using with the purpose of eliminating threatening situations. The study describes the types of cognitive strategies often by using in vivo language— the language of participants. The opening, focal, and closing strategies contain types of thinking that include specifically cognitive processes and also cognitive problem-solving processes with emotional underpinnings.

Based on the results of this qualitative analysis of subjective experiences of dreamers, the classification of problem-solving cognitive processes demonstrated by dreamers in threatening situations might currently represent the extent of known possibilities for resolving conflictual, problematic, or dilemmatic situations in dreams that are undermined by the presence of emotion of fear. The scope of cognitive capacities dreamers used to alleviate these perturbations within the dream scenarios also allows for the conclusion that the goal-oriented strategies might expand our understanding of executive function that operates during dreaming. The range of cognitive processes further points to the existence of a phenomenon of nocturnal cognitive problem solving (Kozmová, 2008) that becomes activated in response to emotional disequilibrium and renders itself to speculations about the function of specific problem-solving dreams.

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Evidence of wisdom in ‘extraordinary’ dreams
Stanley Krippner
Saybrook Graduate School

The history of dreams and dreaming contain anecdotal reports as well as research evidence that dreams can sometimes reach beyond ordinary limits of space and time providing information so profound that dreamers often refer to it as “wisdom.” These “extraordinary dreams” not only provide evidence of information that seem to transcend ordinary sensory barriers but may even provide glimpses into dimensions considered by many cultures to be the domain of spirit. These dreams include geological discoveries (Louis Agassiz’s discovery of a rare fossil, following directions given him in a dream), archeological discoveries (Herman Hilprecht’s piecing together a Middle Eastern artifact after receiving instructions from a “dream teacher”), technologi-
cal discoveries (Elias Howe’s invention of the lock-stitch sewing machine following a dream-delivered insight), and mathematical discoveries (Jerome Cardan’s recurring dream that motivated him to write his most celebrated book), and musical discoveries (Giuseppe Tartini’s composing of the “Devil’s Sonata,” Wagner’s composing of the beginning of “Das Rheingold”). Occasionally, these dreams provide wisdom in the spiritual domain as well (ranging from the predictive dreams of Buddha’s mother as well as those of the Old Testament prophets). The New Testament tells the story of how a warning dream enabled Joseph, Mary, and the infant Jesus to escape King Herod’s wrath. A combination of these two domains can be seen in the dreams of the Indian mathematical prodigy Srinivasa Ramanujan who consulted with Hindu goddess Namakali in his dreams to go beyond mathematical theory current in Europe at the time. When he was invited to study at Cambridge University in England, his mother refused until she was urged to change her mind by the goddess Managiri who appeared to her in a dream. In contemporary indigenous and shamanic traditions, dreams continue to provide insights into major and minor life crises, providing the basis for decision-making and problem-solving.

The Subjective and the Objective Duration of Static NREM Sleep Dreams

Valdas Noreika1; Jennifer M. Windt2; Valtteri Arstila1; Christine M. Falter3; Julian Kiverstein4; Antti Revonsuo1,5

(1) University of Turku; (2) Johannes Gutenberg-University Mainz; (3) University of Oxford; (4) University of Edinburgh; (5) University of Skövde

Background: Several researchers have argued that dreams may last throughout the night, while others have claimed that dreams are formed instantaneously at the moment of awakening. Yet, only a few empirical studies, based on post-awakening reports, incorporation of external stimuli into dream content, or counting tasks performed in lucid dreams, have aimed to explore the average duration of dreams. These studies have focused on the duration of typical complex REM sleep dreams, leaving the more simple forms of NREM sleep dreaming aside. We aimed to investigate the duration of static NREM sleep dreams, which usually consist of just a few comparatively mundane experiences.

Method: 10 participants spent 4 experimental non-consecutive nights in the sleep laboratory and were awakened 8 times per night, following the early-night serial awakenings paradigm (Noreika, Valli, Lahtela, & Revonsuo, 2009). awakenings took place during NREM sleep Stages 2 and 3 as well as during sleep onset REM sleep and were followed by a free dream report. Participants were also asked to answer a detailed questionnaire on different aspects of dreaming, including 5 questions about the subjectively estimated duration and the speed of time passage in the dream. The objective duration of NREM dreams was tentatively explored by EEG contrast between the reports of dreaming and dreamless sleep in a series of 2 s pre-awakening segments, starting with a 2 s segment of sleep just before awakening, then analyzing a previous 2 s segment, then another previous segment, and so on. We expected that
such stepwise analysis would detect a time point at which alpha and beta power of pre-awakening sleep EEG would not differ anymore between conditions of reported dreams and dreamless sleep, which would suggest how long these dreams may have lasted on average.

**Results:** (1) Most of the NREM dreams appeared to be static and limited in content, while the majority of the REM dreams were complex and dynamic. (2) Even though the duration of sleep was equivalent, the subjectively estimated duration of dreams differed between sleep stages, with REM dreams being reported as having been longer than NREM dreams. Yet, even the simplest NREM dreams were often experienced as having a duration of 30 s, 1 min or even longer, rather than being brief flashes of images. (3) By contrast, the subjective speed of time passage did not differ between dreams of different sleep stages and was typically scored as resembling waking life. (4) EEG spectral power in alpha to beta frequency range varied randomly between the dream and the dreamless conditions across a pre-awakening period of 20 s.

**Conclusions:** The subjectively reported duration of dreaming is associated with the complexity of dream experiences: dynamic REM dreams seem to last longer than static NREM dreams. Even though NREM dreams are also reported as extended in time, EEG findings do not support this and are compatible with the view that static NREM dreams might be generated during a brief moment before or during awakening.

**Acknowledgments:** The study was funded by the Volkswagen Foundation and the Finnish Graduate School of Psychology.

**REMS Suppression and Significantly lower Nightmare vs Dream Recall In Patients with OSA**

J. F. Pagel  
University of Colorado Medical School

In a study of a sleep laboratory population including patients with more severe apnea undergoing split-night studies (204/393 [51.9%]) patients with more severe OSA, as based on higher AHI, reported a significantly lower frequency of nightmares. No such changes were found to significantly affect the reported frequency of dream recall in this study. Mean Apnea-hypopnea Index (AHI) for this study population was 34.9 (std = 32.0). AHI and AI (Apnea Index) were significantly higher (p<0.000) for the grouping incorporating frequent nightmare recall, 71.4% of individuals in the group with an AHI < 5.0 reported nightmares occurring more than once/week. As the AHI score increased, the percent of participants with such frequent nightmare recall decreased linearly. This finding indicates that OSA suppresses the cognitive experience of nightmare recall, an effect that occurs independently of OSA effects on reported dream recall frequency.

This finding, that worsening OSA results in a significant decline in reported nightmare recall frequency could potentially be secondary to the effects of OSA in inducing daytime sleepiness. Patients that are more difficult to arouse report lower nightmare frequency. However, daytime sleepiness is not present in all patients with OSA, with studies reporting excessive sleepiness in 15.5-22.5% of middle-aged OSA patients. In addition to daytime sleepiness, OSA is known to result in cognitive deficits that include declines in working memory and deficits in frontal cortex executive functions. However, cognitive deficits are not present in all OSA patients and have been difficult to describe consistently for the disease process. The potential effects of OSA in inducing cognitive impairment do not explain why worsening OSA should significantly affect nightmare as opposed to dream recall. The possibly that insomniacs, known to have higher nightmare frequency than the general population, might comprise a higher percentage of low AHI no-CPAP group and introduce a selection variable accounting for the higher proportion of nightmares was also addressed in this study. Even in the lower mean AHI group not treated with CPAP, increasing AHI significantly reduced reported nightmare frequency. While dreaming occurs throughout sleep, nightmares are generally described as a REMS associated parasomnia. REMS is the sleep stage most susceptible to abnormal breathing events, with OSA selectively suppressing REMS. It appears likely that diminished REMS in OSA patients accounts for the finding of decreased frequency of nightmares compared to dreaming in this population.

**Absolute Metaphor in Dreams**

J. F. Pagel  
University of Colorado Medical School

Science can be defined as the study of the correspondence, grounded in correctness, between metaphoric characteristics and the subject of study. The phenomena of dreaming that can be “scientifically” studied include: content, emotion, recall frequency, visual process, memories and memory process, associated diagnoses and effects on behavior. Most approaches to the study of dreaming avoid studying such dream phenomena and move directly into the study of postulated underlying processes (the phenomenology of dreaming). Studies of dream phenomenology are generally either neuro-physiological (primarily the study of REM sleep) or psycho-dynamic (Freudian, Jungian, etc.). Such approaches (studies of theory-constitutive metaphors) are conducted at a degree of logical remove from the topic of study in that the scientific validity for the proposed correlates of dreaming in each of these systems of study are unproven. These approaches do have advantages in that they address the process of dreaming rather than discrete and limited associated phenomena. Potential approaches that exist for scientifically studying dream process include the study of absolute metaphors of the dream state – characteristics that are not reducible with conceptual thought or language. Such absolute metaphors in dreaming include studies of formal structure and rhetoric, as well as studies of imagery viewed non-contextually (without replacement, interpretation, or analysis of association).