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Nadia J. Bijaoui

Joshua Bernstein

Christine Markham

Basil Aboul-Enein

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Can dream science be used to elicit healthy behaviors?

Nadia J. Bijaoui¹, Joshua Bernstein², Christine Markham³, & Basil H. Aboul-Enein⁴

¹Bio Health Education, USA

²A.T. Still University of Health Sciences, USA

³University of Texas, Health Science Center, USA

⁴London School of Hygiene & Tropical Medicine, United Kingdom

Summary. The science of dreams and their interpretation may seem like a recent trend, justifying current research interests. Yet, for centuries, dream science, once called oneirology, has captivated dreamers in quest of meanings and motivated scientists in search of explanations. Due to the recent expansion of dream research this narrative review discusses and explores relationships between dreaming and health promoting behaviors. Perspectives from current evidence are classified according to the fundamentals of the Freudian dream theory. Selected investigations are reviewed according to specific elements of the psychoanalytic theory, suggesting new approaches including a possible explanation of the paradox of the rapid eye movement (REM) sleep and new terms proposed, pre-REM and post-REM, to replace non-REM (NREM) sleep. This review draws parallels between selected studies and the possible health promotion benefits within a psychoanalytic perspective, proposing possible lines of research to improve physical and mental health and wellbeing within the context of dreaming. The potential of dreaming to elicit healthy behaviors may be possible if the dynamics of the psyche's structure are consciously understood. Further examinations of dream science could lead to unexplored areas of public health, neuropsychology, and health promotion with an integrative and cross-disciplinary approach.

Keywords: Dreams; Neuropsychology; Health Behaviors; Health Promotion; REM Sleep.

1. Introduction

Human cognition surrounding dreams dates back to Greek antiquity with sleep induction for dreaming and healing (Askitopoulou, 2015; Laios et al., 2016) and ancient Egypt with Joseph's interpretation of a pharaoh's dream that prevented seven years of famine (Getsinger, 1978; Karp, 2016; Szpakowska, 2003). Joseph's clarification is one of the earliest documented dream interpretations of health behaviors by initiating anticipatory measures to avoid starvation (Karp, 2016). Dreams are the uncontested expression of the subconscious, or the road to the unconscious (unconscious mind) (Freud, 1916, 1917). Investigating dreams' hidden messages and possibilities to improve health behaviors requires exploration of specific concepts and an understanding of the functional psyche (Freud, 1916, 1917; Haar, 1973). Years later, this older source has regained much interest as researchers are revisiting Freud for unsolved mysteries in dream science (Maquet et al., 2005; Perogamvros & Schwartz, 2012; Ruby, 2011).

While treating the pathological behaviors of neurotic patients, Freud (1916, 1917) documented the challenges he

encountered. As a neurological surgeon, Freud was puzzled when suitable treatments for certain disorders were not found. Freud observed dream functions were similar in all human subjects whether suffering from neurological diseases or not. His investigations guided him towards the psyche and the foundation of a new field – psychoanalysis. While investigating sleep patterns, Freud (1916, 1917) noticed three phases occurring consistently: A biological phase in the relaxation leading to a deeper sleep and to dreaming; a physiological phase and a psychic phase while dreaming. Haar (1973) stated that for Freud, the dream has not only a meaning in psychic life, but also as a specific physiological function. Additionally, Freud identified three levels of psychic activities that he named the Id, the Ego, and the Super Ego; these became the constructs of psychoanalysis and predictors of behavior within the fusion of biological, physiological, psychic, emotional, cognitive, and behavioral frameworks. The Id represents the basic instincts that a child learns to repress within the *inconscient*. The Ego, or *Self*, characterizes who a person really is; and the Super Ego, an extension of the Ego within a societal context, illustrates how the Ego wants to appear in society (Freud, 1923, 1961). While awake, the Ego and Super Ego operate as sentinels to prevent inappropriate expression of the Id. While sleeping, the Id is the only psychic structure operating and the only time it is not controlled by the Ego and Super Ego. Freud developed several definitions of dreaming, the most relevant when discussing the Id, the Ego, and the Super Ego, being "...la manifestation déguisée d'un désir refoulé" (...the disguised manifestation of a repressed desire) (Freud, 1916, 1917; Haar, 1973). This definition may seem more relevant for 1916, yet could still be applicable today

Corresponding address:

Basil H. Aboul-Enein, London School of Hygiene & Tropical Medicine
Department of Global Health & Development 15-17
Tavistock Place London WC1H 9SH United Kingdom
Email: Basil.Aboul-Enein@lshtm.ac.uk

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with a different interpretation. Dreams offer a direct connection to the *inconscient* and provide valuable tools for awareness leading to behavior modification. Donnely and McPeak (1996) reported the dreams of two subjects, one who was healthy, and one who had cancer surgery. The dream analysis provided tools for self-discovery and development to the healthy subject and therapeutic options not previously explored for the ill subject.

When a person sleeps, he/she does not want to deal with the outside world, making it not a neurological matter but a psychological one (Freud, 1916, 1917). Freud also expressed his wish that experimental psychology would provide more data. One century later, his request is being examined (Maquet et al., 2005; Ruby, 2011). In a comprehensive and detailed review of the neuro-physiological correlates of dreaming, Ruby (2011) revisited the complexity of dream research for a century and concluded that, after progress and setbacks, neuroscience and psychoanalysis must collaborate within a neuropsychanalytic perspective: Rapid eye movement (REM) sleep (Jouvet, 1965) is a contemporary application of the Freudian's physiological and psychic phases. Dream science is now integrating various perspectives and building interest in new investigations (Nielsen & Stenstrom, 2005; Pagel, 2012; Perogamvros & Schwartz, 2012; Ruby, 2011; Schredl, 2014). Incorporating Freud's work into current investigations may highlight possibilities not previously explored. The purpose of this paper is to integrate psychoanalytic expression of dreaming to selected investigations in order to influence healthy behaviors when awake. The biological, physiological, and psychic phases of sleep (Freud, 1916, 1917) are re-evaluated as functions of non-rapid eye movement (NREM) and REM sleep (Bódizs, Simor, Csóka, Bérdi, & Kopp, 2008; Jouvet, 1965; Maquet et al., 2005; Nielsen, 2000) to propose new research opportunities and health promotion applications.

2. Sleep Biological Phase – NREM

NREM sleep was initially identified as a dreamless transitional phase prior to deep sleep and preceding the REM phase (Bódizs et al., 2008; Jouvet, 1965; Maquet et al., 2005; Nielsen, 2000). NREM is characterized by a series of stages, each one progressing towards deeper sleep and the decrease of some metabolic functions, including progressive reduction of muscular activities and low-amplitude brain waves (Carley & Farabi, 2016; Institute of Medicine Committee on Sleep Medicine and Research, 2006; Jouvet, 1965; Purves et al., 2018). Nielsen (2000) reported that even though NREM was described as sleepless dream, his perspective was diverging and provided evidence of cognitive activities and covert dreaming during NREM sleep. Furthermore, NREM sleep was described as taking place before and after a REM sleep with a discrepancy in the number of stages reported. The discussion section will suggest a new terminology to avoid this confusion.

3. Sleep Physiological Phase – REM – The Paradox

The physiological phase (Freud, 1916, 1917; Haar, 1973) is similar to the REM sleep, which is characterized by increased metabolic functions of blood flow (Bódizs et al., 2008; Maquet et al., 2005; Nielsen, 2000) similar to the wake state in the Amygdala (Purves et al., 2018). However, REM sleep, or “paradoxical” sleep (Jouvet, 1965; Thorne, 2010),

is characterized by increased muscle atonia leading to almost complete paralysis of large muscles. This paradox is what Freud (1916, 1917) recognized as two opposed tendencies: The need to sleep (muscle atonia) and the psychic stimulus of dreaming (REM sleep), or “*Le rêve exprimerait donc le mode de réaction de l'âme, pendant l'état de sommeil, aux excitations qu'elle subit*” (The dream then expresses a way for the soul to react to the stimuli it endures while sleeping); dreaming being a reaction by contradictions to psychic phenomena triggered by somatic stimuli (Freud, 1916, p. 61). Kahn (2016) captures the duality of the Freudian physiological and psychic phases when referring to the dream two approaches, an objective one (brain activity measurement) and a subjective one (dream recall). Freud further defined the *inconscient* as the psyche itself and its essential reality. The *inconscient* being the realm of the Id gives the dream its mystery, as its messages are concealed: Once awake the Super Ego and the Ego supervise the Id. The paradox appears to result from contradictory and conflicting positions of psychic structures (the Id, the Ego, and the Super Ego) operating within a contrasting physiological milieu (increased metabolic function and decreased muscular function); which demonstrates that the Id expression of freedom triggers a metabolic excitation, while the Ego and Super Ego are no longer in control (Bijaoui, 2017; Freud, 1916, 1917; Haar, 1973). Understanding the cause of the paradox may offer new avenues for behavior modification, incorporating the Freudian's personality structure (Bijaoui, 2017; Freud, 1923) to dream science.

4. Dream Psychic Phase – Also REM

The paradox of REM sleep (Jouvet, 1965; Valencia Garcia et al., 2017) is taking place concurrently within the physiological and psychic phases (Freud, 1916, 1917; Haar, 1973); the paradox representing opposite purposes expressed in muscle atonia (Ego and Super Ego are dormant) and in excitation (the Id). Thus, during the REM sleep, which, according to our postulation, consists of the Freudian physiological and psychic phases occurring together, the psyche deals with the complexities of perception, imagery, cognition, memory, emotion, and individual dilemmas, such as untangling signals learned and stored in the hippocampus with potential for reactivation; learning and memory occurring in the hippocampus (Pajkert et al., 2017; Whitlock, Heynen, Shuler, & Bear, 2006). Perception and individual imagery make it difficult to systematize emotion, cognition, learning, and memory within a shared model. Free association - or a dreamer-unique way to link what he/she perceives to other learned and assimilated notions (Bijaoui, 2012, 2017; Freud, 1917; Piaget, 1952) - establishes an internal system of differentiation expressed in dreaming, which gives each dream an individual perspective.

However, perception is likely to be deformed while dreaming: Is it perception, imagination or hallucination (Bódizs et al., 2008)? Or symbolism (Freud, 1916, 1917; Haar, 1973)? Cognition, memory, and emotion within a dream provided conflicting references (Bódizs et al., 2008; Smith, 2013). (Freud, 1916); Freud (1917) identified two kinds of memory within a dream: A recent memory and a childhood memory, or a memory from a long time ago and stored in the hippocampus. Nielsen and Stenstrom (2005) referred to Freud's recent memory as a ‘day-residue’. However, it appears the authors were not familiar with Freud's childhood memory when they stated: “...the concept of episodic memory was

unknown to Freud" (Nielsen & Stenstrom, 2005, p. 1286). A memory from a long time ago, is what Nielsen and Stenstrom (2005) discussed as "episodic memory": A memory that re-appears in a dream, is dependent upon individual perception, free association, and emotional context, entailing an episodic memory that has been edited by the *inconscious*. The Id creates the dream around a recent stimulus that takes it back to a painful or happy memory, or to a repressed desire that consciousness has forgotten. But the *inconscious* Id never forgets.

While awake, any recent event may prompt a dream even though the dreamer doesn't perceive it as a potential psychic trigger, as seen in Stephan, Schredl, Henley-Einion, and Blagrove (2012) who reported children's nightmares after watching violent television programming. In this study, participants from 6-18 years of age ($n = 3,167$) incorporated TV content into dreams, experiencing a high percentage of nightmare frequency (73.65%). The frequency here could be seen with a dual effect: Frequency of nightmares and frequency of violent programs seen on TV, which could be daily events reinforcing the nightmares. This study particularly illustrates the relevance of a recent memory triggering emotion in dreaming.

Emotions in dreaming may be expressed in nightmares (Asplund, 2003; Blagrove, Farmer, & Williams, 2004; Zadra & Donderi, 2000), anxiety (Schredl, Adam, Beckmann, & Petrova, 2016), apathy (Zanasi et al., 2014), or pleasure (Freud, 1961; Perogamvros, Dang-Vu, Desseilles, & Schwartz, 2013; Perogamvros & Schwartz, 2012). Repressed emotions could lead to depression: Schredl et al. (2016) investigated the relationship between illness, health-related worries, and health-related dreams ($n = 178$ with 112 women, 66 men; ranging from 16 to 82 yrs) and found a significant relationship between dreams, health-related worries (34.09%), and illness (40.45%). Zanasi et al. (2014) compared dream narratives of 41 bariatric surgery candidates who demonstrated a lack of emotional expression when compared to 41 healthy individuals. Authors concluded severe obesity was correlated to psychological traits (lack of emotional expression) with results in 46.7% of bariatric surgery candidates and 39.1% in control group members.

Progress in neuroscience is providing scientific context for brain imageries that support Freud's concepts. The pleasurable emotions the Id seeks while the Ego and the Super Ego are inoperative constitutes the framework of pleasure seeking brain activities for personal satisfaction in a dream (Bódizs et al., 2008); and establishes a reward system (Perogamvros et al., 2013; Perogamvros & Schwartz, 2012). Perogamvros and Schwartz (2012) proposed a Reward Activation Model (RAM) studying the mesolimbic dopaminergic (ML-DA) system and consisting of two categories: the rewards and punishers, and the SEEKING system (Alcaro & Panksepp, 2011). The SEEKING mind is a brain process in search of pleasure (Alcaro & Panksepp, 2011). Application of the RAM confirmed that, "the activation of the ML-DA reward system during sleep enhances the overnight consolidation of rewarded or emotionally-relevant memories" (Perogamvros & Schwartz, 2012, p. 1943). As mentioned by the authors, those findings illustrate Freud's dream definition of a disguised manifestation of a repressed desire. Considering sexuality during Freud's period was mostly taboo and his population suffered from neurosis associated with sexual repression, the RAM system provides an excellent contemporary scheme to describe the Id's pleasure seek-

ing. Freud (1917) also proposed sublimation to redirect sexual energy. The RAM could be administrated with variables measuring the effect of individual lifestyle and psychological framework on the expression of sexual energy to investigate and improve the dream effect into energy for healthy behaviors.

5. Lucid dreams in NREM and REM Sleep

Freud did not include lucid dreams in his therapeutic model; his definition of lucid dreaming (*rêve réveillé*) related to artistic and literary creations (Freud, 1908). However, lucid dreaming is important to modern oneirology, providing new territories of research for pathological and non-pathological behaviors, as well as a modern adaptation of Freud's dream definition that will be proposed under Discussion. Lucid dreams, or the experience of being aware of being dreaming (Sparrow, Thurston, & Carlson, 2013) were first reported not to take place during a deep sleep (Green, 1968); then were reported in both NREM (Stumbrys & Erlacher, 2012) and REM sleep (LaBerge, 1990).

Sparrow et al. (2013) observed that lucid dreaming could be induced during what they termed "middle-of-the-night". The authors investigated levels of reflectiveness and constructive engagement (Rossi, 1972) vs. pre-lucidity, and lucidity in dreaming. Sparrow et al. (2013) observed a significant increase in week 3-post treatment, in both variables and especially in levels of reflectiveness. Sparrow et al. (2013) further reported a similar response in both groups and observed that lucid dreaming could be induced in the "middle-of-the-night" with meditation. Sparrow et al. (2013) specified that their results contrasted from empirical findings and concluded that induction and meditation in the "middle-of-the-night" enhance reflectiveness and constructive engagement in dreams. Sleep induction (Sparrow et al., 2013) is taking us back to stimulation and hypnosis in psychoanalysis and provides an important milestone reconciling psychoanalysis and dream science. Yet, this advancement seems only partial without more psychoanalytic integration and modernization, as reviewed below.

Jones and Stumbrys (2014) initiated an investigation correlating physical self (PSDQ), mental health (RPWB), and lucid dreaming among members of a sport team population ($n = 72$, with 47 male, 25 female; $M = 23.08$, $SD = 3.15$). The authors also reviewed the definitions of lucid dreaming, making a difference between being consciously aware of being dreaming and remembering well the content of a dream. Lucid dream frequency (LDF) and dream recall frequency (DRF) were correlated to different aspects of physical and mental health. Significant correlations were reported between PSDQ and both LDF and DRF; and especially between RPWB and both LDF and DRF. Even though the results showed a positive association between lucid dreaming, mental health, and physical fitness, Jones and Stumbrys (2014) concluded that the study did not support the association of lucid dreaming and better mental health and physical fitness. No relationship was found between lucid dream frequency and mental well-being, although mental issues were accounted for. Strong links were found between the physical self-concept and mental well-being. Jones and Stumbrys (2014) started by reviewing the definition and application of lucid dreaming, which before indicated a prevalent mixing of two definitions: Being consciously aware of dreaming and/or remembering detailed content of a dream (recall frequency); another important milestone. Lucid dream

Table 1. Independent Variable and Opportunity for Behavior Modification

Sleep Cycle	Behavior Modification Opportunity
1prREM	Psychotherapeutic HR for PH SS PNI HR for healthy behaviors
LpoREM	HR for Behavior modification Implementation HR for PD
REM	EMNDR

Note. 1prREM = First pre-REM; EMNDR = EMDR emotions for nightmares, depression, repression; HR = Hypnotic recordings; LpoREM = Last post-REM; PD = Psychodrama; PH = Psychic harmony; PNI = Psycho-neuroimmunology; SS = Sexual sublimation.

frequency was negatively related to physical self-perception and nightmares were correlated to mental conflicts. This study could be revisited with a larger population and/or more members of sports teams' population, which could increase the power and significance of interpretations.

6. Discussion

Dream science is a promising field yet potential applications for health promotion and wellness are not fully understood. Most importantly, dream science is not yet clarified objectively in the literature. Revisiting and modernizing psychoanalysis may provide a foundation for coherence, starting with a definition of dreaming that incorporates REM sleep. To avoid confusion, NREM is referred to as pre-REM or post-REM, a dreamer having the potential to dream several dreams during an uninterrupted sleep of several hours; pre-REM or post-REM providing ideal situations to elicit health behaviors (see Table 1). A dream template for behavioral science illustrates the dream cycle and the elements of a dream, proposing a reference to reach the Id and for behavior modification (see Figures 1, 2, &3).

6.1. Proposed Dream Definition

After reviewing contemporary literature and combining Freud's most popular definition to modern science, we infer: Dreaming is a manifestation of a memory, disguised to a certain degree, which is triggered by a recent event, and expressed within a repeated cycle of pre-REM, REM, and post-REM sleep. Degree of disguised manifestation refers to our statement that coherence and recall of a dream define a degree of harmony between the psychic energies: The more a dream is remembered, the more the Id, the Ego, and Super Ego are in harmony (Bijaoui, 2017; Freud, 1923). Psychic energy (Freud, 1916, 1917; Pulvino, 1975), energy behind unconscious mental functioning and the foundation of the psychoanalytic theory of personality, never disappears; even though it may change form, as in psychosomatic conditions. As we are examining the Id, Ego, and Super Ego as different entities, we are referring to three psychic energies.

6.2. Another Dream Paradox

The first paradox documented related to the blood flow increase and muscle function decrease during the REM sleep (Jouvet, 1965; Maquet et al., 2005; Nielsen, 2000; Perogamvros et al., 2013), occurring simultaneously during the physiological and psychic phases (Freud, 1916, 1917; Haar, 1973). A second paradox may be seen in the contradiction of the activities of an unrestricted Id while its sentinels (Ego and Super Ego) (Freud, 1923) are dormant, giving the inconscient a voice. Conflicting psychic energies that regulate dreaming are developed under Psychic Harmony. In a dramatization of this concept and within a psychoanalytic dimension, this is when the Id takes over – free to express repressed and/or forgotten emotions. The undisciplined character of the Id could be difficult to engage in the promotion of health behavior; but certainly possible with psychoanalytic techniques and psychoeducational interventions, presenting opportunities in health promotion. A dream is composed of five independent variables and of eight dependent variables. Figure 3 proposes a dream template structure that illustrates our proposed definition of

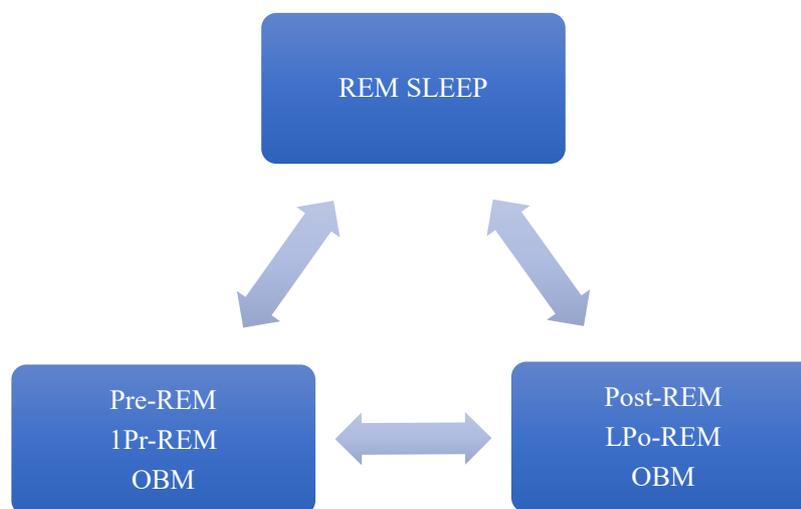


Figure 1. Dream Cycle & Opening for Behavior Modification (OBM). Dreaming is illustrated as repeated cycles of pre-REM, REM, and post-REM sleep. This figure proposes the first pre-REM and the last post-REM to induce behavior modification promoting healthy behaviors. To be followed by dream recall (Figure 3).

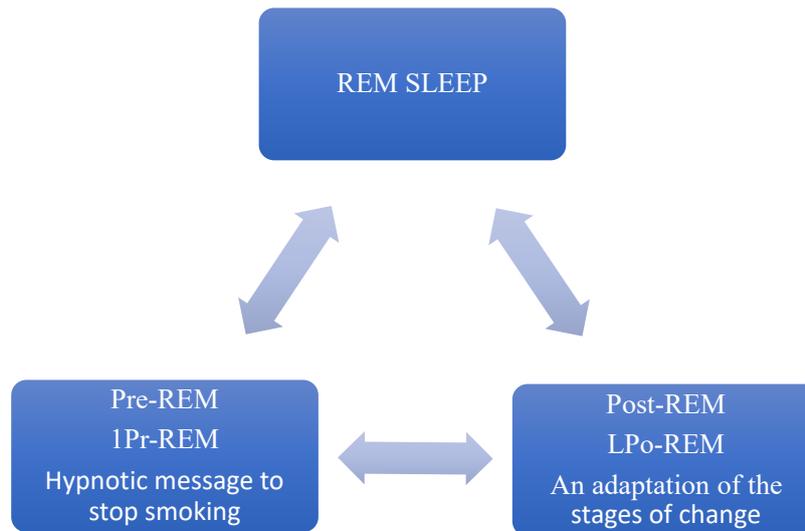


Figure 1. Dream Template for Behavioral Interventions Example of a hypnotic recorded message to induce smoking cessation while falling asleep (first pre-REM) and a meditative recorded message to influence daily behavior (last post-REM) are anticipated to decrease smoking. Participants will log number of cigarettes smoked daily and dream recall (Figure 3). Figures 1 and 3 are adaptable for health behavior improvement.

dreaming and the introduction of a second paradox to explain the recall and coherence or lack of in a dream.

6.3. Lucid Dreams

Lucid dreaming was also reported within unclear dimensions and two definitions (Jones & Stumbrys, 2014; Sparrow et al., 2013). Physiologically speaking, we are inferring that lucid dreams may happen during a pre-REM, or REM, or post-REM sleep, at anytime during sleep; which would confirm that dreaming is a repeated cycle of pre-REM, REM, and post-REM sleep. Psychically speaking and adapting the restructured Freudian concept of more or less disguised manifestation of repression into memory and recall, we are also inferring the more a dreamer recalls a dream, the less censure is operating between consciousness and inconscient (Bijaoui, 2017), another opportunity for future research.

Jones and Stumbrys (2014) differentiated being aware of dreaming in a dream and dream recall in lucid dreaming. However, the results are confounded by mental well-being, recall, and mental health issues. According to our postulation, this can be explained by dream recall, which is dependent upon psychic harmony and the degree of censure between the communication of the three psychic structures: The Id, the Ego, and the Super Ego. For instance, a depressed person may remember well a dream because her/his psychic structures are communicating effectively in spite of an adverse condition. The extent of coherence in a dream and its degree of recall seem to indicate the level of harmony between the three psychic structures – another opportunity for future research. To enable behavioral interventions, lucid dreaming is now evaluated outside the parameters of REM and only to first pre-REM and the last post-REM sleep of a night; presenting ideal conditions for reaching the inconscient and inviting the Id to cooperate in implementing healthy behaviors.

6.4. Research Opportunities and Health Promotion

Application

Windt and Noreika (2011) termed dreaming a second global state of consciousness and wished to assist new research with a model system of dreaming within an interdisciplinary approach. However, they concluded the project was still problematic and suggested electrical brain stimulation of prefrontal areas instead, which Ruby (2011) may perceive as a setback. While attempting a model of dreaming was an important milestone in oneirology, another important piece may be missing: The incorporation of the Freudian psychic structure to allow dream science to become dream therapy and to introduce behavior modification within dreaming. Table 1 and Figure 2 propose a guide for incorporating behavioral interventions into dreaming. Cigarettes smoking cessation is proposed, the template however is suitable for any behavior modification (see Figure 2):

6.4.1 Hypothesis.

Dream induction will assist healthy behaviors.

6.4.2 Objective.

Stop cigarette smoking sooner and longer lasting than with traditional methods.

6.4.3 Method

- Prior to intervention, participants will report the number of cigarettes smoked daily (baseline).
- Participants will be listening to a provided recorded hypnotic message to induce smoking cessation while falling asleep (first pre-REM).
- Another recorded hypnotic message based on Prochaska and DiClemente's (1983) stages of change will be played before waking up (last post-REM).
- Participants will log the numbers of cigarettes smoked daily.
- Participants will log any dream in the dream template of Figure 3.

Step 1 – Report Your Dream

Date: _____ Dream setting: _____

Personal free association: _____

Dream Attributes

Coherence: _____

Recall: _____

Awake narrative: _____

Emotions while dreaming: _____

Emotions while waking: _____

Degree of disguise: _____

Short-term memory: _____

Long-term memory: _____

Step 2 – Dream Definition Application

Apply dream definition: _____

What is emerging? _____

Figure 1. Dream Template for Behavioral Interventions Example of a hypnotic recorded message to induce smoking cessation while falling asleep (first pre-REM) and a meditative recorded message to influence daily behavior (last post-REM) are anticipated to decrease smoking. Participants will log number of cigarettes smoked daily and dream recall (Figure 3). Figures 1 and 3 are adaptable for health behavior improvement.

6.4.4 Anticipated results

Decrease in cigarettes smoking leading to lasting, permanent, cessation.

Thus, a regular night sleep presents more than one dream. Each dream is composed of three stages: pre-REM, REM, and post-REM; with pre-REM and post-REM being the most accessible to a dreamer's consciousness for psychoanalytic and behavioral interventions (see Figure 2). While dreaming, the unconscious is expressing memories and repressed emotions within the dreamer's scope of experiences (see Figure 3). Psychoanalysis provided methods that could be developed into valuable tools. Tools such as sublimation, free style exploration, hypnosis, and meditation were meant to reach the Id/inconscious. In addition to psychoanalytic methods, EMDR (Eye Movement Desensitization and Reprocessing) and psychodrama could also be considered.

6.4.5 Psychic Harmony

It was suggested in the last section that not recalling a dream may be correlated to individual harmony between the Id, the Ego, and the Super Ego. Measuring dream recall in function of personal harmony would provide interesting data, therapy opportunities, and an eventual confirmation that dream recall is dependent upon psychic harmony (see Figure 3).

6.4.6 Sexual Energy

The 'Me Too' sexual assault awareness movement also means that when a single woman is sexually offended, all women are, broadening the scope of health education. Of-

fenders may benefit from sex therapy through dream induction. Exploring offenders' characters, and starting by evaluating their first relationship to a woman (probably the mother, implying possible family therapy), may provide a path to sexual sublimation transferring inappropriate sexual energy into higher purpose (Freud, 1916, 1917) and especially into non-offending ways (see Figure 3). Haar (1973) referred to Freudian's sexual sublimation as a possibility of evolution for sexual impulses.

6.4.7 First pre-REM Sleep

While modern technologies provide observations of the REM sleep, they may not be readily available, especially if participants are documenting their dreams at home. Behavioral research could concentrate on the first pre-REM and the last post-REM sleep (below) of a regular night sleep, those phases being accessible to the dreamer outside an experimental setting. Sensorial stimulations induce dreams relating to the stimulus and to the dreamer's state of mind such as olfactory stimuli (Freud, 1916, 1917; Schredl, 2014). Auditory stimuli are easiest to self-administer when falling asleep (first pre-REM). Pre-recorded meditative/hypnotic messages including visualization could address a specific health message. Health behaviors, such as smoking cessation, increasing physical activity, safe sex, addictions, and eating healthy, could be implemented with hypnotic pre-recorded messages to observe changes in health behaviors (see Figure 2).

6.4.8 Last post-REM sleep

The exact time of the last post-REM, just before waking

up, may vary, therefore it may be difficult for a self-administered intervention. If possible, another recorded message could predict the day's activities with corresponding health behaviors reinforced. An adaptation of The Trans-theoretical Stages of Change Model (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997) could provide a line of conduct for that day following the guidelines of Prochaska and DiClemente (1983) stages of change. A template is suggested for health practitioners (see Figure 2).

6.4.9 *Id and Psychoneuroimmunology*

In the case of illness (Donnelly & McPeak, 1996; Schredl et al., 2016), somatic concerns may become stimuli of a dream. Psychoneuroimmunology (PNI) offers techniques to deal physically and emotionally with an illness or a condition. As PNI addresses the psyche to modify the physical, its incorporation into dreaming could provide an interesting line of research. Could the Id heal a suffering Ego or Super Ego (see Figure 3)?

6.4.10 *Repression and Nightmares*

Sexual expression is not the only element confined within the Id/inconscient. Painful memories may also be repressed and revived by recent events, potentially stimulating nightmares. The expression of painful memories while sleeping is likely to trigger emotions when awake, providing a field of investigation during the pre-REM and post-REM stages to heal past or recent fears or pains (see Figure 3).

6.4.11 *Nightmares & Eye Movement Desensitization and Reprocessing (EMDR)*

EMDR being mainly used for PTSD therapy (Jeffries & Davis, 2013) may transition to interesting investigations: Could EMDR reduce the frequency of nightmares by alleviating painful memories repressed in the Id and stored in the hippocampus? Psychic dilemmas may potentially be reactivated at anytime until dealt with. Associating EMDR to visualization may ease a trauma not only behaviorally but also emotionally for long lasting relief (see Figure 3).

6.4.12 *Psychodrama*

Psychodrama, an application of psychoeducational counseling, offers dramatization techniques for healing and preventing. Discover your nightlife: Dream analysis (Bijaoui, 2017) techniques could be developed for health promotion purposes. While meditation and visualization are typically sober techniques, psychodrama uses humor. Maybe the Id, Ego, and Super Ego would be more cooperative with humor? See Figures 2 & 3 for suggestions on how to target a particular health condition through dream induction.

6.5. Conclusion

Suggested future research is specific to first pre-REM and last pre-REM of nighttime sleep for health promotion applications. Neuroscience investigations may extend the proposed concept that dreaming is a cyclic phenomenon of pre-REM, REM, and post-REM stages. The REM paradox may be explained in psychoanalytic terms: In a dream, physiological and psychic energies are competing with each other while the body wants to relax and let go of its functions during sleep (a state required by the Ego and Super Ego); while the Id/inconscient, in order to find healing and/or pleasure, wants to revisit inhibited and/or repressed feelings

that have affected it, reliving its memories within a dream fantasized setting of images. Furthermore, we introduced a second paradox possibly explaining the degree of recall and coherence in a dream. Psychoanalysis projected the blueprint for learning and healing with dream science. Currently, oneirology offers numerous options to be explored, opening doors for creativity and discoveries in research. The relationship and interactions of the Id, Ego, and Super Ego, either dreaming or awake, provide a zone for action where possible interventions may be designed and implemented while sleeping. However, the foundation of research should be strictly reinforced: Do no harm, either physically or emotionally. Furthermore, entering the privacy of someone inconscient is a privilege not to be abused.

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