a window in it, the image is not simply a door, but the picture of meaningful connections between all your memory and emotional associations with a door, the concept of old, the color green and window. These meaningful associations and connects differ completely for each person. One might identify the door as “something that opens to a new opportunity” and another “something that allows me to control what gets in or stays out.” Further “old” might refer to age for one

person or a memory of an old door for another. Window might be a “way to see in” for one and a “way to see out” for another. The combination of these associations is the totality of the meaning. Hartmann contended that it is the emotional issues the dream is dealing with that chooses or creates the image or blends several imagery fragments to make a new one – the blending (or *condensation* as Freud called it) being the linkages between feelings, memories and concepts that are associated with or make up the totality of the emotional issue. The dream image is the expression of the combined associations. Hartmann further states that this use of metaphoric similarity is generally how we learn – in particular how children learn— not by “rules” but by similarities. Our brain functioning seems to work first or most easily by similarity or metaphor, and only later do we learn to apply rules. Dreaming metaphorically recombines and re-organizes the material in our memory – the dream image itself being vital to the process of integrating our memory systems.

Why Can't I Remember My Dreams?

It appears that sleep and dreaming plays an important role in memory and learning, and in restoring our mental well-being, but since most of our dreams are not recalled, it appears that the mental processes taking place will continue whether we recall and understand them or not! So is it necessary to remember and work on our dreams? Could recall and subsequent dreamwork augment the process?

Is There Value in Remembering Dreams?

There is a wealth of evidence, including the experience of therapists who use dreams in their work, suggesting that properly understanding and working with our dreams can speed the wellness process. Justina Lasley, author of *Honoring the Dream* (2004) states, “In my experience all dreams are significant and can be used to come to new understanding by bringing unconscious material to consciousness - I have never worked with an individual on a dream that has not carried new information and truth for the dreamer.”

Research studies into various dreamworking approaches using a common measure of the efficacy, Gains from Dream Interpretation (GDI) questionnaire, have demonstrated that dreamers have gained a greater degree of insight when a dream is worked than in simply discussing the related situation in (in therapy or otherwise) without the dream (Hoss, Valli, Gongloff 2019, Chapter 16). Particularly effective are approaches which integrate dreamwork with some degree of action or therapeutic approach – thus containing three basic steps: (1) **exploring** individual dream imagery helping to make associations between the dream and waking life emotional issues; (2) gaining **insight** from relating the whole dream or dream story to one's life situation; and (3) **action**, deciding about making changes in waking life based on the exploration and insight. Although a dreamworker or therapist may help guide the process, the important part is that it is the dreamer who arrives at the interpretation of the dream and makes the decisions about action, with the support, encouragement, and collaboration of the dreamworker, therapist or group. Empirical investigations have found that participants believe that discussion of personal dreams following such a procedure with a therapist/dreamworker is more effective at producing insight than other types of dreamwork, such as self-dream work, dreamwork with a computer program rather than a therapist, or discussions about loss. Of particular importance is the action stage. Better outcomes (i.e., action ideas and problem-solving) were found for clients who engaged in the action stage than for clients who did not.

One such approach which has had the most research performed on it is CEDM (cognitive-experiential dream model) developed by Clara Hill (2004). The **Transformative Dreamwork** protocol in this book also follows that model of **exploration, insight and action** – going a bit deeper, however, into gaining insight by exploring underlying emotions using *role-play* and color work.

Dream therapy has been reported (Palombo, 1978) to also stimulate follow-up dreams that show progress, thus a “corrective dream,” which incorporates the originally reported dream together with the new information supplied in the therapy session. *“I was dreaming I was looking everywhere for my purse. Suddenly I saw you there in the dream. You pointed out that the purse was on my shoulder. I stated, oh thank you, I guess I had it all the while.”* This dream came after a therapy session where the dreamer finally realized that the self-worth they had been seeking was there all the time. It just took the dream, and the dreamwork with the therapist, to point it out.

Some nightmares may be a means for the dreaming mind to involve the waking mind in dealing with an emotionally overwhelming issue. Nightmares release energy and surface anxieties associated with past trauma or recent threats to one’s inner self, which might be too difficult to deal with all at once. The forced awareness of that dark inner matter, brought by nightmares, can become a part of the healing process if properly dealt with. Hartmann and Galvin (in Krippner, 2002) have attempted to teach frequent nightmare sufferers how to attain lucidity during terrifying dreams. This can be a successful approach. I found it works well with children who are very suggestible. One example is the case in which a child suffered from frequent nightmares of being chased by a big black monster. I told her that the next time she dreamed it, she should turn around and hug the monster. That night she had the same dream and the next morning reported with great joy that she had hugged the monster. I asked her what happened to the monster. She said, *“It turned into my mommy.”* The dream never returned.

Gaining rewarding results from remembering and understanding your dreams does not necessarily depend on lucidity. *“I had a frightening dream where I was being chased away by a big buffalo with a little buffalo following it.”* When we worked on his dream, the dreamer’s association with the big buffalo was: *“he was huge and powerful, when he wants you to go, you go,”* which he recognized as related to his boss. His association with the little buffalo was: *“a little pipsqueak that followed the big one around -- just like that little pipsqueak at work!”* Before the dream, the dreamer was unhappy on the job but was unable to focus on the reason. The dream revealed that the source of his discontent was the actions of his boss and the relationship his boss had with the co-worker whom the dreamer considered to be a “little pipsqueak” that followed the boss around. The clarity of recalling and understanding the dream now permits the dreamer to focus on the real cause of his discontent and deal with it more appropriately.

How Can I Recall My Dreams?

If we consider, 80% to 95% dream recall after awakening from REM sleep and 40% to 60% recall from NREM sleep, it appears we spend about one fourth of our night in the vivid dreams of the REM sleep stage and much of the rest of night in some sort of mentation or dream activity. So, the problem is not one of dreaming, but appears to be one of recall. There appear to be many factors involved in dream recall.

Sleep Habits

- ***When we Wake:*** One theory (Koukkou et al., 1983) is that dreams are more readily recalled if the state of the brain is closer to that of the brain after waking up – thus dream recall from REM sleep (80% to 95% range) would naturally be more frequent than from NREM (40% to 60% range) since the brain is more active and characteristically closer to the waking state in REM than most NREM stages.
- ***How we Wake:*** Hobson reports that dream recall rapidly falls off, the longer one takes to wake up after the REM period. In laboratory research it was also found that sudden awakenings are also shown to induce better recall than gradual awakenings – BUT - if a participant has a task to complete immediately upon awakening, this distraction interferes with and reduces dream recall compared to participants who are allowed to lie in bed and collect their memory of a dream. Therefore – it is best to

immediately close your eyes again and go back over the dream before you get up and write it down - anything that distracts you upon awakening will interfere with your ability to compose and gather their memory of a dream.

- ***Sleep Length***: Recall might also relate to one's sleeping habits. Webb and Agnew (1970) found that people, who sleep longer than 8.5 hours, had 50% more REM sleep than people who sleep less than 6.5 hours. Later sleep tends to be less deep and closer to waking, with longer dream periods as figure 1-1 illustrates. Based on this information, you would expect more recall and longer dream reports as people sleep longer. There are still mixed results on this, however. Whereas Backeland and Hartmann (1971) found it to be the case, Blagrove et. al. (2003) did not. The total opportunity for dream recall may be greater as you sleep longer, but spontaneous dream recall still depends on other factors, including the dreamer's interest in recalling and writing down the dream.
- ***Frequent Awakenings***: frequent awakenings during the night increases the likelihood of recalling a dream (Schredl et al., 1998; 2003). We all have micro-awakening at night, sometimes turning over, but never really becoming fully conscious or aware of the. At times however we do fully awake, maybe after a particularly emotional dream or simply to go to the bathroom or change the temperature in the room. These all can be opportunities for dream recall if one takes advantage of them. The downside is the process of turning on lights and engaging in writing or recording the dream can make it much harder to fall back to sleep.
- ***Circadian Rhythm*** (biological clock or 24 hour rhythm) alignment with the NREM-REM sleep cycle and the circadian influence on (modulation of) REM sleep, together influence dreaming and dream recall (Chellappa, 2009). As we age, for example, dreams and recall is affected by age related reductions in the circadian modulation of REM sleep with older subjects exhibiting fewer dreams. Knowing that our dream recall is effected by the normal 24hr biological rhythms suggests that if our sleep time becomes misaligned with those natural rhythms, for example if artificially determined by alarm clocks and other external demands, then that would have an effect dream recall. So, to improve dream recall try adjusting your sleep/wake habits and timing to see if that helps.

Psychological and Personality Factors

- ***"Thin Boundaries" - Openness to Experience***: Hartmann (2005) indicates that there are only a few personality factors that closely correlate with dream recall including: tolerance of ambiguity, openness to experience, absorption, creativity, fantasy-proneness and ability to be hypnotized. He states that these factors also relate to "thin boundaries" (Hartmann, 2005). "Thin boundaries" imply openness to experience; blending thoughts and feelings together; less of a sense of personal space; blending/comparing past with present circumstances; feeling more like an individual taking part in many groups; and a tendency to think in terms of shades of gray, rather than black and white. Thin boundary characteristics are closer to the fantasy or dreaming end of the continuum: making broad and loose connections. "Thick boundaries" imply sharp concentration and focus; keeping thoughts and feelings separate; a clear separation of past, present, and future; a sense of my/your space and sexual boundaries; and a tendency to see the world in terms of black versus white, us versus them, and good versus evil. We all have thicker boundaries when we are engaged in a focused task and thinner boundaries when we are fantasizing or dreaming.

Studies have shown have shown that dream recall is related to "openness to experience" (Blagrove 2003, Schredl 2010, Bulkeley, 2011); and people with "thin" boundaries remember more dreams; have more complex, emotional, and longer dreams; and spend more time on the daydreaming and dreaming end of the continuum (Hartmann, 2011; Schredl et al., 2008) They tend to have more lucid dreams,

mystical dreams, and adolescent nightmares. They also have more interaction between characters, amount of negative and positive emotion (higher CI intensity), vividness, and bizarreness. So if you wish to recall more dreams, developing a focus on your inner life, looking within and a willingness to accept what you find out about yourself and exploring new experiences such as discussing and working with your dreams should help.

Brain State & Gender Related Factors

- ***Activation of Episodic Memory Systems:*** Hobson (2003) indicates that working memory is off-line in the dream state, and that the mechanisms for storing memories are diminished to non-existent. Assuming that you wake up while the dream is ongoing or ending, the best approach for recalling dreams is to place your attention on the ongoing dream as you wake up. Try closing your eyes and reviewing the dream before opening your eyes again and moving out of position. Go over the dream completely, to store as much as possible in permanent memory. Then open your eyes and write it down or record it. Jarring yourself awake with an alarm clock might divert you from your dream too quickly to be conducive to dream recall. Wake yourself with a more gentle system (music, more gentle alarm or such).
- ***Gender:*** Spanos, Stam, Radtke & Nightingale, (1980) found that in females, dream recall was greater particularly for those who had more ability to become absorbed in imagery and measures of creativity.
- ***Imaging Capability and Visual Memory:*** In a literature review by Lynne Hoss (1981) a relationship was shown between dream recall frequency and artistic and imagery abilities. She reports that Schechter, Schmeidler and Staal (1965) tested both dream recall and creative tendencies in 100 students of art, science and engineering. There was a significantly higher proportion of dream recall among art students (assessed as more creative, and therefore using more right hemisphere process as will be described in Section 2). Recall was lowest among engineering students (attributed to the more linear, temporal thought process of the left hemisphere). No differences between the sexes were found. Her work also cites research by Cory, Ormiston, Simmel and Dainoff (1975) that found recall to be greater in those with greater memory capability for visual images. Hiscock and Cohen (1973) found a highly significant difference between dream recallers and non-recallers in ability to form clear, vivid images.

Interest in and Attitude Toward Dreams

- ***Active Interest:*** Researchers Hill (1993) and Schredl (2003) found that interest in dreams or a positive attitude toward dreams influenced dream recall. If a person takes an active interest in recalling a dream on a particular night, or during a period of nights, they are more likely to do so and to keep a journal where they can write them down and stimulate more or higher quality recall. I found it to happen in my dream courses or workshops where a participant, who claims they don't recall dreams, suddenly begins recalling them for a period afterwards.
- ***Incubation:*** Incubation consists of a self-suggestion ritual, performed before going to sleep, whereby you repeat to yourself that you will dream (perhaps of a certain topic) and will wake and recall the dream. Incubation is a way of placing unfinished business at the forefront of the mind when going to sleep. The request should be accompanied with a paper and pencil beside the bed, or a voice recorder, so that the dream can be recorded. I find that incubation works best with no particular subject matter in mind, just a suggestion that you will dream and wake to recall the dream. If you want to try to dream about a specific situation, it is best to pick one that is emotionally significant, associated with some anxiety or unresolved problem.

SECTION 2 – THE NEUROSCIENCE

Just as the human body represents a whole museum of organs, each with a long evolutionary history, so we should expect to find that the mind is organized in a similar way – C.G. Jung

How Might Dreams Form?

When REM sleep was first studied in the 50's and 60's, the great majority of dream reports appeared to come from REM awakenings, so dreaming was at first considered to primarily be a REM sleep phenomenon. Hobson, McCarley, (1977) theorized that a part of the brain stem called the pontine tegmentum arouses us into the pseudo-conscious state of REM sleep. This in turn produces relatively chaotic signals that activate the forebrain which then tries to make the best sense that it can (a "synthesis") out of the noisy input it is receiving – forming the dream. That is the dream is a result of higher brain centers trying to make sense of the activity in the lower centers. This noisy input was thought to be a key reason why dreams are allegedly bizarre and disjointed.

As researchers began to recognize that a high percentage of dreams occur in various NREM stages as well, REM sleep was no longer considered physiological equivalent of dreaming. Antrobus argued that higher brain centers, and some cognitive processes, are involved in the creation of dreams at the onset (in Krippner, 2002). Solms (1999) suggested that dreaming is a continuous processing characterized by a variability within and between sleep stages, that is generated by a different process, not dependent on the REM arousal mechanism of the pons. He considered it a “dream on” mechanism in the forebrain involving the frontal and limbic parts of the brain (concerned with arousal, emotion, memory and motivation) in interplay with parts at the back of the brain concerned with abstract thinking and visual perception (the occipito-temporo-parietal junction where abstract thoughts and memories are converted into concrete perceptions).

Although dreaming occurs in REM and NREM states, as discussed in Section 1 there are some notable differences in the dreaming reported between stages. With our more vivid, story-like, emotionally driven dreams coming from the REM stage this section will focus on the REM state but will summarize some of the differences in NREM as well as what transpires in the Lucid dreaming state.

REM Sleep and Dreaming

Brain imaging studies, such as those led by Pierre Maquet, Allen. R. Braun and Eric A. Nofzinger, have revealed a unique mix of activity and inactivity in brain centers during REM and NREM sleep (Hobson, 2003). Figure 2-1 provides a rough approximation of location, based on these studies, of the active (white) and inactive (gray) centers, both interior and cortical regions, imposed on a lateral sagittal view. Table 2-1 uses excerpts from Hobson's (2003) summarization of PET scan data as well as Dang Vu et al (2007), E. Pace-Schott (2007) and other references as noted, plus general research literature describing functions typically observed for those brain centers in waking state studies. Based on this data, the table extrapolates how the presence or absence of those brain functions might affect the content of the dream.

The state of the brain in REM sleep lead Braun et al. (in Hobson, 2003) to declare, “REM sleep may constitute a state of generalized brain activity with the specific exclusion of executive systems which normally participate in the highest order analysis and integration of neural information.” In other words, we are conscious, and the brain is operating, but the senses are “disconnected” (site E). We are also

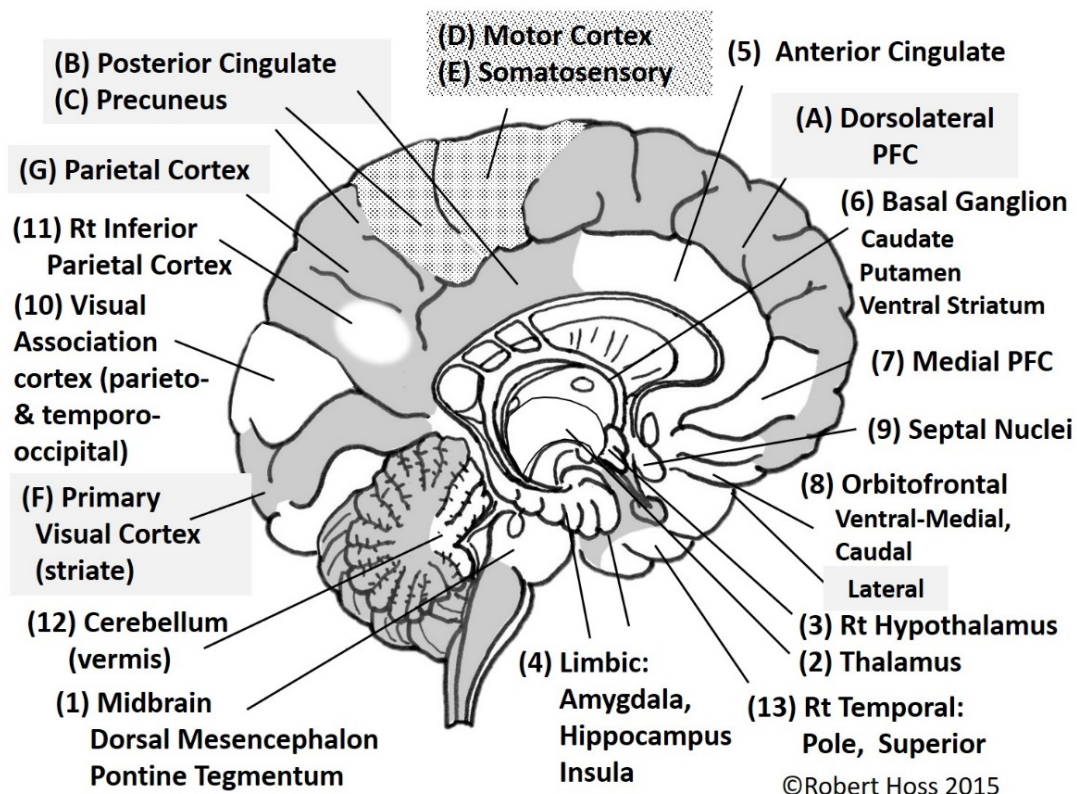
essentially paralyzed; although the motor cortex (site D) may activate slightly when we are moving in a dream the brainstem inhibits motor signals to body. Much of the logic and self-reflection we depend on to construct the perception of a rational world is off-line (site A). Most all input comes from within.

Other areas that are relatively inactive (shown in gray) include: the primary visual cortex (V1), posterior cingulate gyrus (site B), inferior parietal cortex (site G) (except the right inferior site 11) are also relatively de-activated. Various studies suggest that activity in the precuneus (site C) may depend on the nature of the dream content and recall.

Active areas include: the associative cortex in parieto-occipital and temporo-occipital regions (sites 10 & 11, which extends into the temporal lobe or fusiform gyrus), associated with visual processing, perception or association as well as spatial processing and sensory integration, as might be expected of visual dream activity often reported in REM sleep and even NREM sleep dreaming. In addition, the limbic regions (site 4) including the amygdala and hippocampus and right anterior insular cortex are active, more-so on average than in waking. It was also found that many of the centers understood to be involved in problem detection, emotional regulation, analogic decision making, memory consolidation and learning, are also active during REM sleep: the anterior cingulate (site 5); basal ganglia (site 6); medial prefrontal cortex (site 7); the ventromedial & caudal orbitofrontal cortex (site 8) and basal forebrain.

Figure 2-1 Brain state in REM sleep

Active (white) and inactive/less-active (gray) centers during REM sleep.



In NREM sleep, active areas (some known to be involved in waking state motor and task learning) include: ventral prefrontal cortex; motor cortex; cerebellum; posterior cingulate cortex (PCC) & precuneus; frontal and para-hippocampal gyri. A good source of further reading on the activity of the frontal and/or cognitive centers is *Sleep and Dreaming* (Hobson, 2003) and *The New Science of Dreaming* (Pace-Schott, Dang-Vu, 2007).

A high definition 256 channel EEG based study by Siclari et al. (2017) collected near real-time dream information while measuring cortical activation by awakening 39 subjects throughout the night (1048 awakenings in all) and having them report dream activity or simply mental activity. The study found that when subjects reported experiencing a dream, either in NREM or REM sleep, the posterior cortical parieto-occipital region (which they called the dreaming “hot zone”) became more active. In both REM and NREM the “hot-zone” covered bilateral parieto-occipital regions (sites 10, 11 and part of G) encompassing the medial and lateral occipital lobe (visual processing) as one might expect.

The “hot zone” extended to the precuneus (site C, episodic memory retrieval and self-consciousness) particularly when dream content was recalled, remaining inactive when mental activity but no dream content was recalled. They also found the dreaming brain to function to some degree as the waking brain does – by dynamically and partially activating various centers which related to the content of the dream. Where there was movement in the dream there was an increase in activity in the right superior temporal sulcus (part of site 13 for motion perception). Frontal or anterior cortical regions activated when there was more thinking activity in the dream and the parietal, occipital and temporal areas when perceiving. Faces in dreams resulted in activity in the temporo-occipital area (right fusiform face area of site 13). Spatial setting dreams were associated with activity in the right posterior parietal cortex (site 11, spatial perception). Dreams containing speech were associated with activity in the left Wernicke’s area.

Table 2-1 lists those areas of the brain mentioned above that have been observed to become active and inactive during the REM state, along with the possible influence that brain state has on dream content and processes taking place.

Please refer to Section 3 “Do Dreams Have a Function?” for a description of how these active regions might work together to exhibit a problem resolution and/or learning function by: a) detecting and picturing problems, anomalies or “norm violations”; b) planning and introducing corrective scenarios (*counterfactuals*); c) scenario testing and mediation; and d) observing and emotionally reinforcing the outcome, thus storing it.

Table 2-1
Influence of Brain States on REM Dream Content

2-1a Centers Active in REM Sleep

Structure	Function	Dream Content
1 – Midbrain & Pons	Forebrain Arousal (PGO spikes); REM and Sleep Activation	Sense of Consciousness, Eye Movement
2 – Thalamus	Control of sleep cycle; mediates arousal and attention	Sense of “consciousness”
3 – Rt. Hypo-Thalamus, Basal Forebrain	Autonomic & Instinctual functions, motivation and reward; fight or flight; Cortical arousal	Instinctive content (fear, escape, dream emotion), motivation and reward themes
4 - Limbic: Amygdala	Formation and storage of memories associated with emotional events particularly fear memories and response. Nuclei of the amygdala receive and send information to other brain regions that are important for emotional memory such as the hippocampus. Bizarreness as correlated with the right amygdala (De Gennaro, '11).	Selected emotional memories stimulate the dream; integration of dream emotion with actions; sense of anxiety; goal direction in dream stories; bizarre imagery
Hippocampus	Access to emotional memories. Consolidation of information from short-term memory to long-term memory, and in spatial memory that enables navigation.	Presentation of emotional memories; reference to inner “model”; learning.
Insula	Emotionally linked functions related to perception; subjective feelings, sense of self, interpersonal experience, sudden insight; emotional decision-making scenarios that guide behavior (Craig, '09; Medford,'10);	Insight in dreams. Self-directed guidance and emotional reinforcement.
5 - Anterior Cingulate,	Part of a general performance monitoring system. Detects when errors in reasoning occurred or might occur (Carter,'98). Acts when there is violation in expectancy (Oliveira,'07), conflict, anomaly, error in reasoning. Imagines or observes activity, generates performance expectations; selects appropriate response or scenario based on anticipating & valuing rewards (Bush,'02). Monitors the outcome and consequences (Apps, '12; Carter,'98; Hayden,'09), provides cues to other areas of the brain to choose between conflicting perceptions (Allman, '01) and adapts behavior if outcome is not as expected (Luu.'04; Bush,'00, '02). Emotional self-control, focused problem-solving and adaptive response to changing conditions. (Botvinick, 99; Posner,'98).	Detection of problems, conflicts and novel or adverse unexpected situations which set the stage for the dream as picture-metaphor. Planning, introducing, monitoring and guiding the resolution scenario/dream plot aimed at resolving the conflict with an anticipated rewarding conclusion.
6 – Basal Ganglia (caudate & ventral striatum)	Alerts us that something is not right, and initiates action/decisions related to novel, unexpected situations (Balleine,'07). Reward-based decision-making and learning and adapting to changing conditions (Allman.'01, Yamada,'07). Learns through exposure to select actions that maximize reward but motivates to seek eventual rather than immediate reward (Packard,'02). Selects which response to make or inhibit (Falkenstein, '01, Lieberman, '00). Central to extinction learning: ventral striatum activates areas of prefrontal and orbitofrontal cortex and amygdala involved in inhibitory control and extinction learning (Romaguera,'12, Quirk,'00).	Paying attention and learning. Detection of problems, conflicts and novel or adverse unexpected situations and initiating (with the ACC) action toward resolution. Influences a dream plot that selects eventual rather than immediate reward. Mood control: dampens emotions toward different mood/viewpoint upon awakening.
7 –Medial Prefrontal Cortex	Learning, memory, and decision-making (Euston '12). Self-referential goal directed plan generation, behavioral simulation, rehearsal monitoring and learning, behavior and reward processing (Partiot,'95; Gusnard,'01; Bechara,'94; Vertes,'02). Provides a 'sense of knowing' and retrospective confidence judgment. (Marley, '09; Phan,'02). Involved in emotional regulation and extinction of conditioned fear (Sotres-Bayon & Quirk,'10); increased connectivity with amygdala in REM (Van der Helm,'11).	Calming emotions/mood. Learning and decision making. Planning of a self-referential, reward based, goal directed dream plot. Behavior simulation, rehearsal and learning. Provides a 'sense of knowing' that may give the guiding forces observed in our dreams a sense of authority and wisdom.

8 – Orbitofrontal: (Ventral Medial & Caudal)	Novelty detection. Inspecting events that deviate from expectation (Petrides, 2007). Creating associations with past experiences and deciding on/regulating planning behavior based on expectation, reward and punishment (Bechara, '94). The caudal and ventromedial orbitofrontal cortex are involved in expectation (Kringelbach, '04, '05) and regulating planning behavior (Bechara, '94) based on reward and punishment, caudal involved in novelty-related decision making, behavioral stimulation and rehearsal. Social and emotional judgment (Moll, '02)	Involved in problem detection and regulates the planning, behavior (rehearsal simulation) and decision making in the dream plot based on past experience, social judgement and expectation of reward or punishment.
9 – Septal Nuclei	Plays a role in reward and reinforcement	Emotional reinforcement of successful resolution scenario
10 – Visual Association Cortex	These regions form picture associations with the emotions, memories and conceptualizations processed within, and organize them into a dream space (Hobson, '03; Jung-Beeman; '05; Bottini, '94).	Visual imagery in the dream represents personal emotional and memory associations.
Temporal-Occipital	Processes color, texture and shape. Occipital and inferior-medial temporal regions are involved in conscious awareness in visual perception.	Color and shape as symbolic, meaningful associations. Activation in Lucid dreams likely why they appear more vivid and clear.
Tempo -Parietal and TP Junction	Determines relevance of incoming information. Integrates visual, tactile, body position & movement, contributing to self-consciousness & body image. Emotional intelligence. Angular gyrus stimulation = OBE sensation (Blanke, '05).	Self-consciousness an body awareness in Lucid dreaming. OBE experiences while dreaming.
11 – Right Inferior Parietal Cortex	Forming a perception of one's own physical body image as well as one's abstract image of self – self related "meaning." Perception of the spatial and social components of the world. Spatial imagery construction; orientation and movement; image of self; pictographs. (Ratey, 2001; Calvin, 1980; Pace-Schott, '03)	Creation of visual imagery and a visual dream space with meaningful spatial orientations. Emphasis on the internal model of self and social relationships.
12 – Cerebellum (vermis)	Coordination of motor activity and programmed movements. Fine tuning of movement adds specific features such as vestibular sensations.	You perceive you are moving and have bodily senses in the dream.
13 – Temporal: Rt Pole & Superior sulcus	Multimodal analysis, social and emotional processing, emotion and socially relevant memory. Face Recognition. Parietal-temporal plays a role in metaphor processing (Ramachandran, '06; Rapp, '04)	Integration of emotional, social, facial memories into the "meaning" of the imagery and dream figures

2-1b Conditionally Active – partial activation depending on content

Structure	Function	Dream Content
C - Precuneus	Self-consciousness, Self- perspective, self-referential processing (anterior region, involved in self-centered mental imagery strategies; posterior region episodic memory retrieval) (Cavanna, '06), sense of control over one's actions and autobiographical /working memory. Activates when dream is recalled in REM & NREM (Siclari, '17)	Self- focused dream plot. Dream recall. Self-reflection and sense of control in lucid dreaming.
D – Motor Cortex	Generation of body movements (brainstem inhibits actual movement).	Perception that you are moving in the dream.
E – Primary Somatosensory Cortex	Internal generation of sensory perceptions (external input dampened)	Fictive sensory content in the dream. Integration of external sensory stimulus into dream content.

2-1c Centers Relatively Inactive in REM Sleep

Structure	Function	Dream Content
A – Dorsal Lateral Prefrontal Cortex	Executive functions: Attention; Directed thought = rationalizing, logic, planning, choice, decision making, anticipation of consequences; Inhibits inappropriate behavior; Working memory.	Loss of will, reflective awareness and control of the dream (ego self is just one dream figure); Irrational actions and imagery seem normal; Material enters the dream freely without rational filtering
B - Posterior Cingulate Cortex	Episodic and Working Memory. Mediates interactions between emotion and autobiographical memory retrieval.	Sudden scene changes seem normal; loss of reflective awareness.
C - Precuneus	Recall and processing episodic memory. Self-perspective, sense of control over one's actions and autobiographical/working memory.	Waking episodes that stimulated the dream not replayed in the dream (only fragments). Loss of will/control. Inability to recall dream.
D – Primary Motor Cortex	Generation of motion commands (no longer connected to body through brain stem in REM)	Reflects movement in the dream but body paralyzed in REM dream sleep.
E – Primary Somatosensory Cortex	Generation of sensory perceptions from bodily senses	Little to no external sensory input enters the dream.
F – Primary Visual V1	Generates visual perceptions from the sensory input of the eyes	No external visual information entering the eyes nor the dream (minor light flashes may be incorporated in the dream story)
Left Inferior Parietal Lobe and Temporal Lobe	Language association and naming; Left hemisphere “speaks” by naming things	Imagery does not represent its waking named identity; Dreams identify concepts via metaphor, function, association and pictographs.

Lucid Dreaming

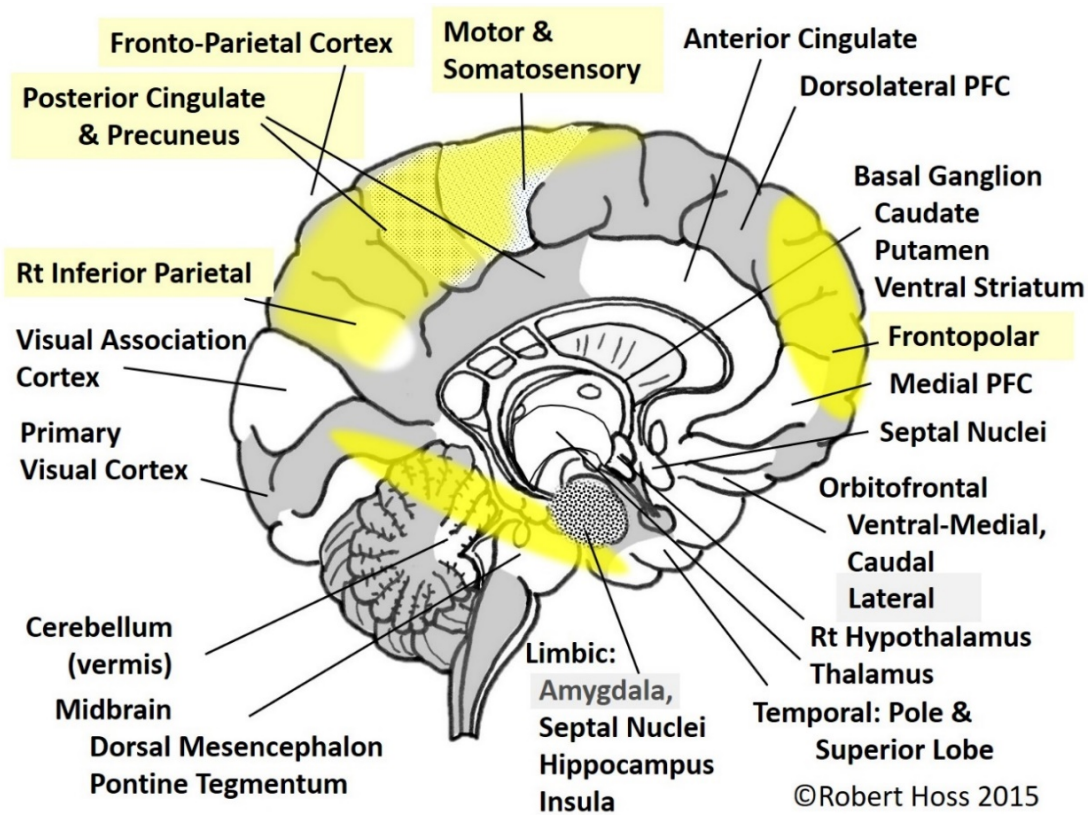
Information from fMRI and EEG studies shown in figure 2-2 illustrate activations in neocortical regions observed during lucid dreaming as compared with non-lucid REM sleep (Voss, 2014; Czisch, 2011; Stumbrys, 2013, Erlacher & Schredl, 2008; Dresler, 2011, 2012).

In lucid dreaming certain areas of the brain normally inactive or less active in the REM state become increasingly active when lucidity occurs. These changes in brain state result in lucid dreams being characterized by waking like consciousness, self-reflection, the ability to cognitively determine and control one's own actions, a limited ability to influence the dream itself, dialog and interaction with the figures in the dream as well as the dream itself, vivid and colorful imagery, and other extraordinary experiences.

Frontal areas include the right dorsolateral and frontopolar prefrontal cortex related to processing of internal states including reflection on one's thoughts and feelings, and are associated with higher cognitive processes, such as self-consciousness, decision making, working memory and attention. and social communications, which generally increase during lucid dreaming (Dresler et al., 2012). Increases in 40Hz gamma power have been observed in the prefrontal areas (Mota-Rolim et al., 2008; Voss et al., 2014). In addition, an anatomical analysis by Filevich (2015) found increased gray matter volume in the frontopolar cortex of individuals with higher scores on frequency of lucid dreams.

Figure 2-2 Brain state during Lucid Dreaming

Areas observed to be more active during lucidity are in yellow highlights as compared with REM sleep in gray scale.



Holzinger (2006) observed an increase in power in the beta band (13 - 20 Hz) in the parietal regions during lucid dreaming. Increased activation is observed in the tempo-occipital-parietal, inferior-medial temporal regions and frontoparietal regions (Dressler et al., 2012) which include: the precuneus (self-perspective, self-referential processing, sense of control over one's actions and autobiographical/working memory); the inferior parietal lobe (intelligence, self-related meaning, visuospatial processing); the supramarginal gyrus (an area involved in language perception and processing). This creates a greater availability of self-related information, thus more coherence and stability of the first-person perspective or cognitive self.

Increases in occipital and inferior-medial temporal regions, which are involved in conscious awareness in visual perception, is likely why lucid dreams appear so much more vivid and clear than a typical dream. The temporo-parietal area also integrates visual, tactile, and other information contributing to self-reflection, body imagery, episodic memory, meaning, control and knowledge that one is currently dreaming. In addition the frontoparietal region is understood to be involved in awareness of one's own thoughts (metacognition) which is a primary characteristic of dreaming.

A global reduction in power in the delta band during lucid dreaming, has also been noted (Dodet et al., 2015). The global reduction in EEG power in the delta band during lucid dreaming also occurs in REM when there is thoughtful or cognitive mental activity (Perogamvros et al., 2017).

In Dressler's original experiments, he asked lucid dreaming subjects to signal the researcher with ocular movements (to indicate they were lucid) then perform a series of left-right hand movements during their

lucid dreams. He observed activity in the sensory-motor cortex and motor areas responsible for the planning, programming and monitoring of intended movement (Dresler et al., 2011). Although activity was present, it was reduced when compared to performing the task while awake.

A “Dual Brain” Perspective

The prior sections discuss various centers in the brain that are active and inactive in the dream state, and how those combinations might be responsible for the content of the dream story. Here I will discuss a hemispheric view of brain processing that (although overly generalized) might help put the experience and thought processes that occur during dream sleep into perspective.

Although we may think of the brain as a single structure, it is actually divided in two halves or hemispheres. These hemispheres are linked by several bundles of nerve fibers that establish a communications path between the two halves. Perhaps one of the most surprising aspects of this is that the control of our body movements and our senses are divided between these two hemispheres and this occurs cross-wise. That is, the right side of our body is controlled by the left hemisphere and the left side by the right hemisphere. Also, it is the left hemisphere that is connected to the right visual field in each eye, and the right hemisphere that is connected to the left visual field in each eye.

Differences in processing have been observed between right and left hemispheres (Springer & Deutsch, 1980). Some of these differences were discussed in the prior section as associated with the right and left side of the frontal and parietal lobes. The left hemisphere, or “left brain,” in a general sense has been found to be more involved in understanding language, processing speech and reading, labeling things with words, and in linear logical thinking. It is charged with creating a model or story that makes sense. The right hemisphere, or “right brain,” appears more involved in processing non-verbal information (music, art, pattern recognition), forming associations and understanding what an object represents (as opposed to its name) and in visual understanding. It is also reported to be involved in detecting and interpreting anomalies of experience (Ratey, 2001) a process that is important in understanding the nature of dreams. An fMRI study by Kensinger and Schacter (2006) found the left amygdala responded to words while either the right and/or bilateral amygdala activation regions responded to images. In addition, participants were more sensitive to emotional images than to emotional words.

Even if we can define differences between right and left hemisphere processing, the differentiation is not universal. The more distinct differences lie with right-handed males. It is found that with left-handed individuals and with females, there is more bilateral or reversed representation of function normally attributed to one hemisphere or the other i.e., they might have speech functions in the right hemisphere rather than the left, or right hemisphere functions represented in both hemispheres. Regardless of individual variations with individual brain structure, it remains useful to understand the nature of the information processing differences, since it provides an interesting perspective regarding the differences between waking and dreaming thought.

Some of the more widely cited characteristics attributed to the two hemispheres (Springer & Deutsch, 1980; Edwards, 1989; Ratey, 2001; Hampden-Turner, 1981) are illustrated in table 2-2. Note the strong similarity between the right brain processing characteristics, and how you might describe the dream state. Observe how unlike the dream state the left-brain processing is. Does the processing in the right hemisphere seem more “dreamlike” in nature, and the left more like waking thought and dialogue? If there is a strong link between the right brain and the dream state, then perhaps viewing the dream from the standpoint of the thought processes attributed to the right brain provides a further key to understanding dreams.

Table 2-2 Processing Differences Attributed to Brain Hemispheres

Left Brain	Right Brain
Processes peripheral details	Processes central aspects or essence
Verbal (produce speech)	Non-Verbal (comprehension only)
Temporal & Sequential	Simultaneous & Visuospatial
Language Processing (speech, words)	Emotion & Social Processing (face and body language)
Categorizing (naming, titles)	Metaphor (relation, analogy, context)
Digital (using numbers to count)	Analog (using values)
Logical (linearly linked Ideas)	Gestalt, Holistic (seeing the whole)
Analytic (step by step, part by part)	Synthetic (forming the whole)
Deductive, Convergent, Vertical thinking	Imaginative, Divergent, Lateral thinking
Thinking, Sensing (Jungian concept)	Feeling, Intuition (Jungian concept)
Rational and Realistic (reason & facts)	Intuitive (patterns, insight) and Impulsive
<i>Ego, Persona, Conscious</i> personality	<i>Shadow, Id, Unconscious</i>
"Western Thought" (Technical, Rational)	"Eastern Thought" (Intuitive, Mystic, Myth)

Even though we may be more aware of left-brain processes when we're awake, both hemispheres are operating, and influencing our waking actions and thoughts. Edwards (1989) describes right hemisphere information processing in the waking state as: visual imagery processing; perceptual awareness of things with minimal connection to words; no sense of linear time; not requiring a basis for reason or facts; relating to things as they are in all their perceptual complexity; seeing likeness and relationships between things; seeing metaphors and analogies; seeing how parts fit together to form a whole or gestalt; seeing the whole all at once; insight and intuition; perceiving many facets of a problem simultaneously, often leading to divergent or multiple conclusions. This may sound like the landscape of a dream – perhaps we are indeed dreaming (although unconsciously or subliminally) even while we are awake!

Research associated with hemisphere activity during dream sleep (Hoss, L., 1981) resulted in a variety of theories; including Bakan's early theory (1977-78) that dreaming is primarily a function of the right hemisphere. While this is not strictly accurate based on what we now know, drawing on evidence from studies of EEG, brain injury, epilepsy and sleep research, Bakan contended that, "marked similarities exist between dream experience and the kind of thinking which has been ascribed to the right hemisphere, e.g., perceptual, fantasy, affective, primary process." Linking of dreaming with the right hemisphere also came from observations of patients with damage to the right parietal region of the brain. Patients reported that they no longer had dreams and lost the ability to visualize, despite previous abilities in these areas. (Gazaniga, 1983; Humphrey, 1951; Hoss, L., 1981). In 1972, researchers (Goldstein, et al., 1972) found shifts in the ratio of right and left EEG amplitude during changes from REM to NREM sleep. In a sleep laboratory study of right-handed males, they found the right hemisphere to be more active than the left during the dream state (REM).

More recent evidence with better measurement tools, as noted in table 2-1, shows that it is more than just the right brain involved in dreaming, but rather various centers in the brain activating and de-activating that make the dream state more right brain like and less left brain like, from processing standpoint. This likely occurs because some of the more influential centers that are activated in the dream state, are specific to the right hemisphere, such as the right inferior parietal cortex (Hobson, 2003). This is the visuospatial processing center of the brain perhaps involved in constructing the dream space and integrating various fictive dream images and experiences to create the spatial activity within it.

Also centers that are deactivated (such as the left parietal cortex, and dorsolateral prefrontal cortex) are responsible for processing functions that are typically associated with left hemisphere. Nofzinger found an

increase in activation of the right hypothalamus and the right frontal cortex during REM sleep and a decrease in the left frontal cortex; Marquet found an increase in the right parietal cortex and decrease in the left during REM (Hobson, 2003).

Even if it is not strictly the inclusion of the right hemisphere, and exclusion of the left, involved in dreaming, the work that has gone into describing the generalized differences in processing or “thinking” involved in the two hemispheres, can be useful in understanding dream thought and language as opposed to waking thought and language.

The Unique “Language” of Dreams

As noted above, activity in the associative cortex that are involved in visual processing, spatial processing and sensory integration, are largely responsible for the visually and sensory rich dream experience. The research by Siclari et al. found that when subjects reported experiencing a dream, either in NREM or REM sleep, it is this associative area (which they called the “dreaming hot zone”) that became active. The internal “language” of this part of the brain is therefore the clue to understanding the “language of dreams.” Because this is an associative area responsible for perception, or the association of imagery with emotional experiences in memory (“meaning”), the dream imagery would naturally contain meaningful relationships to our lives. Thus, the dream story and the imagery itself, are connections of associations (emotional, memory and conceptual associations) presented in the form of a figurative picture analogy or *picture-metaphor* as researchers Ernest Hartmann and Bill Domhoff describe it. The connection between associated thoughts, feelings and memories become pictured as a connection of images which we call the dream (this composite being a concept known as *condensation*).

Picture Metaphor

Montague Ullman (1969), published a paper *Dreams as Metaphor in Motion* demonstrating that dreams appear to metaphorically picture an important problem or concern of the dreamer, or as Hartmann contends, the emotional state of the dreamer. According to Domhoff (2003) there is a simple explanation for the extensive use, by the human mind, of metaphor in speech and dreams. Metaphors map our well-understood basic experiences (such as warmth) to more difficult concepts (such as friendship) - example: “we had a warm relationship.” They map physiological processes (sweetness) to more complex emotional experiences (pleasure) - for example: “what a sweet deal that was!” He states that each person learns a system of conceptual metaphors, as a result of repeated experiences in the course of childhood development.

In the form of a metaphor, a dream image can describe a complex concept with a picture that more simply captures the essence of that concept (much like a speech metaphor does). This can be achieved within a single image as in this “*Father’s Face*” dream. The dreamer had blamed their marital issues on her husband and begin to have recurrent dreams of being angry and running away from him: “*I have a recurrent dream of being terribly angry with my husband, who I am always running away from. These dreams continued until one night I turned around and faced my husband and looked at his face... it was my father’s face!*” Here the face of the dreamer’s father on the body of her husband captures the concept of projecting the unresolved issues with her father onto her husband, in one simple combined image.

The concept of *picture metaphor* also includes the actions pictured in a dream as in this “*Mother Pushing on My Stomach*” dream. The conflict in the dreamer’s life was emotional pressure from her family (particularly her mother) to have children, because “that’s what American families do” and “the clock is ticking” – versus - her desire to pursue a career. She felt the sense of immediacy and obligation was at an impasse not knowing how or who is to decide. At that point she dreamed, “*I am pregnant and in labor and everyone is expecting me to have a baby. My mother is pushing on my stomach but it’s not doing any good.*”

The doctor enters and says, “don’t push too hard she is not ready.” He then tells me “you have the choice to have a baby or not; you are the one who has to decide.”

The dream to waking life metaphoric relationship seems fairly clear in this dream. “*Everyone is expecting me to have a baby*” is a pretty literal picture of the waking life event or emotional pressure but “*I am pregnant....My mother is pushing on my stomach, but it is not doing any good*” and “*don’t push to hard she is not ready*” was more of a figurative picture of the situation. In waking life, she was not pregnant, and her mother was not literally pushing on her stomach – being pregnant was a metaphor for a “sense of immediacy or inevitability” and her mother pushing on her stomach a metaphor for “pushing her to have a baby.” That it was “*not doing any good*” pictures her resistance and resolve.

Hartmann in *The Nature and Functions of Dreaming* (2011) considers metaphors to be based on emotional similarity stating, “Metaphor is the way we think, and I believe it is the way we build our memory systems using emotionally based similarity.” Emotional similarity between unresolved issues with father and husband was pictured by placing the husbands face on the father’s body. Emotional similarity was also evidenced in the picture of the mother pushing on the dreamer’s stomach to immediately have a baby and the emotional pressure in waking life to have children now – the “clock is ticking.”

This visual communication is not unlike that taking place subliminally within our brains in the waking state. As we speak, in the back of our mind we generally visualize the events taking place that we are speaking of. Many parts of the brain are involved in language processing. When we communicate, certain language centers in the left hemisphere are responsible for verbal speech, and for identifying all that we think and perceive with names, titles and words. These centers determine “what” we speak or write. Other language centers in the right hemisphere are responsible for the “why” and the “how.” These centers process context and meaning (Springer, 1980) create a visualization of our train of thought, and supply the emotional content, tone (Gazaniga, 1983) inflection and body language. For example, a simple statement such as “I want to go outside” (left hemisphere wording), may be accompanied in the right hemisphere by a visualization of opening the door, associations with and memories of being outside, and emotions related to the anticipated experience. In the waking state our focus is outward so we may not be aware of this internal visual dialog – but when we sleep the focus is inward and the dialog becomes our dream.

Condensation

As discussed in Part #2, the Psychology of Dreams, Freud promoted the idea that dream images are a *condensation* or fusion of several different *elements*, in which the content of a dream *element* is always far more extensive than what is apparent. He considered it purposeful—reducing of the length of the material, that is, combining two or more complicated thoughts into a single image or scene. This was illustrated in the above example where one concept (a sense of inevitability) was combined with another (the emotional pressure from her mother to immediately choose children over career) and a third (her not being ready) into one composite image of her “*being pregnant*” and her “*mother pushing on her stomach which was not doing any good.*”

The “dream language” of *picture-metaphor* and association is thus one in which imagery fragments combine to represent connections between associated thoughts, feelings and memories. Waking language is one of presenting thoughts, feelings and memories with combinations of written or spoken letters and words. Each dream image is a meaningful symbol in the “dream language,” just as each letter or sound is a meaningful symbol in our waking language. When we tell a dream, images appear to be translated (perhaps by our verbal language centers) into word associations or figures of speech. This can be illustrated in this “*Old Shoe*” dream: “*I dreamed I was talking in a derogatory way to my friend, who seemed quite normal in the dream as an old shoe with his face on it*” The bizarre image of a shoe with a face on it seemed

perfectly normal in the dream, but upon waking was perceived as an irrational creation. There is indeed meaning to this irrational creation in the combining of two concepts – the first being his friend and the second the way he was treating his friend (treating him badly, ignoring or discarding him as if he were an “old shoe”).

Condensation likely has a neurological basis. The right hemisphere matches objects by similar appearance (Springer & Deutsch, 1980). It also processes relationships and tries to create a whole (a Gestalt) from many parts. Imagery combinations are a natural synthesis function which links related emotions, perceptions and memories to form a more complete holistic representation of the situation it is dealing with. The occipital-temporal-parietal areas connects with memory centers to add personal “meaning” to a dream image. Another function it performs is to integrate disparate but associated material – thus integrate or condense imagery fragments that represent that material. A function of the right inferior parietal cortex, for example, is spatial integration and dream imagery formation. It may play a key role in creating images (and the dream scene) that are in essence a spatial integration or linking of multiple associations (represented by multiple imagery fragments) into a single image.

Functional Association

As discussed above, dreams are processed in a part of the brain that talks in a non-verbal language, one that deals with relationship, properties and pattern. The right hemisphere tends to identify an object by function and the left hemisphere by name (Springer & Deutsch, 1980). One of the early cures for certain seizure conditions was the surgical separation of the corpus callosum, the nerve paths connecting the two hemispheres. What resulted was an individual with two distinct brain halves, processing and perceiving independently (Hoppe, 1977). A test was done where a subject’s left visual field (connected to the right hemisphere) was blocked so that only his left hemisphere could see. He was shown a fork, which he correctly identified as “a fork.” Then the right visual field (connected to the left hemisphere) was blocked so that only the right hemisphere could see. He could no longer identify the object as a fork, but rather called it “something I eat with.” The right brain could not title the object; it could only identify its context or function.

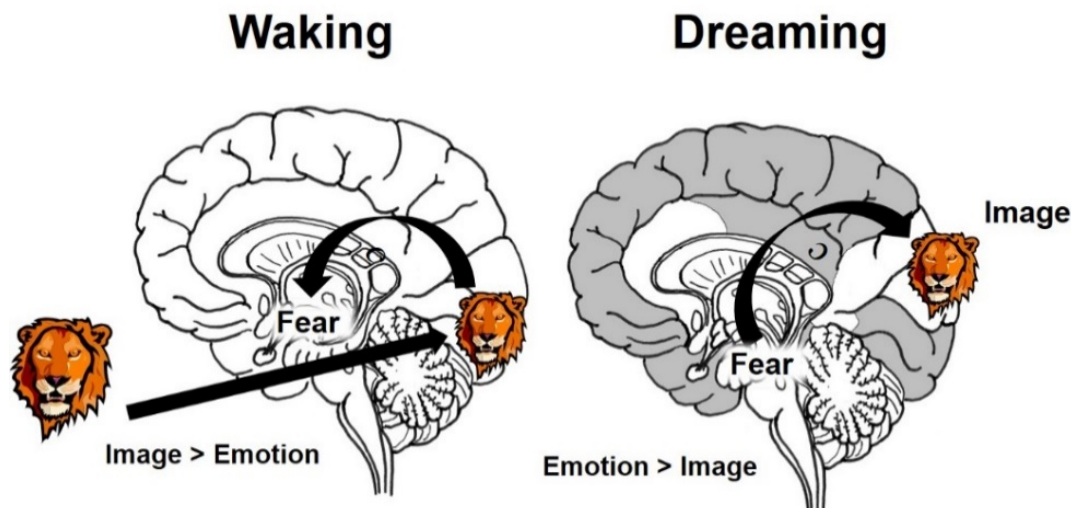
Understanding that the images or dream *elements* might be a representation of how you perceive their function or purpose can be useful when working on a dream. As above, instead of identifying a fork as a fork in your dream, consider defining what you do with it, what its essence or purpose is. This is a simple approach which can lead to your first level of association – or what it personally “means” to you.

Emotional Association

There is much support for the notion that emotions or emotional memories have a primary influence on dream content. Various studies (summarized in Hobson et al., 2003) suggest that an emotional influence on dream content is related to the activation of the limbic system, primarily in REM sleep. Foulkes found dream emotion to be typically consistent with dream narrative and Seligman and Yellen considered it to be the primary shaper of the dream plot rather than a reaction to that plot. Devinsky noted that anterior cingulate activation contributes to emotional features, such as the assessment of motivational salience and integration of dream emotion with action. Nofzinger considered a basic function of REM sleep to be the integration of neocortical functions with frontal motivational and reward mechanisms. In 1998, Maquet proposed that the function, of the apparent orchestration of cortical activity by the amygdala during REM sleep, may be the selective processing of emotionally relevant memories - which might be the reason that threat-related emotions are dominant in REM dreams (in Dang Vu et al., 2007). Ernest Hartman considered the dream image to picture the emotional state of the dreamer, and Fritz Perls considered dream images to picture the *impasses* and emotional conflicts that created them.

Dream imagery (and its hidden meaning) may be a result of what Berne and Savary (2004) term “Limbic Logic” which resides in the amygdala and other limbic centers (active during dreaming). Having a goal of safety and survival in times of danger it thus associates an emotion to the sensory data it encounters. The limbic system, which is often more active in REM dreams than in waking, grasps images and emotions and processes them by association. A role of the limbic system in focusing attention is to associate an emotion or emotional memory to the sensory data it encounters. Whereas in the waking state the limbic system sees a world full of images and links them to emotions/emotional memories, in the dreaming state it is reasonable to deduce that the limbic system recovers emotional memories from waking life and creates a dream imagery associated with that memory or feeling. Figure 2-3 illustrates this concept.

Figure 2-3
Conceptual Role of Emotion in the Creation of a Dream Image



Ernest Hartmann (2011) observed dreams to contain a “Central Image” or “Contextualizing” image (CI) which pictures the emotional state of the dreamer. The CI can be a striking, arresting, or compelling image, which stands out by virtue of being especially powerful, vivid, bizarre, or detailed. An example he gives is the vivid dream of being overwhelmed by a tidal wave, in someone who has recently experienced a traumatic event. Hartmann contends that the intensity of the central image is a measure of the strength of the emotion. The more powerful the emotion, the more intense the central imagery of the dream will be. He indicates that central image intensity can be measured reliably, as supported by research, including a recent systematic study of dreams before and after 9/11/01. Whereas the dreams in this study did not contain images of buildings being destroyed or airplanes crashing, they CI scores (emotional strength) of the dreams collected after the event, were greater than before the event.

Hartmann indicates further that dreaming is hyper-connective, that is, the mind (brain) makes connections more broadly in dreaming than in waking (where we operate on linear, over-learned logical connections). However, the dreaming connections are not random. They are guided by the emotion of the dreamer. The underlying emotion is not only pictured, or contextualized by the dream, but for Hartmann, emotion drives the process of weaving of new information into existing memory systems in dreams, in order to adaptively learn and create new insights.

The Unique Nature of Dreams

Aside from the unique “language” of the dreaming brain, the biology of the sleep state also effects other aspects of the dream experience. Comparing table 2-1 with the description of the common dream in Section 4, it becomes more obvious why dreams have the characteristics that they do - the dreaming brain “thinks” differently than the waking brain.

Dreams Come from Within

Because the body is unable to respond to signals from the motor cortex (site D) in REM and muscles relax in NREM, there is little or no physical body motion while dreaming. This is likely an evolutionary benefit, because acting out your dreams could be harmful. But sometimes the de-activation is not perfect, as this case illustrates: *I recall one case from an early Boy Scout outing where one of the Scouts was missing from his tent in the morning. He was found walking through the woods back toward the camp, carrying his sleeping bag. He reported having had a dream that a flood was coming, so he picked up his sleeping bag and ran down the hill to get away from it.* In essence he had acted out his dream. An interesting side note is that he reported that when he woke up down the hill, he had no injury to his feet. All the injury came as he tried to walk back!

Since sensory signals to the sensory cortex (sites C and D) are impeded, little to no external sensory information is stimulating the dream. An exception would be the minor dream-altering effects caused by strong external influences, or internal bodily needs, as discussed in Section 4 under the topic physical factors. The intrusion of external stimuli is usually observed to modify the ongoing dream, rather than being the primary source of the dream. *“It was a long dream where myself and some others embarked on a boat trip trying to get to a party or gathering of friends. The water had become shallow and the passageway blocked with landforms, so we had to get out of the boat and walk to our destination. Suddenly the rocky terrain I was climbing over became chunks of ice and glaciers, and I could feel the cold as I touched the ice. I then awoke to a very cold room and realized my arms were outside of my bed covers and were cold.”* Here is a case, typical of many cases, where the dream originates totally from within, until the external stimuli grows strong enough to enter and be incorporated. The basic plot of the dream story was stimulated by a waking life search for self-identity, which in turn produces the theme of seeking, journeying and looking forward to a joyous union with the fragmented parts of the dreamer. As the physical sensation from the dreamer’s cold arms became intense, it was incorporated in the dream by altering the physical dreamscape. The primary plot of the dream remained in place, but it gradually became diverted by the additional stimulus that the dream was attempting to accommodate.

You are “Conscious” in Dreams

While we generally believe that when we are asleep or unconscious, this is not the case. Dreams represent a unique sleeping state of consciousness – just not the same state of consciousness as in waking. When awake the prefrontal cortex (site A) is active providing a greater sense of self-reflection, will, rational thought, and working memory. In our dreams we only perceive that we are awake – believing and acting as if all that is going on around us, no matter how bizarre, is real and makes perfectly logical sense. Foulkes argues that dreams are little more than waking consciousness stripped of most sensory input and freed from the obligation of making coherent connections to the external world (in Krippner, 2002). We are consciously viewing and moving around in a dream space, which we believe to be real, since the dream space was created in the visual associative and spatial processing areas much the same way as in waking.

Thinking within the dream is generally preserved no matter how implausible the contents of the dream,

however, the ability to think or reflect rationally about the contents of the dream is severely compromised, even if the contents are illogical, so that implausibility is rarely caught. One reason for this is the inability while asleep to access knowledge about how the world works and thus be able to distinguish fact from fantasy. The centers of our brain responsible for rational reasoning and self-reflection (site A) is off-line. Information that is processed in the dreaming brain is therefore not organized by this higher level of processing, nor referenced to our “rational” waking model of reality. The logical “filters” are not applied. In the dream, we perceive the bizarre occurrences and strange combinations of events and images as normal. Talking to our friend, who appears as an “old shoe” for example, seems perfectly normal until we reflect on it after waking.

There appears to be two distinct cognitive components during dreaming: 1) thinking within the context of the dream, where the dream self thinks about dream characters and about what’s going on in the dream, is generally similar to thinking when awake; 2) thinking about what is happening in the dream, is different from wake thinking, not able to reflect on the implausibility of the dream because they are unaware that they are dreaming (Kahn in Hoss, Valli, Gongloff, 2019). Thus, while self-reflection exists for the dream self within the context of the dream, self-reflection by the person having the dream about the dream is absent. This changes if the dreamer becomes lucid. When lucid, the dreamer knows he is dreaming and is thus able to reflect on surroundings and recognize implausibility. In fact, the recognition of something implausible in the dream can lead to becoming lucid.

This understanding is useful in establishing an approach to dreamwork. In a sense, the content of the dream or a dream *element* is “purer” since it is not filtered or categorized by our rational organization in the waking state. Adopting dreamwork techniques that explore the content within dream *elements* in their raw, non-rational or pictographic state is a key to understanding dreams.

Dreams Appear Irrational Only to the Waking Mind

When we are dreaming, scene shifts and events and decisions which are improbable in waking life, appear perfectly rational or normal while we are dreaming. They only appear bizarre when we wake and our frontal rational thinking areas (and rational model of reality) come on line.

Dreams are Not all that Bizarre

That dreams are “bizarre,” or include elements that are improbable or impossible in waking life, is generally considered as their most notable feature. Actually, when studied in detail, dreams are not as bizarre as pop culture or Hollywood would have us believe. After studying hundreds of REM dreams, Frederic Snyder (1970) concluded that “dreaming consciousness” is “a remarkably faithful replica of waking life”; that is, a typical REM dream report is a “clear, coherent, and detailed account of a realistic situation involving the dreamer and other people caught up in very ordinary activities and preoccupations.” Snyder found only about half of dreams do not include unrealistic elements, and extremely bizarre dreams are found to be rare (only about 2%–9%). Researchers (Schredl, 2010a; Snyder, 1970; Strauch & Meier, 1996) found that about 20% to 30% of laboratory and journal reports contained elements that are conceivable (even if unlikely), and 65% to 72% of reports pictured highly credible or every-day events.

Is Dream Logic “Rational”?

There is an inherent analogical decision making and problem resolution taking place in dreams. It is just a different logic or rationality than the waking mind is used to. The fantasies, disconnected non-time sequential stories and non-rational imagery of the dreaming mind, bear close similarity to the characteristics of right hemisphere processing. In dreams these analogical centers (including sites 5, 6, 7 and 8) process

decision making based on association, analogy, and holistic patterns – which dominates over the linear sequential logic and literal verbal identification. Holistic and analogical reasoning is logical, it is just a different logic from our waking life perceptions, where we name or describe our experiences with words, and where rational, deductive and time sequential reasoning is applied. Furthermore, as you will learn in Section 3, problem-solving dreams appear to have a logical or “purposeful” structure to them, either in a series or a single dream.

In the following example, the dreamer became angry with his co-workers and boss and planned to lash out at them (“lecturing” them) the next day – no a healthy thing to do on the job. That night he dreamed: *“I dreamed I was in front of a crowd, about to give a speech, when I was introduced to a man named ‘Willy Pissedoff.’ I was trying to control myself to keep from laughing.”* The dream caused him to laugh at himself and recognize his anger as the characters “Willy Pissedoff” this dampening the anger and avoiding a nasty incident. Here the dream imagery, story-line and dream figure’s name may appear bizarre to the waking mind, but the appearance of these *elements* are quite rational and the logic quite linear if considered in light of their associations rather than their named identity. If each *element* of a dream story is converted to its association or analogy and re-inserted into the dream narrative – it becomes a perfectly logical cause and effect picture and resolution for his waking life emotional conflict. If we could learn to think analogically, and in the same way our right brain perceives and connects information, we could more easily understand the language of our dreams.

An interesting perspective is that since our analogical decision-making frontal networks are active, along with all of the other centers active in REM sleep (albeit at an unconscious or subliminal level), we are in essence dreaming all the time! Furthermore, that unconscious part of our brain acts to prepare a decision before we are even aware that we made the decision. In a study by Soon et al. in 2008, they instrumented the lateral and medial prefrontal cortex (unconscious decision making) and precuneus (triggers conscious awareness) as well as the left and right motor cortex (enables arm movement) to understand the role of these unconscious centers (the *unconscious*) in conscious decision making. They then gave the subjects a test where they had to answer yes or no by pressing buttons with the right or left hand. They found that a decision can be determined and encoded in the prefrontal and parietal cortex up to 10 second before it enters conscious awareness. This delay suggests that decision making (for our higher-level control areas) begins with an unconscious preparation of the decision long before we are conscious of the decision – that is, when we think we make the decision consciously, it has already been made by our unconscious mind.

Dreams are About Daily Events – but Omit the Event Itself

Emotional memories being processed in the dream state appear to be associated with recent waking life events, or long-term issues triggered by recent events. This is the “continuity principle” which states that dreams contain content that is continuous with daytime events or “day residue” (Schredl, 2003). Day-residue from the prior day generally falls off significantly after a few days, however, a dream-lag effect has been observed, which shows a recurrence of day residue fragments in dreams approximately one week later (Alain, 2003). Most therapeutic dreamwork approaches and results support a principle of emotional event continuity in that they generally show the dream to be related to some recent situation, or unresolved past traumatic event, in the dreamer’s waking life.

Although dreams are likely stimulated by a recent waking life event, the dream rarely represents the event that took place or even the visual memories from that event (people and places involved). Depending on the study, only 35% to 65% include fragments of day residue and only 1.4% actual replays (Fosse, et al., 2003). The waking event seems “hidden,” which is perhaps the source of much confusion about dreams. Parts of the brain (in particular the precuneus) involved in episodic and visual recall becomes relatively inactive during REM. Emotional memories, however, may be accessed perhaps because the limbic region

responsible for emotional memory and processing is highly active. The emotional context (“gist”), associations and memories of the waking event appear to be represented in the dream, but the event itself is not, all due to the unique way in which memory is processed during sleep (Fosse, et al., 2003).

Dreams Focus on Self

As much as we might like our dreams to be a view into a greater non-personal universal reality, a few may but the typical dream appears to focus on self. If you reflect on your latest dreams, or even those you may have recorded in the past, note that the focus and concern in the dream is almost always yourself – you searching, you trying to do something, you being lost or frustrated or anxious. We are not isolated, however, in dreams we are constantly interacting with dream characters and perceive their thoughts or emotions (Kahn, 2004). In a 2002 study by Kahn, participants reported that characters in almost every dream evoked feelings in them (the *dream-self*) and that the *dream-self* evoked feelings in the dream figures.

According to Panksepp (2003), dreams are filled with self-referential configurations and variations of emotional problems to be solved. Revonsuo (2000) states that threat perception and harm avoidance lie at the heart of many dreams. This is likely because the brain center involved in construction of imagery and our dream space (site 11) is also involved in perception of our self-image. This center of the brain plays a primary role in constructing the dream image and its location and movement in the dream space. It is responsible for forming a perception of one’s own physical body image (Calvin, 1980) as well as one’s abstract image of self (Pace-Schott, 2003). It also plays a role in the complete perception of the spatial and social components of the world (Ratey, 2001). Thus in dreams, the images created in our dream space, and the dream space itself, may be referenced to an inner model or image of self and our social model of reality.

Dreams Deal with Anomalies in Our Social World

Dreams may not only respond to threats to self (Antti Revonsuo, 2000), but to anomalies in our environment, things that simply do not fit our internal image of self and reality. The Angular Cingulate and Basal Ganglia, which are active in REM, play a role in detecting anomalies and novelty experiences; that something is wrong. This is supported by Jan Born and his colleagues at the University of Lubeck, who used a mathematical number test with a hidden trick in it, and found evidence that dream sleep more than doubled the probability of participants detecting the trick (Gorman, 2004).

The anterior cingulate, orbitofrontal cortex and limbic system (hippocampus and amygdala) play role in novelty detection; alerting our cognitive mind when a stimulus is novel (see table 2-1). The hippocampus compares the present with the past, and thus relates events as either novel or ordinary, inhibiting reaction to the ordinary and orienting our attention to the novel, that which doesn’t fit our memory store. In dreams we often observe events and characters from our past, mixed or integrated in strange ways with the present. Ratey (2001) states that this process is integral to the functioning of our emotional and social brain (who we see ourselves to be in relationship to others and life’s overall picture). The dream story may be stimulated by events that are an anomaly or don’t “fit” the internal perception of self and our social world.

Furthermore, certain brain centers which are active during dreaming (including the amygdala, right parietal lobe and centers in the right temporal lobe), are responsible for recognizing emotional body and facial expressions and are involved in processing social interactions (Ratey, 2001). David Kahn (2004) indicates that within a dream, the dreamer is often aware of other people’s (dream characters) thoughts and feelings. In a study of 35 subjects (320 dream reports containing over 1200 dream characters), he found that in a majority of the reports (77%), the dreamer was aware in the dream that their dream characters had feelings about them. One explanation Kahn offers is that our awareness of the feelings and thoughts of others in our dreams prepares us for social encounters when awake.

Dreams are Projective

Carl Jung proposed that dreams are projective - forward focused or goal oriented. In dreams we are often motivated to search and find a solution, to test possible solutions – thus dreams appear to project the results of our actions and beliefs (or the actions of our *dream self*) and in this way are adaptive. According to Erin Wamsley memories are “reactivated” during sleep and dreams incorporate them to enhance our memory systems, reorganizing, interleaving, and reintegrating fragments of the recent events with past experiences and other content to prepare for the future (Wamsley, 2016).

As discussed in Section 3 this problem solving and adaptive capability is achieved by introducing and testing creative alternatives. Allan Hobson suggests that it is more than just the introduction of any alternative scenario, but that the scenario is based on a predictive modeling. Hobson, in his Predictive Coding (2014) and Proto-consciousness theory (2009) suggests that there is an inborn capacity of the brain to model the world by creating a virtual reality simulation and predictive model of it—our basis for perception in both waking and dreaming (Hobson et al., 2014). During waking, the model is updated with our experiences. During dreaming, the world model is free to generate creative imaginary predictions. In waking, how well the model fits waking reality is tested (the difference between prior beliefs or expectation and subsequent beliefs or how those expectations worked out). During sleep, discrepancies can be compared in an iterative learning process and the model optimized. The dreaming brain “tells waking what to expect and waking verifies or refutes those expectations” (Hobson et al., 2014).

Your Will is Absent or Diminished

This inactive logic center of our sleeping brain (site A along with site C) also the seat of our will, plus decisions and actions based on will. We generally don’t think to control our actions or the storyline of the dream, even though the dream is all created within our own mind. We tend to exist as just a figure in the dream, which is reacting to, subject to or following the plot of the dream. The possible exception is lucid dreaming (as above), in which part of the frontal cortex and precuneus becomes active and willed action becomes possible but can be diminished or short lived depending on the depth of lucidity. The knowledge that the dream is not subject to the will of the *ego* is beneficial to dreamworking. The dream figures, which represent, feelings, beliefs, disconnected *fragments* of our personality, threatening emotional memories etc., are free to express their nature in the dream outside the influence of our will.

Discontinuous Time and Scene Shifts are Normal

The executive part of our brain (sites A and C) that are normally inactive in the dream state are also involved in episodic and working memory. Time is not continuous and dream sequences can suddenly switch on us, and we fail to even notice or reflect on what changed until we awake. This switch is perhaps a result of completing one holistic synthesis of associations, and beginning another, as a new unresolved emotional stimulus enters the dream space. When working with such a dream, therefore, it is best to treat each dream “segment” (between scene shifts) as a separate but associated dream. When each segment is analyzed separately and then compared, a more complete picture of the dream process emerges.

The loss of working memory also has implications for dream recall, and why it is hard to recall more than a few segments of a dream, usually the events closer to waking. Although there is some evidence that learning is taking place in a dream, the activation of the more permanent memory processes in the brain during waking is necessary for recall. This knowledge helps establish techniques for recall that I discussed in Section 1.

SECTION 3 – DO DREAMS HAVE A FUNCTION?

There was a whole world here once, she said, but some of the smaller parts left on personal business and it's not that easy to find replacements – Brian Andreas

Dreams have long been understood to be a valuable tool in psychotherapy for gaining insights or therapeutic benefit by working with the dream in relation to the dreamer's life in some manner. Also in Section 1 we saw that the various cycles of sleep appear to serve certain physiological and memory functions. But does the dream itself serve a function, and if so, does the dream serve this function whether the dream is recalled or not?

Emotional Processing

Researchers understand dreams to reflect waking life emotional concerns and in turn dream emotion tends to affect waking life emotion or mood. Nofzinger considered a basic function of REM sleep to be the integration of higher order cortical functions (perception, action, sensory) with motivation and reward systems; while Maquet proposed that the function of may be the selective processing of emotionally relevant memories. (in Dang Vu, 2007). Milton Kramer (2011) performed a series of seven studies that demonstrated that the principal pre-sleep emotional concern of the dreamer influences the theme of the night's dreams.

Stress Reduction and Mood Control

Freud suggested that bad dreams let the brain learn to gain control over emotions resulting from distressing experiences. Donald Stewart and David Koulack state that a function of dreaming is the adaption to stress over time. This emotional regulation may result of: 1) emotional memories being re-activated in the amygdala to hippocampal network during REM and 2) the reaction of the amygdala being down-regulated due to a reduction in stress producing neurotransmitters in the forebrain (Els Van der Helm, 2011). This may be why we often experience going to sleep emotionally upset at something yet wake in the morning less concerned.

Milton Kramer (2011) theorizes that sleep and dreaming might either achieve or fail to accommodate what he calls the emotional surge across the REM period. For the most part he found the mean level and variability of mood to decrease across the night. Kramer (as did others) found that the emotionally intense experiences of the day are what appear in dreams and that the activities during sleep appear to be "corrective" like a thermostat operating to move the mood level toward a central and lower point. The dream seems particularly involved with one aspect of mood, feeling "unhappy." He found that the effectiveness of a night's dreaming in reducing the intensity and variability of mood occurs in about 60 percent of nights. The effectiveness may be the result of the pattern of dreaming across the night. If there is an attempt to resolve the emotional problem (which he called a progressive-sequential dream pattern) there may be a positive change in the emotional state of the dreamer. If the emotional problem is simply restated and not solved (a repetitive-traumatic dream pattern) the mood change is less successful. Kramer suggests that is through the mechanism of "emotional problem-solving" or failure to "problem solve" that mood change takes place or fails to occur. In essence he found, "How you feel in the morning is related to how you feel in your dreams and what happens in them."

The concept of emotional regulation is pictured in the following dream example. The dreamer had an argument with his boss and co-workers that day that left him feeling horribly wronged. Getting angrier and angrier he planned to “tell them off” the next day. That night he dreamed: “*I dreamed I was in front of a crowd, about to give a speech, when I was introduced to a man named 'Willy Pissedoff.' I was trying to control myself to keep from laughing. I woke laughing and lost all desire to carry out my angry verbal attack.*” Luckily the dreams’ ability to down-regulate the and accommodate emotion (even picturing it in a manner obvious to the waking *ego*) prevented what could have been a career limiting decision.

Fear Extinction

Nightmares typically imply nocturnal awakening whereas bad dreams are usually defined as negatively toned dreams that do not awaken the dreamer. Nielsen and Levin (2007) suggest that normal dreaming serves a fear extinction function and that nightmares reflect a failure in emotional regulation as influenced by the degree of emotional distress during the day, and the dreamer’s reaction to it. Areas in the brain involved in fear response (amygdala, infralimbic and prelimbic medial pre-frontal cortex) are active in REM sleep. The infralimbic regions in particular are understood to be a site of plasticity and emotional learning that allows us to inhibit and extinguish fear responses. Van der Helm (2011) reported an increase in functional connectivity between the ventral medial prefrontal cortex with the amygdala in REM sleep, suggesting that dreams may be involved in emotion regulation and “extinction” of conditioned fear (Sotres-Bayon & Quirk, 2010). The basal ganglia, which is active in REM, is also considered by some as central to extinction learning (Quirk, 2000) and selecting which response to make or inhibit (Lieberman, 2000). Within the basal ganglia, the ventral striatum has been shown to activate areas of the prefrontal cortex, the orbitofrontal cortex and the central nucleus of the amygdala which are important the inhibitory control and extinction learning (Romaguera, 2012, Quirk 2000).

Emotional Problem Resolution

Robert Stickgold (2009) considers sleep as a time when the brain can search for and identify useful associations between recently formed emotional memories and older ones, helping to place them in a more useful context, from which their resolution may become more readily apparent. Milton Kraemer (in Hoss, Valli, Gongloff, 2019) considers dreams to develop in two ways depending on the success or failure to contain the emotional surge: 1) “emotional problem solving” or *progressive-sequential* in which an emotional problem is stated figuratively, worked on, and resolved; and 2) “failure to problem solve” or *repetitive-traumatic* type in which the emotional problem is simply restated in different images or metaphors and no progress toward resolution occurs – extending the assimilation process into waking life. Dreamers show both patterns in approximately the same frequency, 60% to 40%, which underscores that there is not universal success in dreams altering the residual emotional problems of the day. This could account for some of the variability in how a person feels on awakening in the morning.

The function of the *repetitive-traumatic* type dream is not totally clear, perhaps an attempt to contextualize the trauma (something I will describe as the *encounter* phase of a dream) or simply a reactive emotional response to something during the day that triggered the memory of the unresolved experience. Hartmann (2011) contended that severe trauma interferes with this emotional-guided metaphoric process - our dreams become “stuck” and repetitive, devoid of metaphor - we fail to integrate our memories, and we do not develop new playful metaphors or connections and loops of complexity in the cortex.

Kramer suggests that “the current emotional and cognitive concerns of an individual are processed by a problem-solving mechanism across the wake-sleep-wake continuum, and the resultant state is a determinant of performance the next morning – that dreams which enter awareness can become the object of attention for the dreamer and lead to change in the dreamer, to an enhancement of self-knowledge” (Hoss, Valli,

Gongloff, 2019). Ernest Hartmann (2011) also supports the role of a dream-to-waking continuum in the process - the act of remembering dreams in the morning and trying to understand the associated emotional conflicts.

Memory Processing

Ernest Hartmann (2011) suggests that the most basic function of dreaming consists of connecting new material with old material in memory systems, “guided by emotion.” He does not consider this a “consolidation” of memories from the day, but rather a creative weaving in of new information, reorganizing existing memory systems based on what is emotionally important to us. As Erin Wamsley states, “sleep transforms memory traces over time, allowing us to extract generalizations, integrate information, and arrive at creative insights.”

Emotionally Guided Interleaving

Ernest Hartmann (2011) stated that emotions act to influence what we store in memory, adding a salience to a memory, thus prioritizing what is subsequently consolidated into long term memory. Consolidating the theories and the findings of such researchers as Ernest Hartmann, Robert Stickgold & Matthew Walker (2013); Jessica Payne (2009), Josie Malinowski and Caroline Horton (2015), and Erin Wamsley (2016), the processing appears to go something like this: a) a memory “triage” process during sleep helps determine which waking events to remember and which to forget, selecting new information, in a discriminatory manner, to assimilate into the brain’s evolving knowledge; b) dreams “illuminate” and incorporate these “reactivated” memories to enhance our memory systems – and not just any memory, sleep preferentially promotes lasting memory changes for emotional memories; c) these memories are not simply integrated in their original form, ‘meaning’ or the general theme or ‘gist’ is extracted from those memories (which is what actually “changes” your memory); d) emotion acts as a marker for which information is to be selectively processed and integrated into pre-existing memory networks; e) dreams then simultaneously reorganize, interleave, and reintegrate fragments of the recent event with past experiences and related material to prepare for the future; and f) the dream *elements* and activity, the picture-metaphors and bizarre imagery combinations, represent the connections and associations between this material.

Memory Re-Consolidation

Memory re-consolidation (from a psychological perspective) implies reactivating a memory, interleaving it with new information or a new perspective (changing it) and storing (consolidating) the result into long term memory. The interleaving and memory change process described above may be similar to that found in waking-state memory reconsolidation studies whenever permanent change is observed. A study by Karim Nader, Glenn Schafe, and Joseph LeDoux in 2000 concluded that even strongly consolidated memories (old learning) can be made unstable and readily open to change when we recall them. The synapses involved deconsolidate; that is, the small spaces across which neurons communicate with each other chemically unlock. And they stay unlocked for about four to five hours. If a critical new learning experience takes place during that “reconsolidation window,” the old learning can be permanently altered or replaced by the new learning.

In a review of animal and human studies from 2004 to 2009, Bruce Ecker (2012) observed three common elements in the process that brought about permanent change. He called this the *Transformation Sequence*: (1) reactivate (recall and deconsolidate) an emotional memory and reaction to it (the original learning); (2) create a “mismatch schema,” an experience contradictory to that original learning (similar to a *counterfactual* or Jung’s *compensation*); (3) juxtapose the opposing views in a learning experience during

the reconsolidation window (the interactive tension in Jung's terminology) such that 4) when the memory (or emotional response to the memory) reconsolidates it is altered by the new learning. (see below and the Psychology of Dreaming sections for a discussion of Jung's *transcendent function* and *compensation*).

Developing an Inner Model of Self and Reality

Although presented in the pictorial language of the dream, the dream presents our inner perception of reality, who we see ourselves to be in our social relationship with others and our environment (our world view). As Carl Jung (CW vol. 8) stated it, dreams are "a spontaneous self-portrayal, in symbolic form, of the actual situation in the *unconscious*." William Domhoff also considered dream content to be a mental profile of the dreamer stating that "75 to 100 dreams from a person give us a very good psychological portrait of that individual." Hobson's (2009), in his proto-consciousness hypothesis, states that dreams provide a virtual reality model of the world in which content is synthesized and not merely a waking reproduction, dreaming being a predictor and developer, as well as a reflector, of waking consciousness. The quote by Robert Stickgold (2016) that I noted earlier says it all: "When you wake, you understand how the world works better than you did when you went to bed."

Learning

The memory processing function in dreams discussed above (particularly the sequence described therein) might be considered to be a learning process. A growing volume of research is beginning to suggest that dream sleep might promote learning whether we recall or understand the dream or not.

Research Evidence

Two basic learning processes have been discovered to take place in sleep, for two types of memory: ***declarative*** (rehearsing events and learning facts, the what) and ***procedural*** (learning how to do something, strategic learning). ***Procedural*** learning can extend to advanced forms of creative problem resolution learning that will be discussed further below. Most of the research work with sleep learning has been done with learning facts and skills – being less subjective and easier to measure.

Researcher Carlyle Smith (2010) indicates that some of the sporadic, spiky brainwaves in stage 2, known as sleep spindles, are due to innate learning ability, and ***declarative*** learning appears to involve stage 3 non-rapid eye movement (NREM) sleep – whereas learning procedural tasks, whether motor or cognitive, involves either REM sleep or stage 2 NREM. Tasks that are completely new or novel and require a new cognitive strategy appear to involve REM sleep – where remembered dream content is often related to the material being learned.

Research by Stickgold and Walker indicated that subjects that practiced a task in the evening and were retested after a good night's sleep, were 15% to 20% faster and 30% to 40% more accurate than those simply tested twelve hours after learning the task without the intervention of sleep (Gorman, 2004).

In a 2001 study, Matthew Wilson at MIT (Louie & Wilson, 2001) used microprobes to monitor individual neurons in the brains of rats. Among these were "place cells" in the hippocampus, which fire, or pulse electrically, as a rat navigates its environment. Wilson observed the unique firing patterns of individual neural place cells as the rats traversed each part of a maze to find a food reward. When the rats slept, these same patterns appeared again, as if the brain was replaying the maze pattern and relearning it. Likewise, the firing patterns in the visual cortex of the rats were replayed, suggestive of visual dream activity during the process. The results suggest that the rats were rehearsing and consolidating some degree of learning about the maze in their sleep.

The same has been found in humans. In 2008 Hagar Gelbard-Sagiv and her colleagues at the Weizmann Institute worked with a patient who had had similar probes inserted as part of a brain surgery procedure. As the patient viewed a sequence of images presented in story form, Gelbard-Sagiv noted the sequence in which neurons fired. As the patient slept later on, the same neurons fired in the same sequence.

In 2004, Philippe Peigneux and his team at the University of Liège used functional magnetic resonance imaging (fMRI) to look at the brain activity of humans as they worked through a virtual maze. The fMRI showed that the hippocampal areas activated during the maze experience were likewise activated later, during slow-wave (stage 3) sleep. And the amount of the hippocampal activity positively correlated with the improvement of performance the next day.

The Role of the Dream Itself

Is the dream simply a reflection of a mental process taking place in the brain, or might the dream itself play a role in the learning process? Montague Ullman (1959) also stated that dreams have a “remarkable capacity to integrate past experiential data with current life situations in a manner that discloses more significant information pertaining to current conflicts than is available to the individual at any given moment in the waking state.” In 1977 Harry Fiss discovered that when students dreamed of a short story, they remembered it better the following morning. In 2000, M. J. Fosse found that dreams interleave fragments of recent waking episodes with past experiences and other content. In 2010 Erin Wamsley and her colleagues at Furman University asked study volunteers to do a virtual-reality maze task and then sleep, after which the team tested these individuals again. Those who dreamed about the maze task improved their memory ten times more than those who did not dream about it! Wamsley observed content from the maze in all stages of sleep – onset, NREM, and REM – with no statistical differences between REM and NREM.

Ernest Hartmann considered dreams to be a hyper-connected process (creating new connections more broadly than in waking life) which allowing us to arrive at new insights. One of the features often observed in dreams is **surprise** at the moment of connection and new insight. Pavlovian learning researchers Rescorla and Wagner (1972) determined that learning occurs when what happens in the trial does not match expectation – that if you are surprised by an event that you don’t expect, you will learn.

A Learning Continuum

Dreaming across the night exhibits some theme continuity, for example, dreams sampled from different stages and across a single night may all carry an overarching theme related to waking concerns, even if the perceptual or emotional quality and specific details of the dream report change. Furthermore, this continuum appears to be continuous with waking life learning. Michael Schredl (2005) cites two studies that show dreams of the second part of the night comprise more elements of the distant past, while dreams of the first part of the night mostly incorporate recent daytime experiences. Rosalind Cartwright, in a 1977 study, collected dreams from participants and patients throughout the night. She noted, “First dreams appear to be related rather directly to present anxieties, the following dreams to emotionally associated experiences and the final ones to contemplated solutions.” Roussy et al. (1998) also found REM dreams across the night to weave fragments of recent events with past events.

As noted in Chapter 1, a very detailed study by Verdone (1965) *Temporal Reference of Manifest Dream Content*, comparing dream reports from various stages of each subject’s dreams with episodes in their lives, found dreams to evolve over the night, relating more with prior day events during the first REM cycles and gradually including events from recent months then the dreamers more distant past toward the end of the night. Matt Wilson (Louie & Wilson, 2001) in his microprobe studies with mice also observed that the learning process in various stages of sleep may be progressive – observing the maze to replayed in NREM but in REM the image fragments from the recent maze appeared to be are combined with fragments from

prior maze configurations from past tests. (Matt Wilson discussion during presentation at the 30th IASD International Conference, Virginia Beach, Virginia, 22 June, 2013)

How Do We Learn in Dreams?

Can we Observe a Learning Process in Dreams?

I will use a dream example, the “Rusty Car” dream (figure 3-1), to demonstrate how emotional problem resolution and learning might be observed in a dream. The dreamer in this case was offered a teaching position in an area of expertise he had abandoned many years before. He felt it would be too difficult to resurrect his talents, so he decided to turn the position down the next day. But that night, he dreamt: *I am wandering through a red sandy desert and see an old rusty car. I look inside and find the driver is not moving. I give him up for dead. My unknown companion from behind says “the man is just asleep” and urges me to wake the man. I argue that it is useless, but after much discussion I reluctantly give in and shake the man. When I do, both the driver and the car come to life and the car transforms into a newer car.* What is interesting about this dream, from a learning standpoint, is that the change in viewpoint or new learning did seem to be achieved within the dream. The next day the dreamer accepted the assignment, having reversed his decision. It was only upon later reflection that he fully recognized the role the dream may have played in changing his decision.

Figure 3-1 The “Rusty Car” Dream

Introducing a *counterfactual* or contradictory mismatch schema



Learning involves a “change” in memory and outlook, and this was evidenced in the dream above. Also, the sequence in the dream tends to follow the processes discuss above in the Memory Processing. For example, the re-consolidation process (Ecker’s *Transformation Sequence*) was apparent throughout the “Rusty Car” dream. The emotional memory triggered by the event was deconsolidated and pictured as, “*the old rusty car with the dead driver inside.*” A mismatch schema or *counterfactual* was introduced as his unknown companion from behind says, “*he is just asleep.*” The juxtaposition of opposing views in a learning experience occurs as the companion urges him to “*wake the man*” and they argue until after much discussion the dreamer gives in and shakes the man leading to the driver and the car coming back to life – a new learning experience. The emotional reinforcement and net outcome of the dream suggests that a re-consolidation may have taken place that has incorporated the new learning – since the dreamer accepted the position the next day without understanding how the dream related to the situation.

Learning and the Dreaming Brain

As noted in Section 2 the active centers in the dreaming brain (particularly in REM) are found in waking state studies to exhibit a great deal of analogical processing and decision-making capability. Although there is no definitive proof that these centers operate the same way in dreaming as in waking, observations of dream action and content suggest that they may indeed preserve some of that capability and appear to follow some of the memory processes of the *transformation sequence* as discussed above. If the dreaming brain has the capability of resolving problems and supporting a creative learning process then it would need to at a minimum be able to: a) detect a problem or conflict; b) plan possible solution scenarios; c) test these solutions, perhaps guide and monitor the outcome; and d) reinforce and store the result in long term memory.

a) Problem Detection and Encounter:

Dreams are observed to detect unresolved problems, anomalies or norm violations (as McNamara calls them) of an emotionally impactful nature. The memory processing research discussed above suggests that dreams selectively reactivate and “illuminate” emotionally important memories and extract the general theme, ‘gist’ or ‘meaning’ - emotion acting as a marker for which information is to be selectively processed and integrated into pre-existing memory networks. In re-consolidation research this is known as “deconsolidating a memory” and leaving the neural connections labile or subject to change.

In the “Rusty Car” dream above we observed emotional problem detection, and “illumination” in the form of *picture-metaphor* – the dreamer’s view of his talents being rusty and feeling that he is not motivated as pictured in the “rusty car” and “inner driver being dead.” The “*Father’s Face*” dream began by picturing the dreamer’s marital conflict: “*I have a recurrent dream of being terribly angry with my husband, who I am always running away from.*” We also observed problem detection in the “Mother Pushing on My Stomach” dream, the dreamer’s resistance to the pressure from family and her mother to have children now (versus following a career) was pictured as: “*I am pregnant and in labor and everyone is expecting me to have a baby. My mother is pushing on my stomach but it’s not doing any good.*”

Various centers in the brain are active in REM sleep that might provide this capability. Activity in the limbic regions provide access to emotional memories. The anterior cingulate is known as part of a general performance monitoring system that detects conditions under which errors in reasoning have occurred or might occur (Carter 1998) and goes into action when there is a violation in expectancy (Oliveira 2007). The basal ganglia also alert us that something is not right such as an anomaly or novel, adverse unexpected situation and initiates action (Falkenstein, et al., 2001, Packard and Knowlton, 2002).

Once detected, the associative cortex (occipital–temporal-parietal areas) then integrate and present the information from various centers as *picture metaphor* – a picture of the “meaning” or “gist” that is extracted from these emotional memories. As Hartmann stated, dream images picture the emotional state of the dreamer. As Jung put it “dreams picture the unconscious aspect of the conscious event where it appears not as a rational thought but as a symbolic image - an emotionally charged pictorial language.”

b) Scenario Introduction

Many researchers consider dreams to be adaptive in that they plan, simulate, rehearse and test various scenarios to better prepare us for waking life – for example Levin (2009) asserts that dreaming generates strategies for actively checking on and thus responding to potential dangers, including those emanating from internal psychological conflicts. McNamara (2002) considered dreams to be a more cognitively creative process than simply matching memories. He observed a cognitive operation in dreams that identifies “norm

violations” (unresolved perception or conflict) then integrates the conflicted information into memory by generating *counterfactuals* to the violation (a “what-if” scenarios or mental simulation of what might happen if a different decision were made). McNamara (2002) observed *counterfactuals* in 97% of dreams studied in a 34-subject study. Feinstein & Krippner called it a *counter-myth*. Carl Jung (1964, 1968, also see Psychology of Dreaming sections) used the term *compensation* to describe these scenarios which opposes, balances or complements the existing, and often misconceived, view of the *ego*. He saw this as a necessary element of a *transcendent function* in dreams which enables transition from one mental state to another. The concepts of *counterfactual*, *compensation* or *counter-myth* all amount to what Ecker (in his re-consolidation theory) called a “mismatch schema” or experience contradictory to the original belief or learning.

In the “*Rusty Car*” dream, the urging of the unknown companion: “*the driver is just asleep – wake the man,*” is a *counterfactual* - a what if scenario that violates or opposes the existing viewpoint or norm, i.e., “my talents are rusty and my motivation dead,” The *counterfactual* in the “*Father’s Face*” dream was the surprising and impactful image of the father’s face on her husband’s body – illustrating how she had projected unresolved “father issues” onto her husband. In the “*Mother Pushing on My Stomach*” dream the opposing schema to placing the decision in her mother’s hands was the authoritative voice of the doctor that stated: “*you have the choice to have a baby or not; you are the one who has to decide.*” In these cases (as well as the examples to follow) the dream (the *unconscious* mind) appears to creatively develop and present a resolution scenario not previously considered or accepted by the waking ego.

Any of a number of REM active centers might support such a plan generation capability, based on choosing between conflicting perceptions and reward-based goals. In waking state studies, the anterior cingulate is known to play a problem-resolution role which includes: receiving a stimulus or imagining or observing an activity; selecting an appropriate response or resolution scenario; generating performance expectations; providing cues to other areas of the brain to choose between conflicting perceptions (Allman, et al., 2001); monitoring and observing the outcome and consequences (Apps 2012; Hayden 2009, Oliveira 2007); then mediating action and adapting behavior if the outcome is not as expected (Luu 2004). It does this in conjunction with the basal ganglia which is thought to be the brain locus for reward-based planning and learning (Yamada 2007) particularly decisions related to novel, unexpected situations (Balleine, 2007). The medial prefrontal cortex is also involved in: plan generation (Partiot, 1995); goal directed behavior and reward processing (Vertes, 2002); and self-referential behavioral stimulation and rehearsal (Partiot, et al., 1995; Gusnard, 2001). The caudal and ventromedial orbitofrontal cortex is found to be involved in novelty-related decision making, establishing expectation (Kringelbach and Rolls, 2005) and regulating planning behavior (Bechara, 1994) based on reward and punishment.

c) Testing, Monitoring, Influencing

Richard Coutts (2008) proposed that dreams improve our ability to meet waking needs by testing dream scenarios in a cognitive decision-making process, adopting or rejecting them depending on their outcome; those that appear adaptive are retained, while those that appear maladaptive are discarded. Levin (2009) further asserts that it is not until certain actions are taken and new information discovered (confirmed or disconfirmed) that the final phase of learning occurs in the form of adaptive adjustments in the self. Alfred Adler suggested that dreams use an “inner logic” driven by dream emotion that either reinforces or inhibits a contemplated action. Ecker referred to this as juxtaposing the new schema in opposition to the old belief, in a learning experience during the reconsolidation window. Feinstein & Krippner considered this a process of juxtaposing *myth* and *counter myth* aimed at either: sustaining the *existing myth*; strengthening (and maybe testing) the *counter-myth* or integrating conflicting myths into a higher order synthesis or *new myth* that brings about a new way of perceiving the situation. This is not unlike Jung who stated that the transcendent function holds the opposing (*conscious* vs. *unconscious*) material or views in interactive tension until the emergence of third integrated element or solution emerges resulting in a new attitude.

In the “*Father’s Face*” and “*Mother Pushing on my Stomach*” dreams the scenario testing does not proceed within the dream – rather the impactful message or insight appears to be left to the waking self to reflect on and incorporate (the dream-to-waking learning continuum). We can observe the testing process however within the “*Rusty Car*” dream as the shadowy companion urges the dream-self to “*wake the man*” and, after some resistance, the *dream-self* eventually “tests” the scenario by doing just that. In the “*Jokester*” dream (detailed below), after some resistance and argument the dreamer agrees to accept the jokester figure on a trial basis. In these three cases there appears to be the interactive tension (argument) taking place but an eventual emergence of an *conscious/unconscious* integrated solution (as Jung spoke of) or higher order synthesis of the *old-myth* and *counter-myth* that Feinstein & Krippner noted.

Scenario simulation, testing and monitoring might be supported by REM active centers in the brain that are known to monitor progress of a plan against expectation and guiding/changing behavior to influence the outcome. The anterior cingulate generates expectations, monitoring the consequences of an action by observing the outcome and selects an appropriate response by placing a reward value on anticipated outcomes. (Apps, et al., 2012; Carter, 1998; Hayden 2009; Bush, et al., 2002). The medial prefrontal cortex is thought to be involved in introspective self-referential behavioral stimulation and rehearsal (Gusnard, 2001). The Insula provides insight as well as emotionally influenced decision making scenarios that guide or bias behavior (Craig, 2009). The basal ganglia learn to select actions that maximize reward, but motivates us to seek eventual rather than immediate reward (Packard and Knowlton, 2002) and selecting which response to make or inhibit. (Lieberman, 2000). The medial pre-frontal cortex is thought to provide a ‘sense of knowing’ and retrospective confidence judgment (Marley, 2009) and as such may give the guiding forces observed in our dreams a sense of authority and wisdom.

d) Outcome Reinforcement

Finally, when the dream scenario has led to an expected outcome, the dream appears to emotionally reinforce either the scenario in progress or the outcome (particularly when the *dream ego* has accepted the guiding cues and followed the successful scenario). At that point, Carl Jung (1964) observed that when the intended *transcendence* from one state to another occurs, it is often accompanied by renewal or *rebirth* imagery accompanied by joy and often music and a heightened intensity of color and light.

This phenomenon might be a motivation for the *dream-ego* to accept and follow a particular dream scenario or perhaps an important part of storing a successful scenario into memory. It may be part of the emotionally directed learning process discussed above where emotion acts as a marker for which information is to be selectively processed and integrated into pre-existing memory networks. As Hartmann (2011) stated, emotions act to influence what we store in memory, adding a salience to a memory, thus prioritizing what is then consolidated into long term memory, “organizing memory based on what is emotionally important.” The intense emotional reinforcement at the successful conclusion could be the moment when that result is rewarded and stored, when the memory (old learning) is altered and re-consolidated with the new learning.

Emotional reinforcement is observed in the “*Rusty Car*” dream as the *dream-self* follows the proposed scenario and guidance of the shadowy companion and “*shakes the man*” the scene immediately and surprisingly changes to one of reward as “*the man comes alive and the car transforms into a new car.*”

Researchers Perogamvros and Schwartz (2012) in their paper “The roles of the reward system in sleep and dreaming,” present what they call their ‘Reward Activation Model’ (RAM) of sleep and dreams. They report that emotional reward circuits are activated during sleep, which prioritize the processing of information that has high emotional or motivational relevance, and which generates motivational content in the dream. They integrate neurophysiological, neuroimaging, and clinical findings that point to

significant activation of the mesolimbic dopaminergic (ML-DA) reward system during both NREM (N2) and REM sleep. In REM, theta activity and dopamine activity within the ventral tegmental area is elevated. This is significant because this is precisely what occurs in the waking brain when it is processing stimuli that is surprising or of special significance – a moment of learning.

A number of other REM active centers may be involved as well. The anterior cingulate is observed to select a scenario by placing a reward value on the anticipated outcome. The dorsal anterior cingulate also plays a role in reward-based decision-making and expectation and regulating planning behavior based on reward and punishment (Bush, 2002). The medial PFC and ventral medial orbitofrontal cortex are also involved in goal directed behaviors, reward processing, expectation, reward and punishment. (Kringelbach and Rolls, 2005; Phan, et al., 2002; Bechara, 1994).

5 Categories of Dream Function

A number of problem-resolution, mood control and learning functions of dreaming have been postulated, some supported by research studies and others proposed by psychologists and researchers to theoretically explain their observations. Here I have attempted to consolidate the many theories into five categories of “learning” for discussion purposes.

Learning Facts and Skills

As noted above, research has shown that in sleep and dreams two types of learning take place: **declarative** (learning facts and skills) and **procedural** (learning a more universal process for how to do something). Much of the declarative learning of facts and skills appears to take place in the NREM cycles of sleep while procedural learning or weaving the new facts and skills into existing memory to create or enhance a process. The *encounter* may deconsolidate and replay parts of the actual waking episode that is being rehearsed (the fact or skill being practiced) much like the replay in the neurons of the mice in McNamara’s research. A creative *scenario* may take place in the dream plot in the REM state as the recent facts are creatively woven into like past learning to update procedures with a focus on generalizing the learning in to a process that can be applied in future situations.

Creative Problem-Solving

As discussed in Section 2, there are a number of regions in the brain that are active in REM sleep, which might support a robust creative and analytical problem-solving capability: an “active imagining” as David Foulkes called it; or as Deirdre Barrett describes it (2001), “thinking in a different biochemical state.” She states that problems can get solved during dreaming, particularly if the problem involves visualization or “thinking outside the box.”

Although the creative and abstract nature of dreaming has been responsible for many creations in literature, music and all forms of art, some of that is the dreamer using inspiration and form of the imagery and experiences to inspire their creations in the waking state. A great deal of the creations and inventions, however, appear to be in response to an emotionally important unresolved problem (unfinished business) that the dreamer was working on prior to sleeping on it. *The Committee of Sleep* (Barrett, 2001) describes a multitude of these that not only changed the life of the dreamer but changed the lives of many by virtue of their creative invention.

Robert Stickgold (2009), who considers dreams to be the enablers of “the most sophisticated human cognitive functions,” contends that dreams seem to be more about what the brain calculates as most

important, even an unexpected but very emotional event that occurred shortly before you went to sleep. He states that dreams help us find new patterns and create combinations which break through well-worn ruts - dreams are where “we bring things together in fresh, often startling ways, drawing on stores of knowledge from the past, the present, the possible future, in order to find new associations.”

This ability to make creative new connections at a moment of surprise and insight, is illustrated in the dream of Elias Howe who was trying to solve the mechanics of the sewing machine needle. His *encounter* with the problem was pictured as being chased and threatened with spears. The solution was revealed in the image of the spears, which were shaped like sewing needles, but the hole in the pointed end.

The ability to creatively connect previously diverse perceptions was illustrated in the “*Father’s Face*” dream discussed earlier. Here the dream creatively “pictured” a connection between husband and father, revealed the source of conflict with her husband being the unresolved business with her father: “*I have a recurrent dream of being terribly angry with my husband, who I am always running away from. These dreams continued until one night I turned around and faced my husband and looked at his face... it was my father’s face!*” This moment of surprise led to new insight which reversed her previous misconception that it was all husband issues.

Psychological Restoration

Carl Jung stated that the general function of a dream is to “restore our psychological balance by producing dream material that re-establishes the psychic equilibrium” (Jung, 1964). He considered the totality of the human mind, the *psyche*, to be a self-regulating system, not unlike the body, one that self-heals or seeks to maintain a balance. Fritz Perls (1974) also understood dreams to be seeking integration, *wholeness* and closure (a “Gestalt”) stating dreams or dreamwork to be “the royal road to integration.” Restorative dreams can take on many forms depending on the nature of the situation but often introduce a *counterfactual* or *compensating* scenario to offset a misconception.

- ***Bringing Our Awareness Back to Reality:*** Jung stated that dreams act to restore balance by recognizing our *ego* misconceptions and *compensating* for deficiencies in our personality to bring our awareness back to reality - warning of the dangers of our present course. This scenario is illustrated in the following “*Evil Entity*” dream. The dreamer had a fundamentalist upbringing and a view of her natural instinctive urges as sinful (an evil entity within). She thus adopted an unhealthy practice of suppressing those thoughts by going through a prayer ritual every time she had one. In her dream she was trying to exorcise an evil entity by going through a ritual. But instead of the entity disappearing the sky became surprisingly darker and stormier the more she tried (the dream introduced a *counterfactual* or opposing view). Finally, when she would not stop, a loud voice jolted her awake as it boomed from above: “*Stop — you are only making it worse.*”
- ***Emotional Release and Mood Control*** The ability for dreams to restore our mental balance by calming our emotions was illustrated in the “*Willy Pissedoff*” dream above. Ernest Hartmann observed that in the case of trauma related nightmares, dreams also play a role in emotional dampening and release. “The process seems to consist of cross-connecting or interweaving—making connections with whatever related material is available in memory and imagination, guided by the dominant emotions of the dreamer, which gradually become less intense and change their character as the trauma is resolved or integrated” (Hartmann, 1996). This is illustrated in the following example of a series of nightmares which became more intense until they forced a healthy release of emotion, at which point the nightmare ceased. The dreamer had gone through the emotional trauma of her father’s death, and because her family was unable to cope with the tragedy, she found herself managing all of the funeral arrangements and matters associated with the estate. As a result she had not given herself a chance to grieve his death.

Then she began to have a series of “*Father’s Death*” dreams about his death that became nightmares. “*In my first dream I saw my father at a distance walking off into the mist. But then the dreams became nightmarish. In my next two dreams my father began to turn more and more into a skeleton and was beckoning to me from afar. In the fourth dream my father, now a skeleton, appeared at a birthday party for a little girl. He pulled at her and screamed at me, trying to take both of us. At that point I woke and cried for days. In the next dream that followed my father was no longer a skeleton but was as he was in life, very pleasant.*”

- **Maintenance of the Self** Jung (see Psychology of Dreaming sections) spoke of dreams as maintaining a sense of self – a sense of who we truly are not only as an *ego* personality but the totality of who we are and who we can become. Jung was not alone in this thinking. Michel Juvet (1998) indicated that dreams maintain a sense of self by “reprogramming cortical networks to maintain psychological individuality despite adverse waking experiences”. Ernest Hartmann (2011) stated that emotions guide the integration of new material into established memory to establish our “emotional being - our basic sense of self”. Such maintenance of the self or restoral imagery was illustrated in the dream of a woman in her 60s who began to see herself as old, unable to recover the abilities and talents that she once had and considering herself as “no longer the person she once was”. This “*Restoring Self*” dream appears to re-integrate the fragmented parts and re-establish a greater sense of the whole self: “*I entered a stone castle. As I went down the stairs, I saw on my left a large stone archway and a room beyond. On the left side of this room was a young woman. As the sunlight streamed in she came forward, and I saw that she was me. She walked toward me and we blended into one person.*”

Figure 5-3 The “Evil Entity” Dream



Adaptive Learning

Adaptive dreams are those with the aim of problem solving and, in the process, learning how to better deal with adverse life situations, physical and emotional threats as well as conflicted or impactful social situations.

There is a lot of support among researchers suggesting an adaptive function for dreams. Antti Revonsuo's *Threat Simulation Theory* (2000) states that dreams simulate threatening events and rehearse avoidance responses in the safe virtual environment of the dream – all to better prepare us for dealing with waking life. More recently Revonsuo, Jarno Tuominen, and Katja Valli (2016) have suggested dreams also simulate social situations. Fred Levin (2009) also considers dreams to be “adaptive learning engines” that help us identify unconscious threats and develop action plans to deal with them. Wamsley (2016) suggested that and dreams reorganize, interleave, and reintegrate fragments of the present event with past experiences and other content to create scenarios that prepare for the future. Stewart and Koulack (1993) suggested that dreams help us adapt to stressful waking events by activating habitual defense mechanisms matching the stress situation with earlier solutions to a similar problem, thus creating scenarios intended to integrate the two. Hartmann (2011) suggests that the emotion-guided making of new connections provides an adaptive function of weaving in or combining new material with what is already present in memory stores - emotion guiding both the dream imagery and the organization of memory based on what is important to us. Richard Coutts (2008) proposed that dreams improve our ability to meet waking needs by testing waking concerns in dream scenarios (a decision-making process), adapting or rejecting them depending on their outcome.

Adaptive learning dream might begin with an *encounter* that pictures the waking-life problem or threat, then *introduce a scenario* that provides alternative solutions in a dream plot, one that *compensates* or corrects for the viewpoint of the *ego* that no longer works. The scenario may then be *tested and mediated*, taking the dreamer through that scenario with the aim of demonstrating or experiencing a solution that better adapts to the waking life situation. Finally, the dream may *emotionally reinforce* a proposed scenario, the action of the *dream-self* or a successful outcome.

This process was illustrated in the “*Rusty Car*” dream where a waking life emotional problem and conflict was resolved with the introduction of a clear resolution scenario by a dream figure of *unconscious* origin who spoke to the *dream-self* with a statement that had a metaphorically clear relationship to both the dream story and the waking life story. The *dream-self* eventually accepted and acted on the guidance they were rewarded with a positive emotionally impactful ending.

This process of presenting and rewarding a scenario by illustration, without the actions of the *dream-self*, occurred in the following “*Clever Dog*” dream. The dreamer was dealing with a conflict involving male aggressiveness and how to act in a social environment in a way that would not always result in getting hurt and rejected. Whenever he was bullied his reaction was to “fight,” getting angry and attacking those who were teasing him which only brought on more teasing. He had a dream which demonstrated an alternative approach which he might use to adapt to the situation. “*Two unknown men were trying to convince us to let them kill a dog they considered aggressive and threatening [encounter]. The dog suddenly decided to roll over and play dead in order to spare its life [alternative scenario or counterfactual] At that point the dog turned into a cute puppy, and the men stopped, convinced that the dog was no longer a threat [testing the scenario]. The scene was suddenly illuminated by a street lamp overhead*” [reinforcement and learning (light at moment of connection)]. The adaptive resolution being to go along rather than reacting with a counter-attack (“roll over and play dead”).

Transformation

Transformative or *transcendent* dreams are also adaptive but tend to focus on a goal that goes beyond dealing with an immediate problem or threatening situation, to that of personality growth and evolution. Such dreams may take the form of a lengthy series of learning dreams over some period of time or even a lifetime. “a meandering pattern in dreams in which individual strands or tendencies become visible then vanish then return again” - a slow imperceptible process of psychic growth, as Marie-Louise von Franz put it (Jung, 1964). Jung called it a process of *individuation* in which gradually a wider and more mature

personality emerges. Sometimes, however, the learning culminates in a single life changing dream or “big dream”. The book *Dreams that Change Our Lives* (Hoss, Gongloff. 2017) contains roughly 100 dreams that the dreamers claimed changed their lives in a single dream. A few of those examples are included in the *prodromal* cancer dreams, the healing dreams, visionary dreams and precognitive dreams in the next section.

As will be discussed in more detail in the Psychology of Dreaming sections, Jung claimed that dreams contain a *transcendent function* that brings about a change from one state in the *psyche* to another, emerging as a new attitude and viewpoint. The *transcendent function* depends on a principle of *compensation*, the action of the *unconscious* to balance, *compensate* for, or complement the conflicted viewpoint of the *ego* – the jurisdiction of the opposing views resulting in an interactive tension out of which an eventual new attitude or mental state evolves which is a higher-level integration of the two.

These dreams tend to contain a great deal of what Jung called *archetypal* or primordial imagery emerging from the unconscious areas of the mind – basically organizing processes and forces with the aim of personality growth. As with other problem-solving dreams the *encounter* may picture our conflicted waking-life situation but with a focus on a core conflict (also known as *Shadow* material), a completely defeated ego, trauma or dysfunctional belief that has gone unresolved most of your life. The *scenario introduction* would attempt to correct the dysfunctional view by *introducing a scenario* (dream plot) that would not only address the immediate conflict but also the deeper imbalance or condition within the *unconscious* or *psyche*. The *testing and mediation* would be focused on *integrating conscious* and *unconscious* material. The imagery might contain a strong presence of guiding *archetypal* figures and patterns of integration, *wholeness*, *individuation* and *transcendence* (see Psychology of Dreaming sections). If successful the *reinforcement* imagery can be dramatically beautiful, colorful and bright, often nature imagery suggesting growth, renewal and *rebirth* and a sense of closure.

Whereas the “*Rusty Car*” dream focused on how best to resolve an immediate conflict, it was in some sense also a *transcendent* dream in that it addressed a core long standing issues related to how the dreamer viewed himself, his age and his perceived loss of talent. The plot took him from a person who had given up on himself and literally “transformed” him – his motivation and view of what he can do and how he can get there. This illustrates that in some ways most every dream that restores or solves a problem in some way transforms the dreamer, promotes mental growth, even if in just a small way.

Another dramatic transformation can be observed in the following “*Crushed*” dream (Hoss & Gongloff ed, 2017). The young woman had just been fired from a job that was important to her career. This was the second time in a row. A once proud person, she now felt completely deflated, “I have no future, it is all over for good.” At that point she dreamed: “*A building falls on me and I am crushed under the rubble. All goes dark, and I stop breathing. I know I am dead, and it is all over, there is no future. Then I become another person in the dream who is strong and determined and digs my body out of the rubble. Suddenly, I come back to life and realize that I can go on.*” After the dream she realized the strength she had within her and started her own company and today runs two. Whereas this was to a degree a restorative dream, in that it restored her sense of self, as well as an adaptive dream which illustrated a resolution to her immediate problem, it was *transcendent* as well in that her inner model of self was transformed into something new and stronger than before

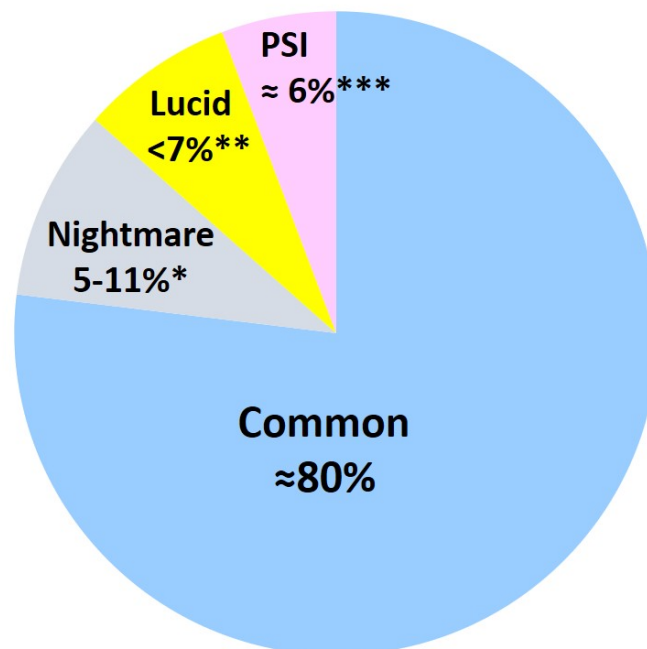
SECTION 4 – DREAM CONTENT WHAT DO WE DREAM ABOUT?

Trust the dreams for in them is hidden the gate to eternity – Kahlil Gibran

Some dreams stories have wonderfully coherent story lines, and others provide just a glimpse of an image or short disjointed events. At times when we are ill, injured, or on medication our dreams seem to become uncomfortable and bizarre. Some report “visionary” or impactful dreams that changed their lives, or the foretelling of events in the future or at a distant place. At time we may “wake within a dream” – knowing we are dreaming and consciously interact with the dream or dream characters. With these endless differences, what can dreams really mean? Is there a common purpose to dreaming?

In this section, I will discuss the multiplicity of dreams in terms of the nature and possible origins of the content. Dreams can take on many forms, as the dreaming brain seems to be open to stimulus from various levels of the human existence and consciousness. Figure 4-1 illustrates the rough approximation of the percentage of four types of dream experiences if we look across a large sampling of dreams reported by the general population.

Figure 4-1 The Multiplicity of Dreams



Levin '07; Van de Castle '94; ** Levitan '92; * Krippner '02*

The “Common” Dream

Below is a set of dream characteristics, based primarily on a compiled list by Hobson (2003) which researchers more consistently attribute to the experience of what might be consider “dreaming,” with data added regarding the content from various sources as noted and many that can be readily found in *Dreaming: Understanding the Biology, Psychology and Culture* (Hoss, Valli, Gongloff, 2019).

1. Dreams mainly involve visual, communication and motion perceptions (McCarley & Hoffman, 1981; Snyder, 1970; Strauch & Meier, 1996):
 - Visual = 85 to 100%; Color = 80 to 97%
 - Auditory - communicating (as opposed to music/sounds) = 53 to 76%
 - Movement = 8 to 75%
 - Tactile = 1 to 26%; Thermal \approx 4%
 - Smell, Taste, Pain < 1 to 7%
2. Dream images can change rapidly (particularly numbers and words).
3. Dreams can be bizarre at times but for the most part contain images and events that are relatively commonplace. In laboratory collected dreams bizarre dreams are very rare (2 to 9%) (Dorus et al., 1971; Snyder, 1970) while 65 to 72% portray highly credible events, such as everyday life or leisure time situations (Schredl, 2010a; Snyder, 1970; Strauch & Meier, 1996). REM dreams are found to be more bizarre than NREM by 70% to 20% (Hobson in Krippner, 2002)
4. We believe that we are awake in our dreams.
5. Over 90% include the *dream-self* (you in the dream) the dream being experienced from a embodied first person perspective.
6. Self-reflection involving logical organization, logical event transitions, familiarity of location is infrequent or involves irrational explanations of the events and plots – which appear normal to the dreamer. Some aspects of high-order cognition and self-reflection is present as the dream self may be aware of their own feelings in the dream as well as thoughts and intentions of dream figures in the dream (Kahn et al., 2002).
7. Dreams lack orientation stability. Persons, times and places are fused, plastic, incongruous and discontinuous.
8. Story lines integrate all the dream *elements* into a single confabulatory.
9. Dreams contain increased, intensified emotion, especially fear-anxiety that can integrate bizarre dream features and shape the dream story.
10. There is a tendency toward more negative emotion in dreams. Dominant emotions (35%) in the dreams include apprehension (anger, fear, distress and anxiety, sadness), followed by happiness and confusion (Hall and Van De Castle, 1966).
11. There is an increased incorporation of instinctive emotions (especially fight- flight), which also may act as powerful organizers of dream cognition.
12. Dreams are concerned more with emotionally prominent content or impact of an event than the actual event. Depending on the study, fragments of daily events have been found to occur in 35 to 65% of dreams but a replay of the event in only 1.4%. (Fosse et al., 2003; Nielsen & Stenstrom, 2005)
13. Control by the will of the dreamer is greatly reduced (with possible the exception of lucid dreaming). A dreamer rarely considers the possibility of actually controlling the flow of dream events, and on those infrequent occasions when this does occur (lucidity), the control may be only for a few seconds.
14. Self-control of thoughts, feelings and behavior is fairly common.

Dream Content

Calvin Hall and Robert Van de Castle (1966) established a set of dream content norms based on 1000 dreams (half men, half women) and published the book *The Content Analysis of Dreams*. For the first time, there was a comprehensive standardized system of classifying and scoring the content of dream reports. With this new tool, a true measure of cultural, gender and other differences in the nature of dreams and dreamers could be achieved. Aside from aging, which will be covered in the following section, some of the findings were:

- **Gender:** It was found that women dream equally of men and women, but 67% of the dream figures in men's dreams are other men (Hall, 1984) and the gender difference in favor of male dream figures appeared in almost every culture. For both men and women across cultures, dreams usually contain more aggression than friendliness, more misfortune than good fortune and more negative than positive emotions. Men have a higher degree of aggression in dreams than women (Domhoff, 2003). Physical aggression was found to be more often present in dreams of males than females, but no major differences in non-physical aggression, such as verbal or covert aggression. Dreams with sexual interaction were not that common, although more often reported by males (12%) than by females (4%).
- **Wake to Dreaming Continuity:** Studies of dream journals reveal continuity between the emotional preoccupations of the dreamers and their waking thoughts (Domhoff, 2003). The dreams of older dreamers did not differ much from college students with the exception of a decline in physical aggression and negative emotions, nor does dream content change much according to long-term journaling studies.
- **Social Interaction:** Friendly interactions can be found in 40% of the dreams, and aggressive interactions in about 46% of the dreams. These were likely REM based dreams - note that for NREM dreams McNamara found aggression by the dreamer to be absent. When social interaction takes place, there is almost always verbal communication or conversation between the *dream-self* and the other dream figures, which tends to be focused on concrete topics (Strauch & Meier, 1996) much as in waking life.
- **Misfortunes:** occur in approximately in 35% of all dreams and are seven times more frequent than the opposite type of events, good fortunes (5%). Approximately two thirds of all dreams contain one or more events that threaten the well-being of the *dream-self* or his or her significant others. The most common types of threatening events include aggression, failures and accidents.
- **Emotion:** In the Hall and Van de Castle studies (1966) the most frequently expressed emotion for both men and women was apprehension (35%), followed by happiness and confusion (about 20% each). Apprehension covers many negative emotions, the most common being anger, fear, distress and anxiety and sadness. In one Hall study, while external judges (relying on explicitly expressed emotions in the narrative) rated dreams more negatively (64% negative), the dreamers themselves rated the emotion in their dreams more pleasant (41%) than unpleasant (25%). Dream emotion is often not appropriate to the activity. In a study by Foulkes et al. (1988), 60% of the dream emotions were judged appropriate to the dream activity, but 17% of the dreams had no emotion when some emotion would have been expected and 3.2% of the dreams contained emotion when none would have been expected.

“Universal” vs. Memorable Dreams

“What does it mean to dream of your teeth falling out?” This along with being naked in public, chased, lost, forgetting or being late for something, flying or falling and such, have been popularly called “universal” or “typical” dreams. The term “typical dreams” was actually coined by Freud who thought they were dreamed by and had the same meaning for most everyone. The problem is that the terms “universal” or “typical” can imply that we dream of these themes most of the time or at least more than other themes and imagery.

The confounding issue is that most “universal” dream reports either come from after-the-fact surveys (web based for example) or structured research surveys where either the respondents or subjects (usually students) are asked whether they ever dreamed about one of the themes on a long but limited list of dream themes. “Yes I have dreamed that!” is an affirmative answer even though the person may have recalled that theme occurring only once in their whole life. Long term memory can be a major factor that impacts such surveys. Studies of large databases of actual dream reports reveal a different story.

“Universal” versus Frequent

An example of a well-structured research survey is the Typical Dream Questionnaire (TDQ) developed by Antonio Zadra and Tore Nielsen (1997) in which the subjects are asked if they have ever dreamed of any of 55 listed themes. The top 5 responses in their Canadian student study were: chased/pursuit 81.5%; sexual experiences 76.5%; falling 73.8%; school themes 67.1%; arriving too late 59.5%. The same test was administered by other researchers in Germany, China and Jordan. Across all four countries, the following themes appear in at least once in the Top 5 in every list: falling, school themes, failing an exam, arriving late, and being chased.

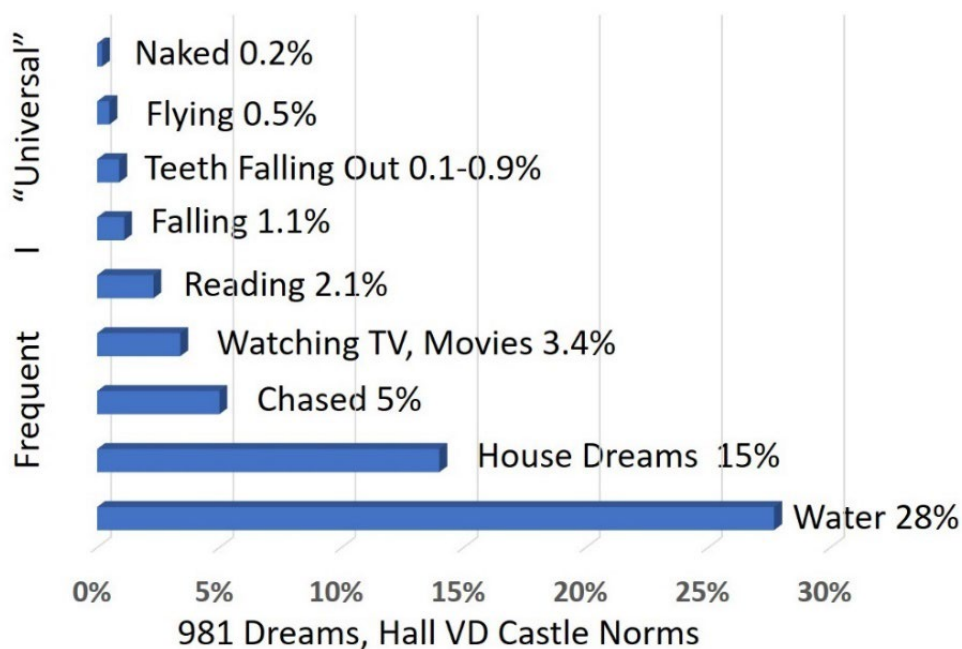
These might therefore be considered top “universal” or “typical” dreams – however if we were to look at how frequently they appear in dreams, themes such as falling and arriving too late appear in only about 1% or less in actual dream reports. The often-discussed theme of “teeth falling out” which in these studies 18% to nearly 50% of subjects reported as having dreamed of at least once (depending on the study), these themes or images appeared 0% to only 0.6% of the time in actual dream reports (when large databases of dream reports were researched). Even the most commonly recalled (80% to 90%) theme of being chased or pursued appears in only about 5% of dreams.

Figure 4-5 illustrates some of top or more commonly discussed “universal” dream themes and a percentage that they appear in a database of 881 dream reports from which the Hall/Van De Castle norms were developed. Note that aside from being chased, the more mundane themes such as water, house dreams, watching TV and reading were much higher in frequency in actual dream reports than the ones popularly considered “universal” dreams.

Memorable as opposed to “Universal”

So, what is going on? Part of the problem is the nature or structure of surveys. If subjects are asked if they recall having dreamed of one of the items on a list of themes: a) they may have only dreamed it once in their life; b) long term memory acts as a filter and; c) the list of themes in the surveys may have not taken into account the most frequently dreamed themes – how often those themes actually appear in dreams. For example, if a survey does not include house dreams or water dreams (which represent a higher frequency of occurrence than most “universal” themes) then the survey is skewed toward such infrequent occurrences as teeth falling out.

Figure 4-5 “Universal” versus Frequent Dreams



The likely reason why the “universal” dream themes have come to be popularized, and likely why they appear on survey lists, is that they are the more emotionally memorable repetitive themes. Water, houses, watching TV and reading – are fairly mundane daily event and not necessarily notable nor memorable, whereas falling, flying, and yes teeth falling out are anomalies (something that doesn’t happen to us often or at all in waking life) and are also highly emotionally charged – thus noticed, recalled and remembered. They are odd or bizarre because they are all *picture-metaphors*, masking the latent content they represent, but the emotional impact and novelty renders them highly memorable. The actual meaning is totally personal but flying for example may be a commonly pictured metaphor for a feeling of freedom and falling a commonly pictured metaphor for being pulled down to reality by some problem in your life.

Metaphors of Life’s Transitions

What we refer to as “universal” themes may simply be a convenient way our minds picture the emotions associated with frequent waking life emotional experiences. Perhaps the “universality” of such themes is that they do appear in much the same form or metaphoric representations when certain common human conditions or life transitions occur. The section on Dreaming as We Age, later in this section, provides a listing of some common themes that occur during life’s transition, briefly summarized from an article by Alan Siegel (in Hoss, Valli, Gongloff, 2019). These common metaphors are what some might refer to as “universal” themes as we experience transitions such as: childhood, adolescence, marital relations, pregnancy, midlife, approaching death and grieving the loss of a loved one.

Effect of Physical Impairment

Are persons who are visually or physically impaired in waking life also impaired in their dreams? The answer is not always and it depends on when they acquired the disability and how the sensory activity is defined and perceived in the dream state.

A number of studies (ex: Hurovitz et al., 1999) on the dreams of people who are blind or sight-impaired concluded that those who are “congenitally blind” (blind from birth and have never experienced eyesight) have no actual visual imagery in their dreams. Also, those who were able to see at birth but due to injury or disease lost their vision early in life (typically before the age of 5), their dreams were considered to have no actual visual imagery either. But for people who lost their sight after the ages of five to seven, they retain the capacity for visual imagery in their dreams throughout adulthood. Foulkes (1999) suggested that this may be because the mental imagery necessary for dreaming develops between the ages of four and seven.

Other studies on congenitally blind people, however, report they are able to “see” in their dreams or to form what they report as visual imagery. In a laboratory study of 10 blind students (Kerr et al., 1982), the two subjects had been congenitally blind were able to report spatial relationships in their dreams even though there was no visual imagery or other sensory content. Another study (Meaidi, 2014) on both congenitally blind subjects and subjects who became blind later in life, found that all reported visual “impressions” in their dreams – but fewer visual “impressions” than did a control group of persons who had always been able to see. Some of the discrepancy in results between studies can be due to the terminology or what is reported as a visual “impression” or an actual visual image. Although on the other hand activity in the visual cortex is not restricted to visual processing (Kennedy, 1997) – the reports of spatial imagery may also be related to processing and integration of other senses within the occipital-parietal and temporal regions that create the spatial or “visual” dream scene.

The dreams of blind or sight-impaired people have been found to include higher frequencies of other sensory modes—hearing, touch, taste, and smell—compared to the dreams of those with sight. A study by Staunton and O’Rourke (2012) of congenitally blind persons, their dreams had physical settings and a desire to engage with the physical world, but hearing was the dominant mode of perception followed by body sensation, that the smell, pain and temperature. In the Hurovitz study the congenitally blind that had no visual imagery reported a high percentage of gustatory, olfactory, and tactual sensory experiences. In the Meaidi study, those blinded later in life, reported an increase in tactile impressions, although their visual imagery did not appear to be affected. Other than sensory mode, the dreams of the blind appear similar to those of sighted persons as found in the Kerr and Meaidi studies where emotional and thematic content, composition and organization of the dreams were the same as sighted persons.

It has been observed that in dreamers with other disabilities, as one capability decreases the other modes tend to increase in their dreams. Studies have found that their dreams transcend the person’s disabilities, they dream they are not disabled - the deaf can hear, the paralyzed can walk and run. In a study of paraplegics (Saurat et al., 2011), the patients were rarely that way in their dreams – they reported the experience of walking in their dreams as often as the non-disabled control group. Even in those congenitally paraplegic dreamed of ambulatory experiences such as standing, walking, running, dancing, and other such activities.

These observations might suggest that there are certain instinctive or genetic neural subroutines for these basic activities, or alternatively the dreamed actions are simulations developed from observing them in waking life (mirror neurons activating during dreaming). For example, Allan Hobson’s proto-consciousness hypothesis (2009) suggests that dream sleep providing a virtual model of the world in which content is synthesized and not merely reproduced. He states that dreaming is not entirely derived from waking experience but that it may tap into the genetically encoded hard-wired experiences in our brains, for such universal features of dreams such as seeing, moving, and feeling, which have little to do with the replay of waking experience.

Further information can be found in *Dreams: Understanding Biology, Psychology and Culture*, Bulkeley & Hoss chapter 6. (Hoss, Valli, Gongloff, 2019)..

Dreaming as We Age

Recall

Interestingly, even though children exhibit more REM sleep than adults, the dream recall in children is lower than in adults. David Foulkes (1982) noted that recall was poor (25%) between the ages of 3 to 5 but increased between 7 and 9, and a gradual increase from 9 to 11 that reflected their developmental maturity and progress. Between 11 and 13, it began to resemble that of adults in the laboratory (80% to 95% from REM sleep and 40% to 60% in NREM sleep), which is found to be delayed in boys, but for girls it is already high at ages 9-11. Recall peaks in early adulthood in the range of 91% for women and 87% for men but tend to decrease from adulthood to old age (perhaps due to reduced REM sleep) remaining better for women than men across all ages.

Children's Dreams

Dream content matures with age, up until 13 to 15 years. Early dreams (ages under 5) appear to be primarily bland with static images and thoughts about daily events – the exception being nightmares. Foulkes, who did pioneering research on children's dreams, was of the opinion (based on his lab studies) that dreaming cannot occur before the age of three, as the child has not yet attained the cognitive maturity prerequisite to dreaming – this being somewhat contradicted by home or preschool settings where children as young as two-years-old reported dreams. At 3 years of age he found the dreams to contain less than fifteen words and devoid of a story like structure. In studies by Foulkes and others, between the ages of 5 to 8 dreams appear to become more story-like with movement and interaction but are not well developed. The dreamer only appears as an active participant at around 8 years. The structure of children's dreams doesn't become adult-like until about 9 to 11 years of age and the dreams are noted to have less aggression, misfortune and negative emotions than adult dreams. The length or content doesn't become adult-like until the pre-teens (about 11 to 13), nor does the dream content show a good correlation to their personality until about this time.

Foulkes noted that recall was poor between the ages of 3 and 5 (25% report rate) but increased between ages 7 and 9; although other studies of home reported dreams demonstrate up to 65 percent of morning recall in the 4 to 10-year-olds. Between 9 to 13 recall begins to resemble that of adults.

Visual imagination may develop gradually and be a necessary prerequisite for dreaming. Young children don't dream well until their visuospatial skills are developed. The part of the brain responsible for visuospatial skills and constructing the dream space (the inferior parietal lobe) is not functionally complete until about ages 5 to 7.

Regarding nightmares; in pre-school infants and children, they often report monsters and being chased, bitten and eaten. This may be a reflection of waking life anxieties, sense of vulnerability, or even instinctive urges which arise naturally but are frightening or for which the child gets punished for acting on. Among preschool children the presence of nightmares and fears can be as much as 74% (Colace, 2010). Nightmares are found to be a normal occurrence between the ages of 6 and 10 after which they generally decrease and mostly disappear. I had such a dream when I was 6 years old: *"I had a recurrent dream that I had to sleep in the basement and I knew there was a monster just around the corner that was going to get me at any moment if I made the slightest sound. One night when it recurred, I just couldn't stand the suspense anymore, so I shouted out to simply get it over with. At that moment, the monster exploded out of where it*

was hiding and in a surge of emotion I woke up.” After that the dream never returned.

Patricia Garfield in her book *Your Child's Dreams* (1984) collected 247 dreams from schoolchildren in the US and a few in India. She found that 64% were considered “bad” dreams and the remaining “good” dreams. Of the bad dreams, almost half had a theme of being chased or attacked, and in the remaining dreams about 40% had a sense of danger or some character being injured or killed, even though there was no direct threat. Of the “good” dreams, about half of the themes fell into two categories. The most frequent category was just “having a good time,” and the next was of the child receiving a gift or having some desired possessions.

Alan Siegel, another researcher in the forefront of children’s dreams, speaks of the content and evolution of children’s dreams in his book *Dream Wisdom* (2003) and the book *Dreamcatching* (1998) which he co-authored with Kelly Bulkeley. He indicates that dreaming begins in the womb and that up to 80% of sleep in premature infants is devoted to REM sleep. He discusses how dream content changes as children grow and experience transitions, from first dreams, through coming of age dreams, to leaving home dreams. Siegel speaks of the appearance of two imposing figures as representing the child’s image of the power of their own parents. One of the first dreams recalled by one of my own daughters was, “*two giant hands reaching for me*”.

In *Dreamcatching* (1998) Siegel and Bulkeley list the most frequent types of dreams among children of all ages as: being threatened by animals or insects; being chased by monsters; flying; falling; being paralyzed or trapped; appearing naked in public; and being tested or examined. He indicates that for toddlers and preschoolers, the most common dream characters are animals. Van de Castle (1994) also found this to be true, with almost 40% of young children’s dreams at ages 4 to 5 containing animals, a percentage which dropped to less than 14% by the time they were teenagers. Like Garfield, he states that being chased or threatened in dreams, and nightmares with threatening creatures, appear to be the most common negative themes in children’s dreams. This indicates that they symbolize a wide variety of early childhood fears and insecurities.

Another of my most frequent recurring childhood dreams was the theme of being paralyzed or trapped, trying to run but being unable to. I had one such dream at age 7 (in Siegel’s *Dreamcatching*): “*I dreamed I was outdoors watching the sky darken as if a tremendous storm was coming. I tried to run but could hardly move, as if my legs were made of lead. As the dreams recurred, they became more lucid and would go from my trying to run away from the storm to where I began to stare at the sky as the storm began to take on beautiful patterns and colors. I continued to have this or like tornado dreams but my fear of the storm had now turned into fascination and I looked forward to the excitement of tornado dreams.*” Interestingly, these delightful and colorful dreams, and my realization that I was able to control my dreams, was a major factor in my ongoing interest in dreams and, as Alan Siegel suggested in *Dreamcatching*, a stimulus for my later interest in researching color in dreams.

Perhaps there is a learning process going on in such childhood dreams. My ability to take some control over and de-fuse the situations in my recurrent and somewhat lucid dreams spilled over into my waking life, and gave me a sense of empowerment, even in the sometimes dis-empowering environment of childhood.

Adolescence to Old Age

Art Funkhouser (1999) indicates that dreaming continues as people age, but the themes they dream about change, as do their daily concerns. It seems there are fewer nightmares, less frequent aggressive dreams, shorter average length of dreams and less frequent dream recall. As we age, the content may eventually evolve into concerns about death. Research on this subject can be found in a book by Mary-Louise von Franz (1998) and the tendencies for dreams to reflect changing waking-life concerns throughout the life cycle can be found later in this section. For a more in-depth discussion refer to Lortie-Lussier, Dale and De Konink in *Dreams: Understanding Biology, Psychology and Culture* (Hoss, Valli, Gongloff, 2019).

Allyson Dale at the University of Ottawa performed a study in 2005 (Dale et al., 2017; Dale in Hoss, Valli, Gongloff, 2019) on dreams spanning adolescence to old age from 375 women and 231 men grouped in five age groups; adolescence (12 to 17 years; 18 to 24 years); early adulthood (25 to 40 years); middle adulthood (41 to 64 years); and late adulthood (65 to 85 years). A brief summary of the results:

- ***Dream figures (characters):*** While the number of dream figures in the dreams remained constant across all age groups the nature of those dream figures changed. Friends (peers) were the main dream figures in the adolescents' dreams, along with popular public personalities. The number of familiar and female dream figures decreases slightly across age groups in adolescent women but increased in the dreams of old men after having been at their lowest in earlier and middle adulthood.
- ***Aggression and Friendly Interactions:*** For both genders, activity and overall aggression (either initiated by targeting the dreamer) decreased from adolescence to old age. Verbal aggression was the dominant form in women's dreams and physical aggression in men's dreams. The dream-self was more often victim in adolescents, but then from adulthood on the dream-self increasingly became the aggressor and less the victim. Friendly interactions steadily decreased from adolescence to old age in women's dreams while they gradually increased from early adulthood on in men's dreams to peak in old age.
- ***Sexual Interactions:*** did not change in frequency with age and is low in all age groups.
- ***Emotions:*** For women positive emotions were highest in adolescence, decreasing sharply in early adulthood, then more gradually, until increasing in old age; while negative emotions are low in adolescence, surge in early adulthood, then decrease until old age when positive emotions prevail. In males frequency of emotions is lowest in adolescence and slowly increasing to highest in old age - negative emotions peaking in adolescence and middle adulthood and lowest is in early adulthood and old age.

Dream Themes Reflect Life's Transitions

As we age we all tend to experience fairly common transitions in life: birth, adolescence, marriage, perhaps divorce, pregnancy, retirement, concerns about dying or grieving one who passed. The content of our dreams metaphorically reflects those transitions, picturing the impact and emotions associated with each one. The commonality of those experiences might appear as somewhat common memorable themes in our dreams. For example, here is a snapshot of a few of the themes reported by Alan Siegel (in Hoss, Valli, Gongloff., 2019) during life's transitions:

- **Early Childhood** – a time of feeling vulnerable, insecure and fearing the unknown: animal dreams, victimized/chased/threatened often by monsters and large figures.
- **Later Childhood** – as the child becomes more self-aware, builds social relationship and more empowered: dreamer and others appear more often, social interaction, attempting to cope.
- **Adult Marriage and Relationships** – excitement and fear of commitment or rejection, apprehension and performance anxiety: spouse or partner has an unappealing appearance or behavior; affairs with former lovers/partners (excitement or guilt); mishaps at wedding.

- Pregnancy – fears about outcome or responsibilities or fantasies, expectations, and excitement about the baby, parenting and relationship: animal birth; womb-like imagery; forgetting the baby; deformed or endangered baby; child with special powers; name and gender dreams.
- Midlife - loss of youth and identity or more positively finding new identity and renewed hope: death, destruction, illness, buildings crumbling - or - new growth and rebirth themes.
- Approaching Death – time running out, imminence, life and relationship review: clock themes, after-life visions, crossing thresholds, darkness, loneliness – or – light, liberation, spiritual themes.
- Grief - denial, anger, struggling through ambivalence or acceptance: Visitation and encounter with deceased (upsetting or with words of comfort); desperately searching (common in unresolved relationships); spiritual beings and settings.

Dreams that Focus on Mental Well-Being

Carl Jung stated that the general function of dreams is to restore our psychological balance by producing dream material that re-establishes...the “psychic” equilibrium (Jung, 1964). The last section listed the some of the theories on the function of dreaming – the predominant ones relating to mental functioning and mental well-being, adapting mentally emotionally and socially to our environment and personal growth: **restorative** dreams, **adaptive** dreams and **transformative** dreams. Such processes as emotional and memory processing and mood control exist as part of these theoretical functions.

Dreams that focus on mental well-being often begin with, or are placed in a setting that, metaphorically represents the waking life issue and the *unfinished business* or unresolved emotional conflict involved. But these are pictured as an analogy rather than a replay as illustrated in the following dream of a woman who had considered herself totally in control of her life, and able to handle anything that came along. Suddenly she found herself dealing with the death of her husband and feeling powerless to do anything about it: “*I dreamed about being locked in a car with no steering wheel and no door handles or window controls. It was rolling backward down a steep hill, and there was no way of stopping it, or getting out of it. I woke up in a panic.*”

Dreams surface and picture subliminal information that might be important but went unnoticed or remained unfinished in your day’s activity. The following dream is a simple illustration of how they can picture that *unfinished business*. Ann Faraday (1974) recalls how she dreamed of her pet bird that “*hit her with a brown derby hat he was wearing.*” When reflecting on the metaphor, she realized she had not fed her pet bird (the “brown derby” image related to a restaurant of the same name).

Beyond simply surfacing the problem, dreams that are focused on mental well-being and growth introduce a problem-solving story line aimed at either restoring balance, adapting to a waking life situation or evolving the personality. The following is an example of a dream (I will call the “*Jokester*” dream) that appears to include a bit of all three: “*I dreamed I was bothered by a young jokester character. I tried to make him to go away, when an influential Shadowy character entered from my left and argued that this jokester had been quite useful and that we should give him a chance. After some discussion I agreed, but just for a while. At that point he walked off to the right down a sunlit path.*” The dreamer related this to a situation the day before where he was uncharacteristically making a joke of a bad situation. At first he was embarrassed, worrying that he may have caused hurt feelings or made a joke at their expense. But surprisingly his friends liked it and laughed. This new side of self that emerged and was reinforced in the waking life situation appeared to be the jokester fragment of himself that emerged and was being reinforced and tentatively accepted in the dream.

Creative Dreaming

Sometimes, the *unfinished business* can be unresolved problems or something you are trying to create that is unrelated to mental well-being. Often the dream story itself is so creative that it stimulates an author, artist or inventor to undertake a creative venture.

Deirdre Barrett, in her book *The Committee of Sleep* (2001), opens with the quote, "It is a common experience that a problem difficult at night is resolved in the morning after the committee of sleep has worked on it." [John Steinbeck]. Deirdre offers a rich collection of examples, a few of which follow, that show how some of the world's most creative people have used the revelations of their dream life to inform their work.

There are many stories about the role that dreams have played in some of our greatest inventions. For example, there is a story told about how Elias Howe, the inventor of the sewing machine, had been struggling with how to mechanically move a sewing needle and thread through cloth and make a stitch. In a dream, spear throwers were chasing him, and he saw the shape of the spears as that of a sewing needle. But the hole was at the sharp lower end of the needle instead of at the blunt upper end as with a hand-held needle. In this dream image he found the solution.

In the visual arts, for example, Jasper Johns couldn't find his unique artistic vision until he dreamed it in the form of a large American flag. Salvador Dali, and his colleagues, built surrealism out of dreams. Today, Lucy Davis, chief architect at a major firm, dreams her extraordinary designs into life. In the film world, director Ingmar Bergman confides, "Twice I have transferred dreams to film exactly as I had dreamed them." Other filmmakers who have alluded to the use of their dreams in their work include: Federico Fellini, Orson Welles, Akira Kurosawa, Robert Altman, and John Sayles. Mary Shelley's terrible nightmare became Frankenstein. Stephen King's haunting dream as a little boy led to his first bestseller. Musicians such as Beethoven, Billy Joel and Paul McCartney have used the music from their dreams in their work. In science, Otto Loewi worked with his dreams on the medical experiment that earned him the Nobel Prize.

Nightmares

Nightmares can be distinguished from "normal" dreams by their overwhelming anxiety, apprehension or fear. Nightmares are differentiated from disturbing or bad dreams by intensity and that the emotional surge wakes the dreamer. According to the APA Diagnostic and Statistical Manual of Mental Disorders, or DSM-5 (APA, 2013), nightmares are defined as extremely dysphoric dreams that typically involve threats to an individual's survival or someone's emotional or physical sense of safety which also cause significant distress after awakening (called *nightmare related distress*). The formal diagnostic criteria for nightmare disorder, the term *chronic nightmares* is typically used when nightmares persist for at least six months with a frequency of one or more nightmares per week.

All "bad dreams" are not considered nightmares. To that end Ross Levin and Tore Nielsen (2007) defined a *disturbed dreaming continuum* and in their studies found 76.7% to be what we might call normal or common dreams, 17.6% bad or disturbing dreams and 5.7% actual nightmares. Other studies indicate pretty much the same, approximately 5 to 11 percent of the general population reporting problems with nightmares; a study by Bixler for example surveyed 1,006 households found 11 percent to report being troubled by nightmares (in Van de Castle, 1994).

Some consider nightmares as a failure of the dream to accommodate the emotional situation or "emotional surge". Ernest Hartmann, author of *The Nightmare* (1984) and *Dreams and Nightmares* (1998) considers

the nightmare not to be a failed or aberrant dream, but rather “one of the most important kinds of dream, and the one in which we can most easily observe a process which probably occurs in all dreams ... in this sense the nightmare is the most useful of dreams.” Hartmann considered the nightmare to have a possible function, making new connections which diminish the emotional disturbance or arousal. “The process seems to consist of cross-connecting or interweaving—making connections with whatever related material is available in memory and imagination, guided by the dominant emotions of the dreamer, which gradually become less intense and change their character as the trauma is resolved or integrated” (Hartmann, 1996). Over time the traumatic material is connected with other parts of the memory systems so that it is no longer so unique or extreme—the idea being that the next time something similar or vaguely similar occurs, the connections will already be present, and the event will not be quite so traumatic.

He saw recurrent dreams, which are often frightening, to be about a recurrent theme and almost never precisely repetitive dreams. The general theme may be the same, but they usually reflect changes in the dreamer’s life and emotional state. In his research and clinical work he determined that even in post-traumatic stress disorder (PTSD), repetitive dreams upon examination turn out to be creations, not simple replays of waking events; There is generally at least one important change as the mind attempts to gain mastery over the situation.

Hartmann states that the dream image, especially the Central or Contextualizing Image (CI), pictures the emotion of the dreamer and that the intensity of the central image is a measure of the strength of the emotion. This might be seen in nightmares when there is a single powerful emotion such as in a tidal wave dream following a traumatic event. Although negative content and emotion appear frequently in most dreams, we do not usually report the dream as a nightmare unless it is extremely upsetting.

Nightmares can fall into various classes regarding their cause, including: a) heavy emotional stress; b) severe threat to the self-image; c) the result of trauma and PTSD; d) long-term nightmare sufferers; e) medical problems requiring attention or f) the influence of drugs or medications. In essence they are created by extreme stress of one or another to the system. Nightmares are different from night terrors, which may be accompanied by screaming before awakening with extended disorientation afterwards (Van de Castle, 1994). Night terrors generally occur (if at all) during the first few hours of sleep in NREM or deep sleep and the dream itself is generally not recalled.

Stress and Threat Related Nightmares

Although research has shown that personality factors such as thin boundaries are related to nightmare frequency, Schredl (2003) found that there is a greater relationship with current daily stress factors than with personality factors. Daily stress often translates internally to a threat to one’s internal image of self. Job disputes, marriage disputes, arguments with friends and associates, etc. are all stress factors that can cause nightmares. But the more significant factor is that these types of situations threaten our sense of who we are. As we will see in later, this threat to self-image may be the stimulus behind a high percentage of our dreams. As the threat grows to the point where the inner model of self and reality can no longer accommodate it, a nightmare may result.

The most common theme in children’s nightmares is that of being chased by monsters or animals later in life, the pursuer becoming more like unidentified frightening characters. Carl Jung (1964, 1971) attributes many of the dark, unidentified figures, the monsters in our dreams, to material coming from the *unconscious* which contains suppressed, unwanted or fearful memories, our traumas, and our undesired behavior patterns. As stressful experiences add emotional energy to this suppressed material, it emerges appearing as the dark, unidentified characters or monsters that pursue or frighten us. We are essentially running from ourselves, afraid that if our darker side catches up with us, we will be destroyed. The following dream

shows this in a humorous way: “I had a recurrent dream that I was running away from a big, black, hairy monster. My legs could hardly move. In the dream one night I found myself trapped. So I turned around to face the monster and called out in fear ‘what are you going to do to me?’ The monster (now appearing less frightening) said, ‘I don’t know lady, it’s your dream!’” The dream never recurred – perhaps having been placed in the new context that the dreamer is really in control of her own fears.

Figure 4-2 Facing Your Fears



According to Jung (1971b), this cycle of impending death is part of the process of integrating the *unconscious* or *Shadow* self into the personality. Since integration implies that our existing self-image (the *ego*) must change, or symbolically “die”, the fear is exaggerated in the dream (see the Psychology of Dreams sections).

Trauma Related Nightmares

Nightmares (called *posttraumatic nightmares*) are often a direct result of a traumatic situation. The suppression of trauma, and subsequent release through replay in dreams, is common in the dreams of veterans suffering from posttraumatic stress disorders, and those who have had life threatening encounters such as natural disasters, all forms of accidents, child abuse and neglect, domestic violence, terrorism, political persecution, loss, or exposure to other significant stressors (Duval & Zadra, 2010). Moreover, far from being infrequent or isolated occurrences, recurrent nightmares about a traumatic event can persist for years and even decades after the trauma. According to Tony Zadra up to 70% of trauma-exposed individuals who develop post-traumatic stress disorder (PTSD) report nightmares containing varying degrees of resemblance to the actual traumatic event they had encountered.

While most of what we read about PTSD nightmares comes from war veterans or victims of various tragedies, sometimes the triggering event could have occurred in childhood, long forgotten, yet played out in a person’s dreams for a lifetime. Here is such an example. In one of my seminars a woman reported “I had a recurrent nightmare all my life – always the same airplane diving down and shooting at me. I can even see the pilots face clearly sneering at me.” I never told anyone, not even my mother since she did not believe much in dreams. But 30 years later I finally told my mother. She was surprised and said “oh you can remember that, it actually did happen - when you were 18 months old.” It had occurred during WWII when I was a child in Europe. Once she told her mother the nightmare never came back. The knowledge of what it was about had placed the event in a non-threatening context.

Deirdre Barrett in her book *Trauma and Dreams* (1996) indicates that a pattern evolves in which the trauma may be dreamed repeatedly at first, much as it happened, but later becomes more “dreamlike” and surreal over time. But even at that trauma-related nightmares do not replicate the traumatic event as it originally occurred (Hartmann, 1998). The nightmares of trauma victims a continuum from dreams that replay the trauma or some element of it, but subsequent phases are often characterized by more metaphoric representations and increasing integration with recent waking life concerns. A couple of studies, one on 300 war veterans and another on patients who were hospitalized after an accident or assault (Wilmer, 1996; Mellman et al., 2001) showed this trend. At one extreme (experienced by roughly half the subjects) were nightmares that replay features of the trauma, perhaps the setting, others involved, and the traumatic event or act itself. Next, nightmares may present fragments or distilled memories of the trauma or aspects of it, distorted themes, or emotions related to the trauma. In the veteran’s dreams 21% reported war sequences but not the event actually experienced. Finally, nightmares can represent the traumatic event in a totally metaphoric fashion with little to no literal resemblance or replay of the actual traumatic event. For example, 26% of the veterans reported dreams in this study that alluded to the war but were mixed with metaphoric and everyday elements.

Barrett indicates that this transition occurs as dreams begin to change into “mastery” dreams for people who begin to recover from the trauma. The repetitive, unchanging replays may continue, however, in those who develop severe posttraumatic stress disorder (PTSD) in their waking life. Barret’s book describes how coaching to develop “mastery” dreams can aid in the resolution of PTSD.

Deirdre Barrett and Jaffar Behbehani (2004) studied post-traumatic stress disorder and recurring nightmares in Kuwait following the Iraqi invasion and occupation of 1990-91. As described in other trauma populations, many Kuwaitis had classic post-traumatic stress nightmares involving literal repetitions of the atrocities they witnessed, with only minor distortions. One dreamer, who had a brother fighting in the resistance, had the following recurring nightmare: *We are at home and the Iraqis come to the house. They break the windows and storm in, searching everywhere and demand to know where he [the brother] is. My two little children are crying. One soldiers is pointing a gun at each of our heads one by one, saying he will shoot us if we do not tell where he is hiding. We do not know. The soldier pulls the trigger and shoots my son, then my daughter. I wake up screaming.* In real life, they came into the house almost like this, and did hold a gun to everyone's head while they asked about the brother, but never shot anyone. The dreamer’s brother had not come home, however, and she feared he had been shot.

As healing occurs evidence of “mastery” can be observed in their dreams. For example, one young woman had a recurring nightmare throughout the occupation in which she was riding in the elevator of a high-rise building, along with many people. The elevator cord would break, plunging the elevator several floors and then dangling by a thread with the terrified passengers not knowing how they could get off before the cord would break and plunge them to their deaths. The dreamer would wake in terror at this point. After the liberation, changes occurred with each repetition of the dream, with the most recent ending in rescuers coming to help people climb to safety through a door in the top of the elevator. As a side note, in Kuwait, people believe that dreams foretell the future rather than reflect the past, making these dreams yet more terrifying. Kuwaitis experienced considerable relief simply from learning that victims of other traumas repeat the trauma in their dreams.

Nightmare Sufferers

Nightmare sufferers are individuals who have a long history of nightmares. Unlike trauma cases, the nightmares do not repeat the same literal event, although the themes might be similar. Frequent nightmare sufferers report their typical non-nightmare dreams as vivid and detailed, filled with very bright colors and distinctive sounds, along with tactile sensations such as pain, taste and smell, which are seldom present in more common dreams (Van de Castle, 1994). In the Hartmann study (1984), many of the long-term

nightmare sufferers had stormy personal relationships, difficult adolescent years, a high suicide attempt rate and many were in therapy. A growing body of research shows that nightmares are strong predictors of poor psychosocial adjustment and strongly associated with a range of disorders, including insomnia, anxiety, and depression as well as suicidal thoughts and behaviors.

Medical and Drug Related Nightmares

Sometimes nightmares can occur to warn of something wrong physically. We have all likely experienced nightmarish or disturbing dreams when very ill. Nightmares have at times warned of the onset of illness or a threatening physical condition before we are consciously aware of it. Nightmares and highly bizarre dreams can be induced by various classes of licit and illicit drugs. These include catecholaminergic agents, some antidepressants, barbiturates, alcohol, beta blockers, and cessation of chronic or heavy use of marijuana.

Nightmare Therapy

It has been well established that nightmares can accompany a broad range of clinical conditions and that they may also occur in otherwise well-functioning individuals. Research has also shown one drug related treatment to be effective for PTSD related nightmares (for example prazosin, however recurrence of nightmares has been known to occur once medication is discontinued). A more effective or long-lasting approach has been to target the nightmares directly with various therapeutic techniques that result in clinical improvements over time. The majority of contemporary nightmare treatments are based on cognitive behavioral therapy (CBT), an approach that aims to identify and correct dysfunctional thoughts, emotions, and behaviors. Of the available approaches, one of the current best practices for the treatment of nightmares is imagery rehearsal therapy (IRT) (Krakow & Zadra, 2006) developed in the early 90s. (Kellner, Neidhardt and Krakow, 1992). IRT is a cognitive imagery approach that teaches patients to change their nightmares and to rehearse new scenarios. This approach has been successfully used in varied populations, including children, veterans, the elderly, trauma victims, people living through significant stressors or life crises, and hospitalized patients suffering from serious mental illness.

Tony Zadra (in Hoss, Valli, Gongloff, 2019) describes the instructions for IRT, summarized as follows. Clients begin by re-scripting a nightmare (one of lesser intensity than the reenactment of a trauma) in whatever way feels right to them, changing the story line of a nightmare into an alternative and often less distressing story and then rehearsing the new dream in their imagination using visual imagery. The focus is not necessarily on the nightmare's ending or transforming it into something triumphant. The key instructions typically include: a) change this nightmare anyway you wish; b) rehearse this new dream a few minutes each day (twice can suffice); and c) continue these instructions every day and consider working with another nightmare to change it into a new dream every three to seven days, such that you only rehearse one or two new dreams each week. It is also vital to remind clients that they are only to rehearse the new dream and not the nightmare.

Another approach used for nightmare therapy is Lucid Dreaming. The therapeutic mechanisms are still a bit unclear and it requires a person to have, or learn to have, a lucid dream – but once lucidity is achieved it can be very effective in eliminating or reducing recurrent nightmares. Tholey (1988), described a “self-healing program” based on lucidity training that contained various elements including techniques for inducing and ending lucid dreams, methods for incubating and influencing the contents of lucid dreams, and principles for interaction with other dream characters. LaBerge (1986) suggested that what a person anticipates will happen next in a lucid dream. This can play an important role in how the dream unfolds – although it can go either way – depending on the degree of self-reflection the dreamer has. By becoming lucid in a nightmare the dreamer can: a) alter the anxiety-producing story line by consciously modifying

the content, b) realize that the experience is only a dream and not a real event taking place in the physical world, and c) choose how they respond to and interact with frightening imagery thus diminishing the nightmares control (Zadra in Hoss, Valli, Gongloff, 2019). The dreamer's ability to alter some detail in the nightmare is a key factor in the elimination of recurrent dreams. The example above where the dreamer finally turned around and faced the monster – after changing the dream by turning around and communicating with the monster – it never recurred.

Physical Stimulus

Sometimes dreams can contain content that is stimulated by disease, fever, severe injury, or by an outside stimulus (noise or cold air for example). Dreams related to physical conditions fall under a general category of somatic (relating to the body). These dreams might be classified in three ways:

- **Somatic** dreams involve physical sensations in our bodies that are represented in our dreams
- **Symptomatic** dreams are those which occur during the course of an illness after it has been detected and reflect the symptomology.
- **Prodromal** dreams are those which indicate the onset of illness prior to any noticeable symptoms.

Somatic

It is rare that an external sensory stimulus will directly affect the dream, because the input to and output from many of the centers of the brain that process such stimulus, are essentially “blocked” in the dream state (Hobson et al., 2003). However, at times external stimulus can find its way into our dreams. This is particularly the case if it is tactile in nature or intense enough. Van de Castle (1994) reports that of three external stimuli applied during REM sleep, a spray of cold water was incorporated in 42% of the recalled dreams, light flashes in 23% and an auditory tone in only 9%.

When an external stimulus enters the dream it rarely becomes the defining plot of that night's dream but rather is incorporated in some way into the ongoing story line. For example, a cold room might bring snow into the dream environment, and the dream may respond to a loud noise as a gunshot. Internal bodily conditions such as pregnancy, disease or simply normal bodily function can often alter the content of the dream: *“At one point in my dream I had to go to the bathroom, but every time I found one, it was broken or flooded or provided no privacy. When I woke up and realized that I really did have to go to the bathroom.”* This is perhaps one of the most commonly reported physical stimuli that invades our ongoing dream stories. In the case of the bathroom theme, I find that the dream will often inhibit any such action while asleep by frustrating the dreamers attempt to find or use the bathroom perhaps the dream's way of saying, “hold on, not here!”

Symptomatic

Dreams of illness or injury generally contain imagery depicting the poor state of the physical body (dirty water, broken pipes, broken machinery, etc.). We sometimes have disturbing, disjointed dreams that seem different from other dreams, sometimes with a lot of repetitive attempts at solving a nonsense problem. They may contain such imagery as bugs crawling around, excess dirty water, ice or cold conditions, or images of a body part and, at odd times, cartoon characters. *“I dreamed there were five of us in a room, including two big fat pink cartoon-like characters, who had been at one time friendly toward us, but had turned on us. The two other men were holding down the fat pink guys and cutting their throats.”* The dreamer woke with a sore throat, swollen tonsils and the flu -- symbolized by the dream imagery.

Color can relate to the physical condition as it did with the “fat little pink characters” above. Many dreams that accompany flu or stomach and intestinal sickness will be filled with dirty brown fluids inside of tunnels or tubes. Rust color, accompanying broken machinery, might appear as in the woman’s dream above. Other sickness-related colors are vile green or muddy yellow. Injury is often accompanied with red in the dream, representing inflammation and blood. This metaphoric depiction was present in this dream following of an eye injury: “*I dreamed of a skull with red fire coming out of a section above the eye.*”

On a more positive note, dreams relating to pregnancy may have elements of renewal, as well as references to body change and self-image. Patricia Garfield (1991) describes common images in pregnancy dreams to include small animals, baby animals and amphibians such as lizards (representing the fetus), water (perhaps representing the amniotic water in which the baby is suspended), buildings and other architectural imagery (relating to the woman’s body, the fetal home).

Prodromal

Prodromal dreams figuratively picture the onset of an illness prior to any symptoms being detected or sensed. Patricia Garfield, in her book *The Healing Power of Dreams* (1991), indicates that dreams often contain references to internal physical conditions before they are known to the conscious mind or felt by the senses. As a result, she indicates that we should pay attention to the related imagery and watch for warning signs, as well as signs of healing. Some of the theoretical thinking about *prodromal* dreams might be found in a passage from Kasatkin (Van de Castle, 1994) who states that because nerves connect to the brain from every part of the body they therefore can relay signals of impending illness – which then are then figuratively pictured by our subconscious minds in the dream. For example, dreams of mental illness may focus on the head: “My father used to have a recurring nightmare where he dreamed he looked into the mirror and had no head. He woke screaming each time. He died from Alzheimer’s while still fairly young.”

Larry Burk (2015) recently surveyed the characteristics of warning dreams preceding the diagnosis of breast cancer in 18 women. The five most common characteristics of their warning dreams reported in the survey were: a sense of importance 94%; more vivid, real or intense than ordinary dreams 83%; an emotional sense of threat, menace or dread 72%; specific words breast cancer/tumor 44%; and the sense of physical contact with the breast 39%.

Wendy Pannier and Tallulah Lyons who managed an IASD Cancer Project, lead dream groups and workshops in cancer centers for over 16 years to help cancer patients and caregivers discover the value of working with or paying attention to dreams in the process. Some of their experiences are described in *Dreams that Change Our Lives* (Hoss & Gongloff ed., 2017). They have experienced dreams of warning and diagnosis but also observed dreams to provide guidance during the care and recovery that help transform the cancer journey into a life-expanding experience. Sometimes the dreams can be literal. Wendy’s own cancer experience reflects this when she had the following dream: “*My gynecologist of many years calls me on the phone and says: ‘You need a D&C’.*” A year later, following a sonogram, her gynecologist called for the first time ever and said, “You need a D&C.” She was diagnosed with Stage IVB cancer – which she later recovered from.

Warnings, diagnosis and remedies can be tricky with dreams, however, since they most often speak in metaphor. It is always best to have a checkup but if nothing is found, to also to look for possible emotional or psychological associations with what appears to be the dream “message,” as in this case: “*I was in a clinic and a nurse was checking me over. She felt some lumps on my groin area and exclaimed, ‘she is riddled with cancer’.* I was not afraid to die but asked the nurse if she could do something to keep me from going through all the pain.” In this case, the dreamer went for a checkup and, fortunately, the dream had

nothing do with a medical condition. She entered my workshop puzzled why her dream told her she had cancer! When we worked on the dream, the dreamer revealed that she was a strong believer in astrology. At the time of the dream she was having a relationship with a man who was astrologically a “Cancer.” She wanted to end the relationship but was puzzled (“riddled”) about how to do it without going through all the emotional pain.

Nonetheless, it is always good to have a checkup if a particular body part recurs in a dream or appears in a particularly disturbing or impacting dream. *“I saw a horrible looking creature, shaped like a huge black gelatinous blob which was threatening my child, oozing out from under a platform on which there was some old inoperative rusting machinery.”* This dream occurred after a bout with post-menopausal bleeding. The dreamer heeded the dream and went for a checkup, which luckily showed the cause to be hormone-related, and not life threatening. In the following dream, the medical condition was symbolically represented before the symptoms were apparent. However the dreamer was less fortunate in this case: *“My father used to have a recurring nightmare where he dreamed he looked into the mirror and had no head. He woke screaming each time. He died from Alzheimer’s while still fairly young.”*

Diagnostic Dreams and Using Dreams to Heal

The great majority of this book will be focused on how to work with your dreams, or your client’s dreams, to deal with unresolved emotional situations, or inappropriate beliefs that leave the dreamer stuck in unhealthy behavior patterns. Dreams may also contain information that is key to healing other disorders, particularly when there is a basis in some earlier emotional trauma or irrational decision about self and life.

Remedies

Sometimes *somatic* dreams appear to hint at a remedy to rebalance the system. The following series occurred to a man who had just gone on a vegetarian diet and was still adjusting to it. *“I dreamed of a fishing boat and on the side of it was written the words ‘eat more fish’.”* At that, the dreamer added fish to his diet and subsequently felt an increase in energy. A couple of nights later he dreamed, *“I was being enticed by a beautiful woman. As I approached her she stated, ‘bring me tea’.”* At this point the dreamer was getting used to these messages of protest from his body and added tea to his diet. Another remedy dream comes from a man who had asthma: *“I dreamed of a hand that was pouring 2 oz. of lemon juice onto 2 ice cubes.”* He took this remedy for 2 weeks and claimed it solved his coughing and fainting.

Figure 4-3 Rebalancing



Healing Dreams

At times the dream itself appears to bring about some degree of healing. Two such cases can be found in the IASD book *Dreams that Change Our Lives* (Hoss & Gongloff ed., 2017).

In one case Wanda asked for help with her constant debilitating migraines. That night she dreamed: *“I am in the room of my oncologist. He says the team he assembled in response to my problem is ready for me. I am briefly aware of some kind of painless surgery on my head. After the surgery, the surgery team to shows me what they removed... a small, blood-covered beadlike piece of tissue. I take it in my hands...and feel small ‘hairy’ tentacles all over the surface. I am grateful and I thank the physician and my team.”* She reports that she awoke feeling cautious but extremely relieved in the absolute absence of pain – and that 6 years later she has had no migraines since that night.

In another case the dream appeared to involve a paranormal or spiritual aspect, akin in some ways to prayer healing. A therapist whose client who after many years of trauma and subsequent treatment was finally on the verge of emotional healing – but was now discovered to have what two doctors had characterized as incurable cancer – three spots of advanced cancer on the client’s ovaries – giving her only months to life. The therapist prayed for her client asking God to help her. That night the therapist had the following dream: *Mary, mother of Jesus, is descending from the sky. As I watch Mary, her arms are outstretched, and three glowing globes of golden-white light issue forth from her hands. I watch as each globe surrounds a spot on the ovaries completely and envelops it.* She reluctantly told her client, who went back to the doctor who now found no sign of the cancer – she was completely cured.

Psychosomatic Disorders

Irrational beliefs can express themselves not only as symptoms of other disorders (bereavement, depression, trauma), but also as symptoms of what may appear to be physical disorders. Deirdre Barrett (2003) in her paper “The ‘Royal Road’ becomes a shrewd shortcut,” describes how dreams can be a useful diagnostic tool in such cases, since dreams represent a powerful metaphor, which patients may be unable to articulate otherwise. The paper illustrates how dreamwork can be utilized in symptom-focused psychotherapy. One example is that of a 36-year-old man who came for treatment of a two-month bout with insomnia. *He reported a dream in which he saw a boy sleeping in a bed, with soft morning light shining in through translucent curtains. Despite the peaceful images of the scene, the dreamer felt a sense of dread. An old-fashioned alarm clock went off, ringing loudly, but the boy did not stir. A woman appeared at the door of the room and called to the boy, who still did not move. The dream ended abruptly with the patient knowing the boy was dead.*

The dreamer recalled there had been a time around age six when he feared bedtime because he might die in his sleep, as he’d heard of people doing. Talking about this long- ago fear, and being able to rationally reevaluate its high improbability, led to some improvement of his insomnia.

In the next session, he reported another dream of a little boy in a room - this time not in bed, but rather sitting against a wall crying. The dreamer knew the boy was sobbing because of a terrible feeling of being alone. This dream triggered more associations to his childhood concept of death as ultimate aloneness; not so much a cessation of consciousness, but the belief that “they put you in ground and you stay there forever.” Once explicitly aware of his sleep = death = aloneness equation, he discussed how several work and relationship changes had left him lonelier in the last couple months. His insomnia disappeared as he made more effort to reconnect socially.

Lucid Dreams

Lucid Dreaming is defined by the APA (American Psychological Association) as “a dream in which the sleeper is aware that he or she is dreaming and may be able to influence the progress of the dream narrative.” As this section will illustrate lucid dreaming extends well beyond that definition.

Lucid dreaming occurs when brain centers that are normally relatively inactive during sleep become active. Parts of the pre-frontal cortex and precuneus involved in self-reflection, conscious awareness and willful control become more active. Occipital and parietal areas involved in imagery, spatial processing, form and color become more active, enhancing the vivid visual and spatial experience. That the dreamer is conscious in the dream was discovered in 1978 by Keith Hearne and independently confirmed in 1981 by Stephen LaBerge (1986). They asked research subjects who could dream lucidly to move their eyes back and forth in a prescribed manner as soon as they realized they were dreaming lucidly. This sort of signaling the researcher from within the dream is now regularly performed in lucidity research with both eye and muscle movements.

The degree of lucidity and the experience can vary widely in lucid dreams:

- **Sub-Lucid Reflection:** simply realizing you are dreaming or in a dream.
- **False awakenings:** the dreamer feels they have or attempts to wake from a dream only to find themselves in another dream. *I dreamed I was at home and my dad wanted me to do some unpleasant work. Suddenly I realized that I was dreaming so I woke myself up to avoid the work. I was happy now to be peacefully sitting with my dad and mom in the living room. Living room! I suddenly realized that I had not woken up and was in another dream.*
- **Acting or “Playing”:** a realization that you are dreaming and a self-reflection and wilful taking charge of your own actions. These often include flying, or wilful interactions with other dream figures. For example, Deirdre Barrett (1991) examined 1,910 dreams from 191 subjects and found flying dreams to be more frequent with lucid dreamers.
- **Influence:** trying to willfully control the dream or make things happen - which works to a degree but generally the dreamer discovers limitations on their ability to alter events or the actions of other dream figures (they are only the *dream-self* or *ego* - in a much bigger landscape of the self).
- **Interacting with Dream Figures:** engaging with dream figures, such as asking them who or what they are or where they come from - exploring the nature of dream imagery. Dream figures may identify themselves as non-integrated parts of your own personality, or various states of consciousness. They rarely believe themselves to be characters in your dream, but rather independent personalities. They often react in unexpected ways (disbelief, defiance, hurt, etc.) if told that they are simply a character in your dream.
- **Self-Improvement or Healing:** **1. Skills:** research with lucid dreaming has been found skills to improve similarly when practiced in a lucid dream as in waking practice. **2. Nightmare therapy:** learning to face your fears pictured as monsters/imagery that diminish when challenged; **3. Mind over Body:** physical healing, breaking habits etc. has been anecdotally reported in a number of cases.
- **Engaging the ‘Wisdom’ behind the dream:** some seasoned lucid dreamers have discovered there is a “wisdom” behind the dream that responds when posing a general question or request to the dream itself, such as “what is my role in life” or simply “show me something I need to know.” The dream will then often “sparkle” into another scene where an answer or some insightful dream story is experienced (often metaphorically, but sometimes direct). This non-personal, helpful and *collective* wisdom acts much what Jung (1971a, b) described as the *collective unconscious* or inner *Self* (central organizing force of the personality).
- **Extraordinary Experiences:** while in the lucid state, some dreamers have experienced or initiated states of awareness or experiences that might be considered paranormal or extrasensory (PSI), Out of

Body (OOBE) and even mind-over-matter. Although such experiences have been reported in non-lucid dreams, lucidity appears to provide a condition open to such experiences.

- ***Trans-personal or Spiritual Experiences:*** seemingly multidimensional experiences often without form and difficult to describe (often called the “void”), sometimes a sense of a divine presence or oneness with a cosmic consciousness.

Although you may have never had a lucid dream, rarely had one or recall only a few lucid like experiences, lucid dreaming is more frequent than you might think. For example, one meta-analysis (Saunders et al., 2016) of 34 surveys discovered that on average 55 percent of the population reporting having had at least one lucid dream and 23 percent reported having them quite frequently (once a month). For an in-depth discussion of the experience, research and methods of inducing lucid dreams, the reader is referred to chapter 9 of *Dreams: Understanding Biology, Psychology and Culture* (Hoss, Valli, Gongloff, 2019).

The Nature of Dream Figures

Psychologies based on the works of Carl Jung and Fritz Perls (see Psychology of Dreams section) understand dream *elements*, and thus dream figures (or characters if you wish), to be representations of our feelings, conceptions, and “alienated” or discarded parts of who we are and that the dream interaction is an attempt at integrating these disowned parts into the personality (see Psychology of Dreaming sections).

This concept was demonstrated in one of my dreams in the IASD book *Dreams that Change Our Lives* (Hoss & Gongloff ed., 2017). At the time was conflicted over the value of following my “visions” a pursuit which was driving me to overstress myself; I began to feel that much of what I had done or wanted to do was in reality of little value – what difference has all this work made? I just wanted to give it all up. *That night my dream went lucid and I called out to the “wisdom behind the dream” - “show me something I need to know”. At that point I found myself in a large white room met by a guide (oddly one of the Mario Brothers) who introduced him to the 4 parts (fragments) of myself that were in conflict: a tall man who identified himself as my fun loving side; a frustrated artist who just wanted his work to be done without all the effort; a mechanical man who identified himself as my “wise and learned past and future self” and finally a beautiful woman who said “I am your visions, I am like diamonds.”* The dream not only demonstrated that dream figures can represent parts of the personality that are fragmented by conflict but in this case provided a delightful answer to my question regarding whether my visions were of any value.

The concept of dreams attempting to “integrate” the personality (per Jung and Perls) is illustrated in a story that Robert Waggoner tells in his book *Lucid Dreaming* (2009). In his lucid dream he meets a woman and asks who she is. She states, *“I am a discarded aspect of yourself.”* As he recognizes the truth in this and decides to accept her completely, she becomes wisps of colored light energy which enters his torso. Here in the lucid dream the integration was self-directed and immediate.

Exploring your dream figures can be an exciting, fun and revealing exploration into the nature of consciousness. Dream figures do not consider themselves as characters in your dream or any dream, they generally act as independent entities with their own personalities, consciousness, capabilities and *egos*. An example of this is a lucid dream where I asked the dream to show me something I need to know. *“The dream sparkled into light and I found myself as a professor lecturing to a class of about twenty dream figures (students). After what seemed like quite a bit of interactive lecturing on what it is like to be in a dream, a woman raised her hand. She asked “well how come if I am just a dream figure I can remember a whole life before this time; I have a husband and two kids”. I stated, “that’s interesting” and turned to the rest of the class and asked “how many of you can remember a life before this moment?” Six students immediately raised their hands – then very gradually all twenty raised their hands.”*

German dream researchers Stumbrys, Erlacher, and Schmidt (2011 and 2014) studied the nature of dream figures. Various experiments were done. In one 13 lucid dreamers asked 24 different dream figures to solve 50 quite simple mathematical problems (for example: $9 \times 9 = 81$ and $30 - 5 = 25$). 18 out of 50 answers were given correct (36%) multiplication and division better than addition and subtraction. In another study, 15 lucid dreamers (27 dream reports) asked dream figures (38 times) to guess the number of fingers they held up behind their backs – which the dream figures (19 out of 29) answered correctly – thus 66% of the time (significantly more than the 9% probability of guessing a random number from 0 to 10). In a third experiment, lucid dreamers (7 in all) were to guess random numbers (17 in all) written down by different dream figures (12 in all) resulting in the correct number being successfully guessed in 10 out of 14 cases or 71.4%. In another study by Tadas Stumbrys and Michael Daniels (2010), they looked at the ability of dream figures to solve logical puzzles or create metaphors. The researchers found that dream figures could create metaphors more easily than solve logical puzzles. For example when asked to create a metaphor in response to “*a lighthouse in a desert*” one dream figure offered up, “*a condom in the hands of a nun.*”

The researchers concluded that the results indicate that there is some form of connection (although not complete) between the *dream ego* and dream figures – which raises an interesting question. If dream figures are meaningless nonsense then the accuracy should be nonsense, or best-case chance – which it wasn't. If they are fully integrated with *ego* consciousness – then the answers should be 100% the same as the dreaming self that is asking the question – but they weren't. They were something in between – perhaps the dream figures are the non-integrated *fragments* our personality that Jung and Perls theorized. Some dream figures, however, may be more than just personality *fragments*, particularly during higher consciousness experiences, so it can be a wonderful exploration of the nature of consciousness to dialog with these figures and ask who they are or where they came from.

Psychological Processes in Lucid Dreams

Some argue that in lucid dreams we are “messing’ with the dreaming process, that it might not be healthy. Not so – in lucid dreams we involve more of the brain and add a valuable element to the process that is not normally there, self-reflection and the ability to more rapidly and learn. We may attempt to influence the dream, but quickly find that our control is very limited – we may control our own actions and have limited “magical” abilities, but the dream continues around us. The lucid dream story and *figures* don't always cooperate with control attempts by the *dream-self*, suggesting that the deeper processing that takes place in a common REM state dream, still goes on in a lucid dream – and there is anecdotal evidence that it does.

One such lucid dream that suggests a problem-solving process taking place, was triggered by a question asked by the lucid dreamer, but it continued with a surprising and delightful solution on its own without any cognitive efforts on the dreamer's part. The dream was one I had at a time when I had been going through a very stressful time, involving others that depended on me compounded by a depressing world view, which I could not figure out how to deal with. At a particularly stressful moment he dreamed: “*All around me is a land of junk, rust and misery, when suddenly I realize I am dreaming. At that point I cry out to what I consider the ‘divine wisdom behind the dream’ – ‘Show me what I need to get through this situation I am in.’ At that point I am rapidly lifted upwards and find myself surrounded by a fantastic universe of light crystals, with a feeling of intense bliss like I have never come even close to feeling in waking life. I looked at my body and it was transparent, also made up of pure light. There was singing all around, but I couldn't make out the tune or lyrics. As I began to reflect on the experience, I again turned to the “wisdom” and said, ‘this is wonderful but what is the answer – what do I need to get through the situation I am in? Suddenly in front of me among the crystals, tiny 3-dimensional red hearts began to appear and float around in a clockwise manner, forming a giant red heart. Then the lyrics of the song became clear, the tune by the Beatles ... ‘All you need is Love.’* When I woke, the stress had lifted – I had my answer.

Another lucid dream that illustrates the process of Jung's concept of personality integration taking place, is reported by Robert Waggoner (2015): "*There is a black woman behind me. I pick her up and place her in front of me asking: "who are you". "I am a discarded aspect of yourself." I sense the truth of this and decide to accept her completely. As I mentally accept her she suddenly collapses into wisps of colored light which enter my torso.*"

Extraordinary Dream Phenomena

These are dreams that contain elements that expand our perception beyond the bounds of normal reality. The dream may start out as a typical dream, but the story line may suddenly incorporate a striking paranormal element. Krippner, Bogzaran and De Carvalho, in *Extraordinary Dreams* (2002), created fourteen categories of what they called "exceptional dreams", some of which they classified "extraordinary" dreams or the somewhat less value-laden term "anomalous dreams." The book provides a wealth of knowledge and research into paranormal and extraordinary dreams, as well as a discussion on how to work with the nature of each type of dream to enhance your life. They state that "these dreams call attention to themselves because of their unusual or anomalous quality, but they also seem meaningful in some way".

"Exceptional" dreams include: Creative Dreams; Lucid Dreams; Transcendent or Impactful Dreams (covered in other sections) – and "extraordinary" or psi related dreams, which I will cover in this section. An "extraordinary" dream of a paranormal nature might fall into one of the following classifications according to Krippner: a) Mutual dreams – whereby two persons report the same or similar dreams on the same night; b) Telepathic dreams – relating to the thoughts of another; c) Clairvoyant dreams – perceiving distant events; d) Precognitive dreams – providing information about an event that has not yet occurred; e) Past life dream – which appear to detail events in a past life we have no way of knowing about; f) Spiritual dreams – whereby we are visited by spirits, deities or those from the other side. g) Out-of-Body – which involves the sensation of leaving your body.

The Research

At Duke University, Louisa Rhine collected roughly 7,000 self-reported anecdotal telepathic experiences and found that nearly two-thirds of them reputedly had occurred in dreams.

Some of the first pioneering scientific work in this area was performed by Ullman, Krippner and Vaughan, who in their classic book, *Dream Telepathy* (1973) which discusses the results of scientifically controlled experiments in paranormal dreaming. More details on this history, provided by Stanley Krippner, can be found in *Dreams that Change our Lives* (Hoss & Gongloff ed. 2017) and *Dreams: Understanding the Biology, Psychology and Culture* (Hoss, Valli, Gongloff, 2019). Montague Ullman began to research this phenomenon in 1966 and later moved his operation into Maimonides Medical Center in Brooklyn, New York, where Stanley Krippner joined him. A protocol was developed in which a target picture (unknown to the researchers was double-sealed in an envelope by an assistant) was randomly selected by a dice throw once the research subject had retired for the night in a sound-attenuated room. Upon viewing the contents of the selected envelope (the target picture) the "transmitter" then related to the picture contents through associations, enactments, and emotion. An experimenter awakened the participant when the instrumentation (EEG tracings, plus eye movements and muscle tension tracking) indicated that a dream was in process, asking, "What has been going through your mind?" The dream report was recorded and later judged for content correlation. The precognition dream studies were done much the same way except that the target was randomly selected following the participant's night in the laboratory.

At Maimonides they conducted 13 formal studies (11 focusing on telepathy, 2 on precognition) and three groups of pilot studies in which telepathy, precognition, and clairvoyance were investigated; in total, 450 nighttime dream sessions resulting in a 63% confirmation rate. A meta-analysis of the results conducted by Dean Radin concluded that the odds were 75 million-to-1 against achieving the results by chance. In 2003, Simon J. Sherwood and Chris A. Roe compared Maimonides studies with other attempted replication studies concluding that in both sets of studies “raters could correctly identify target materials more often than would be expected by chance” with 95 percent confidence.

Although these studies suggest that paranormal events or PSI occurs in the dream state, the percentage of dreams containing PSI is not large. Stanley Krippner and Laura Faith collected 1,666 dream reports from women (910) and men (756) from six countries between 1990 and 1998 in order to identify anomalous dreams. When an independent rating was performed approximately 8% were considered anomalous (6.3% excluding lucid dreams). There was no significant gender differences and the categories reported most often PSI related were out-of-body dreams (1.4 percent), visitation dreams (1.1 percent), and precognitive dreams (1.1 percent).

Despite the data and statistical analysis, the studies are not necessarily considered conclusive from a strict scientific standpoint because of difficulty in replication and variation in evaluation procedures between studies over the years. Mainstream science places them in the “events” category due to their ephemeral nature, the resistance of PSI to appear on demand, and their lack of satisfactory explanatory mechanisms. As a result, they remain in the “reports” category.

Synchronicity

Synchronicities according to Jung are "meaningful coincidences" that occur with no causal relationship yet seem to be meaningfully related. The principle of synchronicity is important since it is not always possible nor necessary to determine if a paranormal dream is say precognitive or telepathic – its pretty much one in the same synchronicity phenomenon.

Jung reports such an event occurring at the point he and Freud split in their relationship. They were having a heated argument, Freud being totally dismissive of Jung’s beliefs in the paranormal. And at that moment Jung felt heat in his chest and a loud explosive noise occurred in the bookcase next to them, causing both to be startled and fearing it would fall over on them. At that point Jung said to Freud: “There, that is an example of a so-called catalytic exteriorization phenomenon.” [Synchronicity]. Freud dismissed it as nonsense. But Jung stated, “You are mistaken, Herr Professor. And to prove my point I now predict that in a moment there will be another such loud report!” At that moment the same explosive noise went off in the bookcase. Freud was aghast but the two never spoke of it again.

Another anecdotal example of dream and waking life synchronicity during an important transitions in the dreamer’s life is the following “*Retirement Party*” dream. This was actually one of my dreams that came at an important transition point in my life – my retirement from my scientific career over fifteen years ago and subsequent transition into full time dream studies. “*I dreamed that my friends at the office gave me a retirement party. They bring me four presents that are intended to be symbolic of my retirement. The first was popcorn, my favorite snack. The next was a set of wooden skis, representative of my favorite sport. The third is an electric guitar, representing my musical interests and talent. The final gift impressed me in the dream as the greatest of all – but upon waking I could not recall what it was.*” Oddly, when I awoke, I could recall all the details of the dream, three of the gifts but not the fourth golden bowl. That afternoon, at an international market, I happened upon a golden Tibetan “song” bowl (something I had never seen before). I suddenly remembered that the fourth forgotten gift in my dream was a golden bowl! I bought the bowl. It is a notable synchronicity that I was now able to obtain the physical manifestation of this central

element in this significant transformative dream. When later working on the meaning of the bowl I realized it represented dreamwork – with all of its meditative harmony and beauty, energy and mysticism.

Telepathic

Dreaming of the thoughts or perceptions of other people at a distance has been the subject of a good degree of scientific research, because it is relatively easy to administer, control and judge. Following the experimental process that Ullman, Krippner and Vaughan had pioneered, my colleague John Williams and I repeated the experimentation on a number of occasions with the students from my Dream Psychology course at Richland College in Richardson, Texas. We had a person who did not know the purpose of the experiment select three pictures on 35mm slides at random and place them in black envelopes. At about midnight, we would pick one at random and project it on the ceiling of the planetarium and view the picture with the intention that it would be telepathically sent to the sleeping students. The night before the class, the students were given instructions to go to bed and wake themselves up with an alarm clock about a half an hour after we started the projection. Upon waking, they were to draw the key dream imagery and record their dream. The dreams were then collected the following day and judged.

The experiments resulted in a small percentage of dream reports (perhaps 2 to 4 each time out of a collection of a dozen or so dreams) that were strikingly similar to the projected picture. It is difficult to say how much could be attributed to coincidence and how much to telepathic ability, but in some cases there was such a striking similarity, that the evidence for telepathy seemed very convincing. For example, one evening the picture was of Salvador Dali's *Discovery of America*. The picture contained bishops waiting on shore, each with a staff in their hand containing a rounded cross inside an oval at the top. One student turned in their drawing stating that they did not recall the dream but they did recall some images. The drawing was of a bishop with the exact same bishops hat and the exact same staff in their hands with the oval and rounded cross at the top (see figure 2-6).

Figure 4-4 Dream Telepathy Experiment



Precognitive

The news and tabloids are filled with reports of people who saw disasters in their dreams, before the actual occurrence. Many are anecdotal, after the fact and difficult to support, but some were reported before-hand. For example, a few days before the 9-11 World Trade disaster my wife, who rarely recalls her dreams, reported the following dream: *"I was looking across the water and all the buildings were toppled like pick-up sticks. Everything went dark and people were rushing to the radio and TV to find out what had happened."*

This example also comes from *Dreams that Change Our Lives*. Janice Baylis reports the following precognitive dream. *My three sons and I were to meet my friend at our usual car-pool meeting place. But that morning she phoned me and told me to meet around the next corner instead of our usual place. While we were meeting around the corner a small airplane crashed where we would have been. As we drove by the wreck I asked: "How did you know?" She answered, "I dreamed it. I didn't tell you it was a dream. You might have thought I was silly to react to a dream." "Thank God you did!" I exclaimed.*

The difficulty with a precognitive dream is determining at the time of the dream whether it is foretelling the future, or if it is just a metaphor related to something happening within the dreamer. Dreaming of an airplane crashing to the ground, for example, can often be a metaphor relating to the dreamer's aspirations, or new ideas and concepts, "crashing to the ground" or being pulled down to reality. This makes precognition difficult. It is always advisable to apply solid dreamwork practices to such a dream, in order to sort out possible psychological causes. Canceling a vacation after such a dream may be an overreaction. However, if the dream is highly impactful and somewhat lucid, real or visionary in nature, and the event can easily be avoided, it may be prudent to do so.

Successfully avoiding an event may be difficult, however, since the dream rarely depicts the scene as it is in reality. Krippner et. al. (2002) reported on work by Louisa Rhine with 191 apparent precognitive experiences, in which 69% of the people were successful in attempting to prevent the foreseen event. I find much less success in the precognitive dreamers I have been exposed to. Most people I have worked with, who report frequent precognitive dreams that do come to pass, report feelings of fear and frustration that they are unable to prevent the events.

In a few cases that I have observed, the dream will contain a precognitive element that has little to do with the dream itself but acts as a trigger for later recall of the dream. This is one I had: *I was driving along the highway recently and a unique, bright yellow custom car passed me going the other way. I suddenly realized that I had seen that same exact car in a dream the night before. At this point the entire dream, which I had totally forgotten, flooded into consciousness. It turned out to be a very important dream to work with, but work on the car revealed little. The meaning of the dream seemed to have nothing to do with the yellow car – the car seemed to be a synchronous element in both the dream and waking life, there to trigger recall.*

Some feel that precognitive dreams are responsible for many déjà vu experiences. On a few occasions, as in the examples above, I have been able to track such experiences back to a particular dream. An alternative theory of déjà vu is based on evidence that a sensory event is processed by two paths in the brain. Sensory information takes a fast track to the limbic system where emotional memories are associated with the event in order to prepare us for action. The slower track goes to the cognitive centers where the event, plus those emotional memories, raises our attention level so that we become aware of it. It is reasonable that the perception of the new event, together with the older emotional memories, could produce a feeling of having been there before.

Mutual Dreams

Sometimes two persons will report having dreams on the same night, with the same identical elements. For example, Stanley Krippner (2002) cites a dream in which the two dreamers, on the same night, dreamed of being in identical locations, describing the same hotel lobby with its unique pillars. Emotional attachment is sometimes involved. Sometimes therapists and subjects may find themselves dreaming similar dreams, with content that is important to the session that week. I have had the experience of dreaming of one of my students, and she dreaming of me, on the same night. In one particular case, the dreams were not similar (other than the presence of the two of us) but, when the dreams were discussed, my dream held valuable information related to understanding her dream and her situation.

Often mutual dreaming is reported in the Lucid dream state. Kelly Lydick (Hoss, et al., 2017) reports a dreaming event that she went to in which participants were asked to work together in a group dreaming experience. The organizer had arranged some objects at the center of a hillside labyrinth, and each dreamer was asked to use the dreamtime to meet the group, journey to the labyrinth, and report back on the objects that were placed there. Kelly went to sleep with the intention of doing so. She dreamed of *flying high above the Earth among the clouds and stars at night approaching and hovering over the labyrinth. As she moved closer to the object in the center, she saw others around her as “shapes, rippling through the night like angels cloaked in human flesh”.* She saw the object as a small, blue-colored glass bowl filled with water. The next morning, the organizer told the group that she had placed a blue bowl of water at the labyrinth. Others shared their experiences and all the stories were nearly the same.

Another example of a mutual, or at least a connected dream experience, is one that my wife and I experienced. *I dreamed of a clock face that had a jagged shape around it. In my dream I was trying to understand the meaning and suddenly a voice said “wake your wife, she will know what it means.” At that moment I woke up and so did my wife. I told her of the image of the jagged clock face and she said, “Oh I was dreaming that you were going to have a rough time”.*

Clairvoyant

Montague Ullman often had patients reporting dreams that coincided with events in his personal life. He decided to research whether this phenomenon was simply coincidence or what might be considered clairvoyance. He arranged for a “target picture”, sealed in an envelope, to be randomly selected once the research participant had retired for the night. One of his first subjects was the medium Eileen Garrett who had agreed to be instrumented for the experiment. One of the pictures was a color photo of the chariot race from the film *Ben-Hur*, currently in release. Garrett reported a dream concerning horses going uphill and associated the image with *Ben-Hur*, which she had seen two weeks previously (Ullman & Krippner, 1973).

Some of the most memorable stories of clairvoyant dreams, the perception of events at a distance, occur between family members at a time of crisis or the death of a loved one. *“I dreamed that my father and I were walking in a beautiful field. At that point he left me and walked into the sunset. I said to him ‘so long Captain’.”* At that moment the dreamer woke up, and a few minutes later he received a phone call regarding the unexpected death of his father (who the family lovingly called “Captain”).

When there are other minds involved the classification can fall into a grey area between clairvoyance and telepathy. Here is the case of possible clairvoyant/telepathic dream which contained better news. My mother dreamed: *“I dreamed I was unpacking a lovely wedding dress. The next day I received a call from my daughter who said she was getting married.”*

Such dreams often are presented in the dream language of metaphor or word-play that relates to the event:

"I was being followed by some harmless but annoying insects that I called 'urine bees.' The day after the dream, I received a note from a urologist B. B. (name), who said that they were moving to our area and wanted to get re-acquainted."

Past Life Phenomenon

There has been evidence, mostly anecdote but some substantiated in various ways Moody (1975), that life may go on after death and even continue with another earthly life. Whether this is part of your belief system or not, people do report dreams is convincing to them of a past life. It is nearly impossible to know for sure, however, since dreams will place you in very creative settings with fragments from events you have seen or read about, that are likely to be metaphors, related to your present life story. Some dreams, however, have elements that might be later verified to a degree: *"I dreamed that I was in a Roman style amphitheater. My name was Pasha. The dream switched, and I was looking at a tomb with the name Pasha."* The dreamer reported that four years later she took a trip to Pompeii. While there, she walked into some unmarked ruins. She told her husband "I have been here before. This used to be a covered amphitheater, and I used to sit right here." Upon speaking to the guide, he confirmed that this was the newly uncovered ruin of what was once a covered amphitheater.

In the book *Dreams that Change Our Lives* a dreamer by the name of Victoria's whose father had died when she was little reports having the following dream. *He calls to her in a dream, "I'm coming back" From Spain she asks. "NO I'm coming back from death." She sees him in place that looks like an orphanage. The next day her brother called to tell her that the adoption center called and they were granted the adoption of a 3-month-old boy.*

Out of Body Experience

One form of paranormal dream, which is strikingly different than any other, is the phenomenon of the out-of-body experience also called OBE or OOBE (Monroe, 1973; Green, 1968). One dreamer reports: *"I suddenly find myself above my body looking down at myself. Upon this realization I feel myself fall into my body and feel a thud as I wake."* And another: *"I felt myself floating up above the bed. Then I drifted down toward the floor next to the bed and looked upward at an angle and across the top of the storage chest, in order to see the sky through the window. There was a crescent moon and a few stars. When I woke up, I tested this and found that I could only see the sky and new crescent moon from that part of the room by kneeling on the floor and looking over the storage chest."* Here, the dreamers find themselves consciously present outside their body, perhaps in another location, sometimes as a whole person or as just a ball of consciousness. What is interesting is that, in many of these reports, the person sees things in this state that they could not have seen from the position they were sleeping in and could confirm later when observed from the location they were at in the OOBE state.

The OOBE experience is similar to some reports of near-death experiences, which are filled with accounts where persons saw themselves float above their body and were able to accurately report on events at a distance, which were later verified. Work has been done to substantiate that the phenomenon occurs, but little is known about the mechanism or whether it is a true separation of spirit or etheric body from physical body, or simply another form of the telepathic experience. Krippner (2002) reports that it occurs across cultures, and that all six countries included in his 1,666-dream database, reported out-of-body dreams (about 1.4%). La Berge indicates that out-of-body dreams occur at sleep onset (when the sensory input is shutting down) and during certain lucid dreams - he reports a study in which 9% of the lucid dream reports included out-of-body experiences (Krippner, 2002). Ceilia Green, in her book *Out of Body Experiences* (1968), indicates that many of these experiences occur when a person is ill, perhaps in surgery, or is resting in bed. She cites a number of experiences during surgery when the patients found themselves out-of-body watching

the surgery take place. OOBEs have also been reported at the onset of near-death experiences (NDE); during brain traumas; during sensory deprivation; and with the use of dissociative and psychedelic drugs. In relation to dreaming, OOBEs are more common in lucid dreams.

It has been suggested that OOBEs may be neurologically related to a brain region called the angular gyrus (part of the temporo-parietal junction) since OOBEs like experiences have been induced by electrical stimulation of that area. In 2002 Swiss neurologist Olaf Blanke's observed the phenomenon in his research on epileptic seizures. When he stimulated the angular gyrus the patient spontaneously had an OOBES like experience. She reported to Blanke that she was looking down on herself from above. He theorized that OOBES are a simulation that results from a misfiring of that junction (Blanke, 2005).

Another theory is that it is a form of sleep paralysis, or a partial awakening where we feel dissociated from our bodies, resulting in the sensation of being out-of-body. These neurological conditions or theories, however, don't fully explain cases where a person observes things that she could not have seen from the position or condition of her body, which were later confirmed when observed from the location they were at in the OOBES state, as in the "crescent moon" experience above.

Spiritually Oriented Experiences

Spiritual dreams might be considered to be dreams that: a) contain figures or events that relate to religious events or beliefs, or b) relate to the human spirit or soul, or non-physical realm, as opposed to the material or physical. Such dreams are often of an impactful transcendent type and have a psycho-spiritual transformative effect.

Dream content arises from many levels of consciousness including what many consider the higher self, the spirit and the divine. Justina Lasley (2004) considers that dreams are spirit talking to conscious mind. Furthermore, she indicates that the most effective form of dreamwork comes from one's own intuition and inner wisdom. This is a belief held by a great number of dreamers and dream workers. It is not simply a matter of faith, but rather an observation that there seems to be an organizing or guiding force in our dreams.

Transcendence

Dreams that relate to spirit often come at a time of deep inner conflict or search and subsequent *transcendence* (transcending our present state). In Psychology of Dreams sections we learn about how Carl Jung (1964, 1971c) described *transcendence* and the imagery patterns (what he called *archetypal* imagery) that often accompanies it which can include emotionally joyful and brightly lit experiences of release and renewal as well as images that represent the process such as the "great tree" the rebirth imagery such as the egg or child or organizing/balancing geometries and numbers

One pattern is that of the triad, the trinity – which he considered symbolic of the transcendent force. He saw the triad as representing the initiating force toward becoming "whole" which he represented as the square or four or "four-ness" or as the circle, sphere or "one." He often spoke of the three becoming four as the natural progression.

The triad becoming one can be seen in the following "Santa Claus trinity" dream of a woman who was conflicted about the role of Christ in her life: *"I dreamed that it was the end of the world and Christ was coming in the sky as the Holy Trinity. But Christ appeared as a trinity of Santa Clauses, who merged as one and began pouring gifts of love from an urn. They were invisible, but I felt the gifts hit me, so I ran. I tripped, falling down the mountain, with the gifts pouring on me the whole time."* Subsequent dreamwork revealed that the dream indeed related to the dreamer's spiritual life with a storyline that was intended to

illuminate and *compensate* for the dreamer's misconception. The dreamer had an expectation that living a good spiritual life should bring the gift of physical rewards. The clue in the dream was the representation of Christ as a Santa Claus. The dream was attempting to correct a misconception: if I am a good girl, God should bring me physical gifts – she saw God as Santa Clause. The dream pictured the “true” gifts to be invisible and intangible gifts of love.

The transcendent nature of the triad is often adopted in religious imagery as well – as in the “Trinity” or Holy Spirit in the Christian religion. The spiritual nature of this triad imagery appears in the following dream, recorded in my mother's journal, which she had at a time of deep spiritual search: *“I was being shown a huge brightly lit triangular-shaped sign with lettering in red which said, ‘Make yourself a perfect channel and wait, and all things will be given to you’.”*

Visitation Dreams

Aside from the possibility that dreams open us up to the influence of our own higher self, there is some evidence that the spiritual connection can extend to others. In Stanley Krippner's research, visitation dreams were one of the most common of the paranormal dream categories at 1.1% of all dreams. There are many reports of seeing and speaking to loved ones in dreams, after they have passed away. *“I dreamed I heard my mother (who had recently passed away) call ‘Ruth, Ruth!’ I saw her looking at me through a window and she was smiling and younger looking.”* The imagery of looking through a portal or separation is commonly reported in dreams after death, but it is difficult to determine whether such a dream comes from the normal functioning of the *psyche*, attempting to reduce the trauma, or whether the visitation is real. One dreamer recalls having such a trauma-reducing dream, after the death of her 5th grade friend. This dream came after many days of grieving and nightmares that woke her up screaming every night: *“I saw very vividly [name of friend] standing in the field next to an airplane. He said to me ‘don't worry about me, I'm just in another plane’.”* She was warmed by his presence and sense of humor; the stress was released and the nightmares stopped. Could this have been a true visitation or simply an internal release?

In some cases, the person who has died reveals information that the living person had no former knowledge of. In one report of a father's death, the Will could not be found. One of the family members subsequently dreamed of the father, wearing an old coat he had not worn in years, and pointing to the inside lining. When they investigated the coat lining, they found he had sewn the Will inside. While these cases are usually anecdotal, when such experiences occur it is difficult to discount them.

Visionary

Throughout the ages there have been many reports of spiritual dreams of a visionary nature that provide guidance, comfort or "truth" from what appears to be a divine presence. The dreamer often perceives the vision as a connection or communication with a higher level of intelligence or a higher spiritual plane. These dreams can be so striking that they change a person's life, or the course of history (holy scripture from many cultures is filled with dream accounts that changed the course of human events). Visions of biblical proportion can come to any one of us. My mother recorded the following dream as she was pondering the nature of the universe; a dream which closely resembled the description of Ezekiel's dream in the Bible. *“I saw a wheel of fire – a strange wheel endlessly turning. Fire - yet not fire - not material fire; electrical forces like the fire seen through closed eyes. The wheel was the Wheel of Time, and hovering above it were souls of all things created; animal, vegetable and man. Much like a computer, programmed to accept each one in its time, each one descended onto the earth only when an opening appeared in the wheel. The vibrations at the opening were attuned to the vibrations of that particular soul. The return from earth happened in a similar manner. Only when the proper opening appeared and the vibrations were right could the soul return from whence it came. There were some who wandered or floated beneath the wheel,*

unable to return through the fire until the proper opening appeared. And I saw the wheel from above, without wonder, as something I had seen before and recognized.”

Bright colors and spectacular feelings can be a result of a transformative dream, or a “big dream” as some call it. Nigel Hamilton (2005) who researched dreams of persons attending spiritual retreats, observes an increase in both light and color as the person goes through various stages in the process of what he terms psycho-spiritual transformation, and a dramatic appearance of light and visionary imagery in the dreams at the point of *transcendence*.

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