

Dreamers as agents making strategizing efforts exemplify core aggregate of executive function in non-lucid dreaming

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Summary. The study of higher-order cognition in dreaming was guided by the question “What are the scope and purpose of thinking/strategizing efforts as one of three previously identified direct mental problem-solving modalities (Kozmová, 2008; 2012) that some dreamers are capable of using to resolve the novelties of felt-need situations encountered during non-lucid dreaming?” The research utilized previously articulated thought processes of a multilayered nocturnal problem-solving phenomenon that emerged from analysis of archived cross-cultural dreams (Kozmová, 2008). The results, in the form of taxonomy of delimited higher-order thought executive processes analyzed by the method of grounded theory, describe core aggregate of executive function that consists of eight types of executive thought processes: (a) analytical, (b) decision-making, (c) defense mechanisms, (d) evaluative, (e) goal-oriented/goal-directed, (f) interpretative, (g) motivational, and (h) self-determinative. The subsequent substantive grounded theory proposes four purposes for dreamers’ demonstration of strategizing efforts within the scope of higher-order cognitive skills: (a) information gathering; (b) judgment; (c) protection and maximizing chances for success; and (d) exercising volition, agency, and autonomy. The future application of core aggregate of executive function in non-lucid dreaming includes research of neural correlates that could support this function during sleep.

Keywords: Executive function in non-lucid dreaming, Higher-order cognition in dreaming, Dreaming consciousness, Agency dreams, Core aggregate of executive function, Grounded theory

“The recent spate of brain imaging articles makes it clear that no amount of technical sophistication can compensate for neglect of exactly what psychological features the neurobiological data are asked to explain.”~ Hobson, Pace-Schott, & Stickgold, 2003, p. 231

1. Introduction

Dreaming could be considered subjective experience occurring within an altered state of consciousness (Hobson, 2010); dreamers across cultures report content of their dreams (Domhoff & Schneider, 2008). Dreams as psychobiological occurrences contain various psychological characteristics including agency (Hill, Spangler, Sim, & Baumann, 2007), mental activities (Wolman & Kozmová, 2007), and formal psychological features of consciousness (Hobson, 1997, 2002; Hobson, Pace-Schott, & Stickgold, 2000).

Regarding the interest in investigation of mental activities occurring during dreaming, the French Académie des Sciences Morales et Politiques posed more than 150 years ago, in 1855, a question about psychological features of dreams: “What mental faculties subsist, or stop, or change considerably during sleep? (cf. de Saint Denys, 1867/1977, cited in Schwartz, 2000, p. 56)”. The question implies that

existence, occurrence, quality, intensity, and extent of specific mental faculties’ could oscillate, remain the same, or change according to alterations in a particular state of consciousness. The comparisons between waking and dreaming states of consciousness and their understanding from functional and theoretical perspectives (for review, see Barrett & McNamara, 2007) continuously sparks interest within consciousness studies relevant to formal psychological feature of cognition in dreaming (Fosse & Domhoff, 2007; Hobson et al., 2000; Kahan & LaBerge, 2011; Wolman & Kozmová, 2007).

1.1. Psychological Agency

The concept of psychological agency or being an active agent within one’s own dreams has been characterized as “acting on one’s behalf” with intentional mental actions (Wolman & Kozmová, 2007, p. 847) and as thinking and acting “according to one’s self-knowledge” (Kozmová, 2008, p. 2). The phenomenon of agency in dreaming has been delineated as one aspect of executive thought processes (e.g., “decision making, problem-solving, planning, and agency,” Wolman & Kozmová, 2007, p. 845).

This possibility of acting on one’s behalf and exercising one’s psychological agency in dreams has been independently confirmed by Hill et al. (2007). In study of interpersonal content of dreams relevant for process and outcome of dream sessions between clients and therapists, one of the five categories has been termed agency dreams. In agency dreams, the dreamers’ exert efforts toward “overcoming formidable interpersonal adversity” (p. 16) such as “attack or threat from another person(s)” (p. 11). This type of dreams thus represents psychobiological occurrences

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in which dreamers work toward resolutions of encountered problems (Glucksman & Kramer, 2004; Greenberg, Katz, Schwartz, & Pearlman, 1992). The following example demonstrates an implied threat in agency dream and dreamer's mental efforts to overcome it:

I had a destination in mind where I am going. I knew I had to pass J.'s house. I also knew that on the way, either I could pass through the place—the clinic where Dr. P. practiced—or I could avoid it. I decided to go through the place even though I felt a bit of a fear. I thought, What will I do if I meet him in the hallway? Nevertheless, I decided to go through the clinic. (Kozmová, 2008, p. 4)

The psychological agency which dreamers exercise in agency dreams by making active mental choices in problematic situations is an impressive demonstration of consciousness: Without reflective awareness that one is dreaming (Gackenbach & LaBerge, 1988), some dreamers become conscious of themselves and situations and through mental acts might actively participate in resolving the problem (Kozmová, 2008).

The notion of psychological agency in dreams, however, has been disputed by proposition that even though "our dreams seem to be agent driven, they are not volitional nor do they contain the self-reflection, insight, judgment, or abstract thought that constitutes secondary consciousness" (Hobson, 2009, p. 808). This notion of lack of psychological agency in dreams conceptualized as hallucinations is supported by proposition of deficient chemical modulation abundant in waking or lucid dreaming (Hobson, 2009).

1.2. Cognition as a Psychological Feature of Consciousness

As conceptualized within the consciousness studies per se, consciousness across waking and dreaming states contains several psychological features: (a) external sensory input; (b) external and internal perception; (c) attention; (d) memory (both recent and remote); (e) orientation; (f) insight (self-reflection in terms of attention, logic, and mental representations); (g) internal language; (h) emotion; (i) instinct; (j) volition; and (k) thought (Hobson, 1997, 2002).

Regarding thinking, the idea that ordinary non-lucid dreaming contains higher-order cognition in the form of "complicated feats of thinking" has been known for more than a century (Freud, 1900/1990, p. 389). Some aspects of waking and dreaming consciousness are currently readily available for comparisons (e.g., assessment of metacognitive skills in waking and sleep, Kahan & LaBerge, 2011; see also Kahan & Sullivan, 2011). Other psychological cognitive elements found within subjective experiences in dreaming are waiting to be investigated. Example of such unknown aspects of dreaming consciousness is previously established existence of higher-order cognition of executive thought processes in dreaming (Wolman & Kozmová, 2007): It is not yet known what types of active choices or mental strategizing efforts dreamers might be able to use when dealing with and/or resolving difficult or curious situations in non-lucid dreaming.

It has been proposed that non-lucid dreamers exhibit "deficit of deliberate thought and action" (Schwartz & Godwyn, 1988, p. 424) and a "failure of directed thought" (Hobson et al., 2000, p. 806) within hallucinatory dreaming state (Hobson, 2002). Since the executive function is deemed ab-

sent in dreaming (Fosse & Domhoff, 2007, p. 66), the notion of decreased cognition in non-lucid dreams thus portrays individual dreamer as a passive recipient of haphazard and randomly created dream situations and scenarios.

1.3. Two Conceptualizations of Dreaming Consciousness and Research of Cognition

Throughout the ensuing years from de Saint Denys' (1867/1977) investigative challenge, dream research in the United States that focused on investigation of mental faculties of thinking during non-lucid dreaming state of consciousness had diverged into two directions: (a) deficiency/irrationality in the dreaming state conceptualized as hallucinatory without secondary consciousness and its cognition; and (b) continuity/rationality in dreaming state conceptualized as based on multiple levels and viewpoints of cognition.

1.4. Understanding dreaming consciousness and its cognition as hallucinatory

During non-lucid dreaming, the personal immersion in one's dreams and separation from reality of the waking world without the overarching cognitive/self-reflective ability to differentiate dreaming from waking (known as lucid dreaming; Gackenbach & LaBerge, 1988) creates a specific internal landscape: The subjectivity of individual dreamers in some dreams and during specific times in life could be entirely dominated by endogenous stimuli of primary consciousness (Moffitt, Hoffmann, Mullington, Purcell, Pigeau, & Wells, 1988; Rossi, 1972).

Primary consciousness of waking life has been characterized as "the direct experience of percepts and feelings, and thoughts and memories arising in direct response to them" (Farthing, 1992, p. 12) and it has been used in dream research. In its specific formulation as hallucinatory, the non-lucid dreaming is understood as "predominantly primary in the sense that it emphasizes perception and emotions at the expense of reason" (Hobson, 2009, p. 808). In this case, the loss of reasoning capacities includes lack of secondary (or reflective) consciousness (Hobson, 2009) defined as "thoughts about one's own conscious experience" (Farthing, 1992, p. 13). Consequently, with focus on its primary endogenous aspects and without abilities of secondary thought process, non-lucid dreaming is continuously understood as hallucinating madness (Hobson, 2010).

Conceptualization of dreaming as a delirium is linked with a mental status examination in psychiatry (Hobson, 2002). During the psychiatric interview, the examiner with self-reflective awareness, judgment, logic, and insight presumably intact will look for the same qualities of secondary thought processes (reasoning) in a patient (Hobson, 1988, 2005). Patient's mental state with impaired or decreased state of consciousness could include "reduced clarity of awareness of the environment" and "reduced ability to focus, sustain, or shift attention" (Kaplan & Sadock, 1998, p. 324); "reasoning ad hoc, logical rigour weak," frail volition, "loss of attention" and "illogical and undirected" thought (Hobson, 2002, pp. 27, 144). The "delirium" of mental illness (understood to be an organic brain disease characterized "by disorientation, illogical cognition, distracted attention, unstable emotion, and dull intellectual functions" [Domhoff, 2011, p. 1163]) then exists without "normal mental processes" (Hobson, 2005, p. 62).

The secondary thought processes of reflective consciousness are understood as the here-and-now capacities for abstract thought, insight, judgment, and self-reflective awareness about the self and waking-life realities (e.g., Kaplan & Sadock, 1998); they include capacity for reality testing. This cognitive accomplishment represents “conscious, rational aspects of oneself” (Bettelheim, 1982, p. 55) that the person (the “I,” or “self,” p. 55) uses for objective evaluation of environmental features, demarcation of realities of the external world and the internal world, and for judgment about relationships between oneself self and surroundings (Kaplan & Sadock, 1998). Reflective consciousness and reality testing in this framework are relegated exclusively as processes governing the waking world life (Hobson et al., 2000) or lucid dreaming during. This later “hybrid state” of dreaming consciousness allows for a subjective reasoning self (which recognizes the dreaming state) to join an observing and acting self (Hobson & Voss, 2010, p. 163); in these times, the lucid dreamer is able to use rational thought and volition (p. 164).

In theorizing about non-lucid dreaming from hallucinatory perspective, reality testing known from waking life has been substituted, in the state-dependent model of consciousness (the AIM model [Activation, Information, Modulation], Hobson, 2009; Hobson et al., 2000; formerly known as the activation-synthesis theory of dreaming; Hobson & McCarley, 1977) by the term “self-reflective awareness” (Hobson, Pace-Schott, & Stickgold, 2000, p. 809). In non-lucid dreaming, this ability to distinguish between waking and dreaming state of consciousness is considered deficient or predominantly lost along with the elements of higher-order cognition.

1.5. Notion of deficiency/irrationality and research of cognition in dreaming.

The AIM model of consciousness (Hobson et al., 2000) presumes isomorphism or concomitance “between mental and physiological states” (p. 793). In non-lucid dreaming, the mind “becomes both hallucinatory and unfocused” (p. 815) and mental activities would not prosper: Dreamers’ thought processes, in this proposition, would be virtually static, suspended, non-logical, irrational, and replaced by primary consciousness (Hobson, 2009, 2010; Hobson & Voss, 2010). As the theorists assert, non-lucid dreaming consist of “inability to direct either our thoughts or actions” (Kahn & Hobson, 1994, p. 2) and the content of conscious experience would be barren of mental activities of thinking elaborations.

Under the auspices of studying deficient cognition as a state dependent property of the dreaming brain, the research claims that thinking, which includes various phenomena that belong to the group of higher-order cognitive skills (e.g., volition, reflectiveness, reflective awareness, self-reflectiveness, self-awareness, self consciousness) are lost during dreaming (Foulkes, 1990; Koukkou & Lehmann, 1983; Rechtschaffen, 1978; Weinstein, Schwartz, & Ellman, 1988). Further, thinking in dreaming has been labeled as hallucinatory mentation (Fosse, Stickgold, & Hobson, 2004) or viewed as illogical, improbable, or impossible (Hobson, Hoffman, Helfland, & Kostner, 1987; Hobson, Pace-Schott, Stickgold, & Kahn, 1998; Muzur, Pace-Schott, & Hobson, 2002).

1.6. Understanding dreaming consciousness and cognition as operating on multiple levels.

In dream research, using the term cognition presents a dilemma because it could be understood, associated with, theorized about, or investigated in variety of different ways that include focus on cognition as (a) continuous psychological formal feature of consciousness (e.g., Wolman & Kozmová, 2007); (b) developmental accomplishment (e.g., Domhoff, 2003); (c) dream production (Mamelak & Hobson, 1989); or (d) imaginative cognition (Nielsen, 2011).

The thinking or cognition as a feature of consciousness could be pragmatically conceptualized as processes of higher-order cognition (including reflection, metacognition, and rationality) that exists during dreaming and which dreamers are capable of using. The following published examples illustrate this mental capacity of thinking in use: (a) “I am thinking that this looks like an exam in geography and not in painting” (Wolman & Kozmová, 2007, p. 845), and (b) “The impossibility of lifting the box while being inside it dawns on me, and I decide to investigate the falls, which seem more perilous than expected. I walk to the near precipice and look down. There’s no way to survive the rocky staircase below” (Hobson, 2005, pp. 139-140).

Cognition involved in production of dreaming is also understood as an involuntary biological and age-based psychological developmental achievement (Domhoff, 2003) that could be interrupted by lesions or illnesses (Solms, 1997). In this viewpoint, specific brain structures need to be developmentally in place before the event of dreaming (first as a static image, later on as a story and dream actions) and its recall could occur (Domhoff, 2003; Foulkes, 1982; Siegel & Bulkeley, 1998).

In dreams studies, the term cognition is also occasionally used in reference to cognitive elements termed incongruities, discontinuities, and uncertainties; and as vagueness of dream events, images, settings, person, places, activities, and plots, including ad hoc explanations of bizarre events (Mamelak & Hobson, 1989; Revonsuo & Salmivalli, 1995). When considering exclusively this “bizarre” aspect of cognition, it seems that dreamers are not often able within dream scenarios to reach cognitively for the ability to distinguish between bizarre impossibilities and improbabilities (Mamelak & Hobson, 1989; however, for frequency of bizarreness in dreams, see Dorus, Dorus, & Rechtschaffen, 1971).

Regarding dream bizarreness in the terms of impossibilities and improbabilities (Mamelak & Hobson, 1989), it is conceivable to inquire whether some cognitive elements unrecognized by dreamers might be in fact parts of dream production in a biological and structural sense (Domhoff, 2003; Solms, 1997). In this line of thought, it could be proposed that these by dreamers unacknowledged and non-responded to elements could be similar to or identical to parts being assembled and recruited within the complex biological behavior of neural correlates to create dreaming. These elements might be presented to the dreamer in unrecognizable psychological terms that are, however, scientifically recognizable during waking life (Mamelak & Hobson, 1989). Nevertheless, during dreaming, dreamers, even without recognizing improbabilities, could be at the same time cognitively engaged in rational thought including metacognitive and reflective capacities (e.g., Kahan, 1994; Kahan & Sullivan, 2011; Wolman & Kozmová, 2007). This proposition is evidenced by notion that dreamers do seem to have enough mental capacities to recognize bizarreness if it is personally

meaningful (e.g., “Mother, how can you speak to me, you are dead!”; Kozmová & Wolman, 2006, p. 211).

Lastly, dreaming as proposed by Nielsen (2011), is considered to be another form of “imaginative cognition” with “reality simulation” that houses and includes spontaneous imagery (e.g., dreaming and daydreaming fantasy) and instrumental imagery (e.g., waking life autobiographical recall, story creation, and imaginal problem-solving, p. 596). In this conceptualization, dreaming classified within imaginative cognition represents for dream psychobiologists “a convincing simulation of waking reality experience” positioned within “a unique imagery family” (p. 596). Similarly to other subjective experiences and to formal psychological features of consciousness (Hobson, 2002), this form of imaginative cognition of dreaming contains features that are possible to investigate, define, and classify with the goal of creating their taxonomy (Nielsen, 2011).

1.7. Notion of continuity/rationality and research of thinking in dreaming.

Research with the assumption of the continuous subjective experience in dreaming—including cognition as one of the features of consciousness—defined the distinct cognitive phenomena occurring in waking life that contain different facets of thinking (e.g., self reference, reflective awareness, speech, self-reflection, and reflectiveness) as occurring during dreaming. The separate groups of researchers who investigated thinking in dreaming concluded that the content of dreams contains definite types of thought (Cicogna, Cavallerro, & Bosinelli, 1991; Kozmová & Wolman, 2006; Meier, 1993; Purcell, Mullington, Moffitt, Hoffmann, & Pigeau, 1986; Snyder, 1970). These cognitions include “verbal thinking” and “dream speech” (Kilroe, 2001, pp. 108, 109); “reflection” and “deliberation” (Meier, 1993, pp. 63, 69); “inferential thinking, remembering, deciding” (Snyder, 1970, p. 139). In addition, “think[ing] over an idea” (Kahan, 1994, p. 181) could be, depending on context, considered reflection or planning. Further findings regarding thought processes included “reflective awareness” (Kahan, 1994, p. 177; Kozmová & Wolman, 2006) and rational thought which included executive thought process of higher-order cognition (Wolman & Kozmová, 2007)

1.8. Higher-order cognition in dreaming

Theoretically, the groups of higher-order cognitive processes (conceptualization of which is based upon state-dependent model of consciousness; Hobson, et al., 2000) are known as “executive ego function” (Hobson, 2007, p. 75); “executive system” (Fosse et al., 2004, p. 302); and “executive cognitive system” (Fosse & Domhoff, 2007, p. 66). The latter one focuses on “biological rhythm (or brain state) approach to cognition” (p. 51) and proposes that neurobiological disfacilitation of brain regions which support cognition in waking state of consciousness does not allow for executive cognitive system to be active during dreaming. In this sense, the term “non-executive orienting” is applied to non-lucid dreaming (Fosse & Domhoff, 2007, p. 49).

In actual dream research, the executive thought processes are termed (a) “directed thinking,” “internal deliberation,” and “focused thinking” (Fosse et al., 2004, p. 302, defined operationally as an executive line of directed thought that consists of “any continued mental effort or occupation, including contemplating, reflecting, and evaluating, as well as

attempts to decide, figure out, grasp, and plan,” p. 299); and (b) rational thought process defined as “decision-making, problem solving, planning, and agency” (Wolman & Kozmová, 2007, p. 845). Both formulations of executive thought understand the specific processes to be part of “secondary process or logical thinking” (Kaplan & Sadock, 1998, p. 218).

Research of directed thought. Within the state dependent model of consciousness in ordinary dreaming (conceptualized as hallucinosis; Hobson, et al., 2000), Fosse et al. (2004) study focused on identifying the quantity of directed thought in different sleep stages in 229 REM and 165 NREM mentation reports (“mental activity during sleep”; Stickgold, 2000, p. 6) dictated by 16 participants who were 19 to 26 years of age (M = 8, F = 8). Surprisingly, even though the dreamers recalled mentation in 88% of their REM sleep awakenings, those accounts were filled with hallucinations, as defined by operational definition (“internally generated [endogenous] sensations in any sensomotoric modality, most commonly a visual, auditory, or kinesthetic”; p. 299). Further, in various segments of NREM sleep stages, the judges found more directed thinking (e.g., 43%) than during REM sleep stages (e.g., 21%). During late-night sleep stages, in both NREM and REM, researchers found focused thoughts at the lowest levels (19% vs. 18%). Directed thinking compared with hallucinations across NREM and REM stages seemed to be decreased in REM sleep stages. Thus, the findings supported the state-dependent hypothesis of decreased higher-order cognition in different stages of dreaming consciousness (Hobson, et al., 2000).

Research of rational thought processes. A different investigation of higher-order cognition in dreaming (Wolman & Kozmová, 2007) worked under the supposition of continuity of consciousness (some of the dreamers’ subjective experiences per se continue based upon preoccupations and concerns of waking life; Domhoff, 2003; Hall, 1953). The authors further assumed that during dreaming are present a combination of “bottom-up” processes of sensory impressions and “top-down” secondary processes of executive function (for review of consciousness processes, see Gray, 2004; for research, see also Kahan, 1994; Kozmová & Wolman, 2006).

Wolman & Kozmová (2007) defined rationality for both waking and dreaming subjective experiences as “a mental process that utilizes an individual’s internal logic and is based on idiosyncratic belief system. This mental process intervenes between sensory perception and the creation of meaning, and leads to a conclusion or to taking action” (p. 841). The definition explicitly implies volition in dreaming because the dreamer uses his or her own mental capacities for mental actions and reaching conclusions. The process ends when the engaged individual reaches a satisfactory, unsatisfactory, reasonable; or unreasonable (in terms of illogical, counterfactual, confabulatory) conclusion (p. 841).

The researchers (Wolman & Kozmová, 2007) operationalized executive thought as a cognition that

represents the dreamer’s agency (authorship of intended or completed action), which is demonstrated by using a variety of higher-order cognitive processes. Executive thought process consists of thinking about taking an action and/or its initiation and completion. It implies intentionality; opportunity; planning; choice; judgment; decision-making; problem-solving; and creativity. Using these processes then contributes to a greater cognitive and be-

havioral flexibility and solidifies the psychological agency of a person. (Original definition by Kozmová & Wolman, 2005, expanded by M. Kozmová and R. Wolman, personal communication, March 11, 2007, for the purposes of extraction of different thought processes from the description of dreams; Wolman & Kozmová, 2007)

For analysis of dream reports, the study (Wolman & Kozmová, 2007) applied an inferential method to thought units extracted from dream diaries of 10 participants (M = 5, aged 22 to 58 years; F = 5, aged 25 to 49 years). The results of analysis revealed a group of eight higher-order rational thought processes including analytical, executive, subjective, affective, perceptual, memory and time awareness, intuitive-projective, and operational thought processes (Wolman & Kozmová, 2007, p. 845). The study also found, under the group of higher-order executive thought processes, the evidence of agency and problem-solving.

Problem-solving in dreams as part of higher-order cognition. If the concerns and preoccupations of everyday life are considered to be a part of the nighttime dreaming (e.g., Hall, 1953), then it seems obvious that dreamers might try to resolve difficulties, problems, and curiosities they encounter in dreams.

The dreamers' attempts for resolution of dilemmas within immediacy of their dreams are termed "problem-solving" and are illustrated by examples from clinical accounts (e.g., Glucksman, 2007) other than individual's use of incubation (defined as focus on posing a problem from waking life prior to sleep and expecting the dream to develop an idea, contribute to a solution, or assist in resolution of the problem in some way; Barrett, 1993, 2001; Krippner, 1981; White & Taytroe, 2003).

Previous sporadic investigations of problem-solving in dreams include tracing of day problems and their residues into dreams in a form of dialectical evolution Kuper's (1983); elucidating psychoanalytical theory through the process of adaptation (Greenberg, Katz, Schwartz, & Pearlman, 1992); mental health (Wolowitz & Anderson, 1989); evaluation of clinical progress (Glucksman & Kramer, 2004); as mechanism of developing, training, rehearsing, and maintaining of "threat perception and threat avoidance skills" (Revonsuo, 2000, p. 898, Revonsuo & Valli, 2000), and as part of executive thought processes (Wolman & Kozmová, 2007).

Investigating the idea of dreamers problem-solving efforts further, Kozmová (2008) mapped out the scope of multilayered phenomenon of nocturnal cognitive problem-solving strategies positioned in the context of dreamers' self-preservation and intrapersonal, interpersonal, and inter-object relationships. Phenomenon consists of three separate modalities (direct [which includes thinking], self-monitoring, and indirect) with distinctive categories and properties.

In order to distinguish the goals of present study from various segments of articulated problem-solving phenomenon (conducted with primary data analysis, Kozmová, 2008) and abovementioned problem-solving research; the present study uses the term "strategizing efforts" (p. 113) to signify thinking mental actions of dreamers as active agents who are capable of making deliberate choices with the goal of resolving difficulties encountered in dreams.

2. Study's Research Question, Goals, Underlying Assumptions, and Presentation Specifications

The current study of executive function in non-lucid dreaming (Wolman & Kozmová, 2007) focused exclusively on secondary analysis of dreamers' strategizing efforts to resolve dream- or self-created problematic, conflicting, threatening, or curious situations within previously identified range of cognitive acts that exemplify nocturnal problem-solving phenomenon (Kozmová, 2008, 2012).

The investigation of executive functions' higher-order cognitive processes, in other words, dreamers' strategizing efforts, posed the following question: "What are the scope and purpose of thinking/strategizing efforts as one of three previously identified direct mental problem-solving modalities (Kozmová, 2008; 2012) that some dreamers are capable of using to resolve the novelties of felt-need situations encountered during non-lucid dreaming?"

The aims of present inquiry were to (a) illuminate the extent of executive function in non-lucid dreams and to create its taxonomy; (b) delimit each part of taxonomy (individual processes of the core aggregate of executive thought processes of higher-order cognition) for its specific properties and overall purposiveness; and (c) pose a substantive grounded theory of executive function in non-lucid dreaming.

The specific contribution of the present study then rests in offering, in a form of taxonomy, the articulated and testable core aggregate of strategizing thought processes of executive function in non-lucid dreaming.

Because the timely articulation of the study's philosophical underpinnings might reduce investigative biases in techniques and in discussion of findings of research (Gantt & Melling, 2009), the following points serve as a disclosure of several assumptions which informed the current research inquiry:

1. For the purposes of the present study, the concept consciousness is defined (based upon conceptualization of other authors [Farthing, 1993; Kozmová, 2008; Kozmová & Wolman, 2006; Purves et al., 2008; W. James, 1890]) as "a subjective awareness of oneself as an experient, actor, observer, and thinker distinct from other experients, actors, observers, and thinkers regardless and including of recognition and acknowledgment of separateness between waking, dreaming, or altered states—which could be momentary or longer than a few minutes—of conscious existence. Consciousness further includes noticing and awareness of sensations, perceptions, emotions, thoughts, and memories registered in the primary and/or reflective mode of experiencing. Consciousness denotes an ability to recall and describe internal experiences. These recalled descriptions (offered orally to self or others or shared in a written or pictorial form) could include non-salient, salient, and surprising elements of subjective experience which may remain experienced, stored in memory, developed further in imagination, or could be volitionally acted upon—internally or externally—by internal or external prompts to action."

2. Dream reports as the "first-person accounts of subjective experiences" (Hobson et al., 2003, p. 231) are considered to be a legitimate source of subjective data suitable for systematic investigation and scientific inquiry (Domhoff, 2003; see also dream science works in three volumes edited by Barrett & McNamara, 2007).

3. Subjective narratives of dream experiences contain

“psychological features” and “mental life” data (Hobson et al., 2003, p. 231).

4. Prior to quantifying the psychological features of the “subjective experience of conscious states,” it is first necessary to characterize those features; after psychological articulation, the combination of narratives with complimentary techniques of neurobiology may shed light on the intricacies and nuances of mental life (Hobson et al., 2003, p. 231).

5. During dreaming, from which archived reports used in the present research originated, dreamers were considered to be disconnected from the waking world by virtue of not being in a contact with people who were awake or asleep. In this sleeping state, without sensory contact with external world, even though dreamers might have recognized in their dreams familiar characters or remember people, places, situations, etc., dreamers considered the dream world as real. Without external help or assistance, which is often available in times of need during waking life, dreamers used their available individual personal mental abilities to deal with the situations that ensued.

6. The dreams in which dream characters were helping or assisting dreamers in difficult situations (Kozmová, 2008) were excluded from the present analysis. The study centered exclusively on dreamers’ strategizing efforts as expression of their psychological agency which has been previously identified as part of executive thought processes (Wolman & Kozmová, 2007). The dream characters’ efforts in saving the dreamer, suggesting solution, or posing the question leading to dreamer’s attempts for solutions are explicated as a part of problem-solving phenomenon elsewhere (Kozmová, 2008, 2012).

7. Without any prior specific arrangements for dream recall with NREM and REM sleep distinction in mind (e.g., Fosse et al., 2004), the study material—archived dreams—were considered to be spontaneously recalled at home from the latter REM sleep periods (Strauch & Meier, 1996).

8. Descriptions of subjective experiences of dreaming (understood as a psychobiological event) from the same culture might elucidate some types of mental strategies—individual thought processes—of higher-order cognition. At the same time, dream descriptions from males and females from seven different cultures, with both individualistic and collectivistic social and cultural orientations might allow for articulation of a composite, richer picture of dreamers’ strategizing capacities.

9. For the purposes of this research, the researcher understands the psychological features of the mind in terms of the “sum-total of mental operations” (Goldberg, 1980, p. 7). This definition is in agreement with understanding of the mind as information in the brain (Hobson, 1988), which has been, in past research, retrieved by an “affirmative probe” (Kahn, Pace-Schott, & Hobson, 2002, p. 47). The probe, during instrumental awakenings, consists of asking a question: “Think back and try to remember what was going on in your mind in the time prior to being beeped” (Fosse et al., 2004, p. 299). In the present research, individuals whose dream content has been analyzed retrieved the information themselves by their own recall endeavors.

10. Given dreamers’ disconnect from waking realities and possibilities, it is understood that only some types of higher-order cognition might be available in non-lucid dreaming. Thus, it was assumed that the dreamer’s mental effort in sleep could demonstrate some, but not all, information and capacities of the brain working during the day. As an

example, long-term planning of one’s life, which dreamer might contemplate during a few minutes of lucid dreaming (Gackenbach & LaBerge, 1988), could be excluded from the availability of mental operations in non-lucid dreaming.

11. Similar to several specific waking states of consciousness during which the individual’s subjective experiences consist of only internal sources of information (e.g., day-dreaming, visualization, and brainstorming), the mental processes of nocturnal dreaming are undergirded mostly by endogenous sources of information.

3. Methods and Materials

3.1. Participants

The current research was archival and retrospective in nature. The archive consisted of 1,298 dreams gathered from 100 males and 100 females from six different countries (Argentina, Brazil, England, and Japan, two republics of the former Soviet Union—Russia and Ukraine) and dreams from 32 females and 66 males from the United States. Between 1990 and 2004, each from the total of 1,298 participants contributed one dream to archival collection enticed by dream seminars led by Stanley Krippner, Ph.D., Saybrook University.

While doing their dreamwork, participants were protected under the approval of the Saybrook Institutional Review Board (SIRB). For concision with the sample size of each group (100 participants), some participants’ relatives and friends, with equal protection from SIRB, were asked to contribute one self-selected dream. Regarding dreams gathered from participants from the United States, some of the dream narratives were irretrievably lost in computer failure; thus, the collection of dreams from the United States remained incomplete.

The dreamworkers, aged 20 to 70 years, with a few younger or older exceptions (median age was approximately 40 years), came from middle- and upper-middle socioeconomic groups; they were motivated by a desire to learn about themselves by working on their self-selected dreams. The collected dreams were professionally translated into English and some of them previously utilized for quantitative content analyses (e.g., Kozmová, Tartz, & Krippner, 2012; Krippner & Weinhold, 2001; Krippner, Winkler, Rochlen, & Yashar, 1998).

3.2. Data Selection

Because the dream as an object of study is often conceptualized differently (Pagel et al., 2001), the present author created an adaptable and comparable “definition of the dream proper” as a source of data used for the present study also utilized in previous research (Kozmová, 2008):

A dream could be characterized as a subjective experience that occurred during sleep. When awake, the experient spontaneously recalled it, and described it, to oneself or to others, in an oral or a written form, in a story-like fashion. In this narrative, which could closely follow one segment or several sequential scenes of the dream, the awake dreamer might depict some or all of the following features of subjective experience that occurred while being in the role of the dreamer: the images seen, the action performed or participated in, the solitary or shared engagements, the situations observed and the observations made, the sensations

sensed, the perceptions noticed, the feelings felt, and the thoughts thought.

The present study investigated strategizing efforts/thought processes as means (tactics, mental maneuvers, mental activities) that dreamers used for resolving problems, difficulties, or satisfying curiosities experienced in dreaming. The active strategies as processes per se were defined as instances in which individual dreamers are, with some degree of internal motivation, able to point, direct, or pay attention to in-the-moment occurring and noticed salient and novel precarious, perturbing, intriguing, or challenging contextually idiosyncratic situations that dreamers themselves or the dream scenarios created. In these situations, dreamers react, act, or respond to circumstances by using their mental abilities with the goal of averting, neutralizing, negotiating, or resolving the implicit or explicit problems or curiosities. Thus, through their own efforts, dreamers strive to arrive to some desired end-state of affairs. Alternatively, at any course of dream events, dreamers might terminate the goal-oriented efforts and forfeit, surrender, give up, or avoid a future personally experienced conclusion or arrival at a specific outcome or resolution. The end resolution or solutions do not need to represent rational or sensible outcomes judged by logic and common sense waking life standards.

3.3. Selection criteria for specific analyzable dreams

Dreams could be classified into different types and studied with dissimilar intentions, methods, and goals (for reviews, see Barrett & McNamara, 2007). At the same time, if only some dreams reflect ongoing difficulties in waking life (e.g., Glucksman, 2007), then, by inference, not every recalled dream will contain instances that indicate an individual dreamer's efforts to neutralize or resolve a personally difficult, dilemmatic, or intriguing situation. In view of these distinctions, the author postulated (after excluding 10 lucid dreams) that archival collection of dreams could be divided into descriptive dreams and agency dreams (Hill et al., 2007). The following operationalized definitions for writ-

ten dreams (both descriptive and agency dreams) were formulated (Kozmová, 2008) as a tool for selection of dreams suitable for analysis to capture any type of dreamers' strategizing efforts and attempts:

1. A descriptive dream contains the descriptions of scenery, situations, actions of the dreamer or other characters, and the dreamer's own observations and experiences within that dream.

2. An agency dream is defined as a dream report that differs from a descriptive type of dream narrative: In a report of an agency dream, an independent reader would be able to discern that the dreamer was propelled or prompted to make an active choice (reasonable or unreasonable) in the presence of a situation or event, one which he or she might have recognized, defined, or identified, and explicitly described within the dream. Alternatively, in the report, it could be observable that during the dream the dreamer might have implicitly hinted at but not described, yet acted upon, some precipitating event. The discernable active choices as responses to internally generated, perceived, and later described contexts, situations, perceptions, beliefs, images, or novelties could be visible and construed as reactions to an emotionally, psychologically, or intellectually realistic immediacy of the dream or to some other unidentifiable cause. The overt or covert events to which dreamers reacted could be characterized by an independent reader as realistic or imagined vicissitudes of life in general (e.g., ambiguities, puzzlements, distresses, dilemmas, conflicts, concerns, difficulties, worries, threats, dangers, curiosities, intrigues, or wonderments). The illustrative examples of descriptive and agency dreams can be found in Table 1.

3.4. Data selection for primary analysis

With the use of operationalized definition of agency dream, from total of cross-cultural 1,288 non-lucid dreams previously used for the research of problem-solving phenomenon (Kozmová, 2008), the distribution of 979 agency dreams (67%) for primary analysis leading to emergence

Table 1: Examples of Descriptive and Agency Dreams from Archive of Cross-Cultural Dreams

Country, year, type of dream	Dream narrative
Male, Russia, 1996 descriptive dream	I have an invitation to visit a house. It is shaped like a heart. I can tell that a very loving family lives there. I enter the house and I am given a red valentine. It is also shaped like a heart, just as the house has a similar shape. The feelings are loving and kindly.
Female, England, 1994 agency dream	I am sitting in a room with my husband. Because I have lost my power of speech, he has to guess what my thoughts are. It is a frustrating and time-consuming task. Eventually he gives up and I am left trying to make a conversation using "Scrabble" game letter pieces.
Female, Japan, 1993 agency dream with explicitly (overtly) stated problem	I am lying down and a long thing is around my neck. It doesn't go away. I'm suffering but I can't do anything. It is a long, thin thing. I am lying down by my husband. I want to tell him about the long, thin thing around my neck but I can't get the words out.
Male, Ukraine, 1992 agency dream with implicitly (covertly) stated problem	I am with a group of five or six people, some are men and some are women, who are interested in spiritual matters, and we are having a discussion about these topics. One of them is a spiritual teacher. He tells me I am an angel. I feel very much like an angel, but I also feel very sexual. I can think of no reason why angels can't have sex with members of this group.

Note: In these illustrations of agency dreams dreamers are using variety of strategies to resolve encountered difficulties (reprinted with author's permission from Kozmová, 2008)

of problem-solving phenomenon (with explicit or implicit problem of threatening, dilemmatic, puzzling, perturbing, curious, dangerous, etc. nature) marks the national origin of dreamers as follows: Argentina (M=76; F=71); Brazil (M=69; F=72); England (M=74; F=66); Japan (M=81; F=77); Russia (M=75; F=75); Ukraine (M=90; F=78); the United States (M=25; F=50). The partial and complete results of working with primary analysis are not part of current research and have been presented elsewhere (Kozmová, 2008).

3.5. Data selection for secondary analysis.

For the secondary analysis pertaining to present research, the author used four saturated groups of agency dreams in which dreamers “mentally strategized,” in other words, exhorted mental thinking efforts in order to resolve difficulties, problems, concerns, or curiosities. These efforts numbered total of 85 dreams with already coded and saturated types of thought processes: (a) unilateral and sequential progression of problem-solving (four varieties); (b) types of thinking as problem-solving strategies dreamers employ during and after life-threatening situations (four varieties); (c) types of thought processes as problems-solving strategies in the context of intrapersonal, interpersonal, and inter-object problematic situations (30 varieties); (d) types of thought processes and their attributes (47 varieties). Table 2 demonstrates one example of dreamers’ strategizing efforts from each four groups used for the secondary analysis.

While working with archived dreams, the researcher had no contact with participants; hence, the demand characteristics of the study were nonexistent (Orne, 1962).

3.6. Criteria for Selection of Method for Dream Content Data Analysis

The selection of method for dream content analysis focused on the following criteria: (a) the method’s suitability to work with the invisible, yet inferable, phenomena (Glaser & Straus, 1967; (b) its fitness for working with the texts (Henwood & Pidgeon, 2003); and (c) its reliance on the researcher’s mental abilities to define mental phenomena (Foulkes, 1990). The selected method called grounded theory (Glaser & Strauss, 1967) has been used by other authors (e.g., English, 2002;

Gilbert, 2004); in the previous pilot study (Kozmová, 2007); and as a methodology for the author’s dissertation research (Kozmová, 2008).

3.7. Description of grounded theory method.

At its baseline, the grounded theory method requires a “theoretically sensitive” (Glaser & Strauss, 1967, p. 46) researcher with conceptually sharp mental abilities to form concepts and capture the theory as it emerges from data analysis; this process makes the theory grounded in data especially when working with not-yet-known but intuited phenomena. The method, even though it favors an initial a posteriori approach in the sense that reasoning leading to conclusions is based on observed facts, nevertheless leaves space for forming a priori hypotheses presumptively deduced without data or with premises based on previous scholarly works or research findings; the ensuing theory thus could be tested through experimental design (Glaser & Strauss, 1967).

As I have previously discussed (Kozmová, 2008), the purpose of the method of grounded theory is to generate, from observed data, a description of the object of research (Glaser & Strauss, 1967). The constant comparative analysis utilizes accounts of people’s actions or behaviors in reaction to investigated phenomena; these investigations take place within local contexts and environments.

The exact subject matter of research does not need to be known to participants or to the observed population, but the researcher intuits beforehand the existence of the phenomenon based on some type of data. The present study used an approach in which researcher wanted to explore the scope and purposiveness of executive thought processes demonstrated in the previous research (Kozmová, 2008; Wolman & Kozmová, 2007). None of the dreams used in the study has been characterized as incubated dream, and a few lucid dreams identified as such by dreamworkers have been eliminated from the initial work of gathering a numerical pool of dreams suitable for analysis. Hence, the instances of dreamers’ reactions arose from their within-dream-created problems or dreams’ scenarios, situations, and novelties that have been randomly generated within the dreaming minds.

Table 2: Examples of Strategizing Efforts Used in Secondary Analysis

Group/type of problem-solving	Dream narrative
Progression of problem-solving: recognition, single problem	A teenage girl comes by, and we talk. <u>She seems to have a sexual interest in me. I am flattered but it is disconcerting because she is so young.</u> She takes me to meet the men, women, boys, and girls in her extended family.
During and after life-threatening situations, evaluation	I run and sob, because I left my teddy bear in the house. I come back there, enter the house, and see my mom has extinguished the fire by water. The fire disappears. <u>Everything is fine. My teddy bear sits safe and sound.</u>
Evaluative, interpersonal situation, assessment of one’s own behavior	<u>I have been very cold and indifferent to them,</u> so they have given up on me. I was scared and sad, crying and trying to stop them.
Flawed logic, impossibility	An eagle crashes through the window. I hide under a chair. The bird moves the chair, picks me up, and takes me with him. <u>I explain that my father will not allow me to fly.</u>

Note: Examples compiled with authors’ permission from (Kozmová, 2008); underlined parts of dreams represent strategizing efforts.

The purpose of the grounded theory method is to find a core variable (e.g., the main phenomenon under consideration) and to define the core variable in terms of categories that consist of modalities, properties, dimensions, processes, and other distinctive markers that comprise the structure of the intuited phenomenon (Glaser & Strauss, 1967). This categorization of core variable could be also termed taxonomy.

The process of conducting research using grounded theory is centered in the constant comparative analysis using comparisons and contrasts (Glaser, 1992) between the instances of the phenomenon. With the assistance of probing questions created for a specific research, elements of the phenomenon emerge in the form of coded categories, their dimensions, and their properties often described in vivo language (in the language of participants). The main goal of this phase of the research is to find saturation of elements of the phenomenon; satiety occurs when sampling and analysis brings quantity or sameness but no novel variety.

In order to reach the point of the phenomenon's saturation in terms of categories, dimensions, properties, processes, etc., the researcher documents the analysis by writing and organizing the memos; memos include instances of both relevant and outlier-type of behavior or processes (Glaser, 1992). The description of the process of research (data analysis) and the end results through various stages of research that lead to the emergence of core variable is summarized in discrete segments by Henwood and Pigeon (2003) in Appendix A.

With the saturation of categories and developed description of the phenomenon, the researcher shifts investigation into the stage of positing a substantive theory. Presumably, researchers' detachment from their favorite hypotheses reduces biases during this segment of analysis. The method allows for quantifying the data, where appropriate, and for testing the results through hypotheses by quantitatively based logico-deductive means (Glaser & Strauss, 1967).

In contrast to the quantitative paradigm, which ensures the validity of constructs and their measures through a comparison of homogeneous samples with the control group (Cozby, 1997), the method of grounded theory is not narrowed by sample restriction (e.g., age, gender, occupation, education, socioeconomic status, matching control group, and other markers of sampling). The flexibility of the comparative analysis (goal of which is to construct and articulate a phenomenon) consists of starting the sampling and comparisons anywhere within the sample and working with a beforehand restricted or added open sample until the elements or processes under investigation reach saturation. The previous research by Kozmová (2008) has demonstrated the method's adaptive capacity by working with closed archival sample.

3.8. Reliability and validity of grounded theory method

The reliability and validity of grounded theory method and its results is constructed differently from behavioral methods of research (e.g., Cozby, 1997). The central difference between research with validated instruments or statistical programs and grounded theory captures the differences between the hypothesis-driven and data-driven research.

Research with grounded theory is a highly intimate endeavor without the benefit of validated instruments or

constructive critique of colleagues (Glaser, 1992). In fact, similarly to descriptive phenomenological psychological method, the researcher working with constant comparative analysis becomes an instrument (Giorgi & Giorgi, 2003). The reliance on one's own mental faculties, psychology of being, intellect, and scholarly approach makes the research highly intriguing, yet open to predispositions and preconceptions which could be challenging to capture without the assistance of an outsider. Considering this idea further, one could be inclined to agree with cautions proposed by other analysts of grounded theory (e.g., Glaser, 1992; Henwood & Pidgeon, 2003) that no two researchers would be able to agree constantly about the labeling of emerged concepts.

Even though the grounded theory method has been used in variety of fields of social sciences and medicine (for review, see Glaser, 1993), the research of dreams with method presents relative novelty since only several authors worked, in partial or complete form, in their dissertations with dreams and grounded theory (e.g., English, 2002; Gilbert, 2004; Hill, 1998; Kozmová, 2008; Matheny, 2001; Sungy, 2001). Presenting descriptive intermediate and final findings in publication as the results of labor-intensive work with immense amount of qualitative data presents challenge within an established format of manuscripts (e.g., American Psychological Association, [APA] 2010). Henwood and Pidgeon (2003), in analysis of complex issues regarding exhibition of the results pointed out that "one of the most perplexing features of generating grounded theory is how researchers move from early and intermediate stages to theoretical integration and closure, for any individual study" (p. 148). Given this intricacy of reliability and validity of research with method of grounded theory, the present author opted to demonstrate in Appendix B an example of working with the method.

4. Results

4.1. Working with Secondary Constant Comparative Analysis

The first phase of secondary constant comparative analysis with method of grounded theory focused on analysis of four specific already coded distinguished thought processes as one of three direct problem-solving modalities of nocturnal problem solving phenomenon (85 types of strategizing efforts; Kozmová, 2008, Tables 3, 8, 9, 10).

The next phase of constant comparative analysis, from which the core variable, the taxonomy of dreamers' strategizing efforts (core aggregate of executive function) within agency dreams emerged, proceeded with the use of the questions.

The following analyzing questions were designed specifically for comparing the dreamers' strategizing instances: 1. In all four available groups of strategizing thought processes, which ones could be considered the identical types of thought with different properties? 2. In all four available groups of dreamers' strategizing efforts, which ones could be considered similar types of strategizing thought with different properties? 3. In all four available groups of dreamers' strategizing efforts, which ones could be considered different types of strategizing thought with different properties? 4. When grouping together all identical, similar, or different types of dreamers' strategizing efforts, what could be the explicit properties of each thought process within each type of strategizing effort? 5. What is the dreamer try-

Table 3: Analytical Executive Thought Process, Its Specific Properties, and Examples

Explicit properties	Examples
Noticing contradiction between one's own abilities and reality of dream situation	<u>I cannot swim, nevertheless, I move effortlessly toward the shore.</u>
Comparison between mental state and physical state	I cannot swim Close to the shore, I put my feet down and <u>find myself submerged in the water without panic.</u> I note with mild curiosity that I am relaxed in a luminous pool, <u>breathing quite naturally.</u>
Reality check comparison to previously known standards	I am to meet a female friend at the largest McDonald's restaurant in the world. We get there and have a very pleasant lunch. But I think, <u>„This is not the largest one after all“.</u>
Comparison of situation with internal religious belief system	I spin the bottle on my head until there are 20 glasses of red wine on my head. Then the wine spills over my body. There is silence in the room. Then I scream. <u>I realize that the red wine is Christ's blood, but I am a Jew. I scream „I am a Jewess!“</u>
Comparison of situation with internal moral belief system substantiated by integrity	I get a prying bar and open the door. I talk with someone who inducts me into the military. <u>I don't want to be in the military!</u> Some man asks me why. <u>I say I don't want to kill people.</u>
Comparison of one's own abilities against others' performance with expressed reason for the outcome	<u>Although I know I am fairly good at this performance, I cannot catch up with the tempo of the other examinees because I often become exhausted and sometimes feel a stabbing pain in my feet.</u>
Comparison of self-states	The male teacher tells us that it is not permitted to show one's feelings. But I know it really is okay because I have grown up in the meantime. <u>I look like a little boy but inside I am an adult.</u>
Time/memory comparison	I am with my wife. <u>I know she has been dead for several years.</u>
Contrasting two emotionally charged situations	I have a spider on my pajamas, and I am afraid it will bite me. Then my father has his arm around me, even though he died three years ago. We walk around the house where I grew up and down the street. An old grade school friend appears, and he hugs me. <u>It was a pleasant moment in contrast to the terrifying spider.</u>
Idiosyncratic synthesis of thesis and antithesis	Some are men and some are women, who are interested in spiritual matters, and we are having a discussion about these topics. One of them is a spiritual teacher. <u>He tells me I am an angel. I feel very much like an angel, but I also feel very sexual. I can think of no reason why angels can't have sex with members of this group.</u>
Cause and effect reasoning	I am very worried. I have a heart full of misgiving. I recall that I have to take an entrance examination for the university. But I have not studied for the exam. <u>Because of my work at a newspaper, I am busy every day. I am scared that I may fail the examination.</u>
Sense-making	I am driving a car. I feel upset. I drive fast. My car break apart on both sides. I hope I have not hit another car and caused an accident. A policeman appears. He stops me and takes me to the office and blames me for the accident. <u>But his story does not make sense.</u>
Assessment of personal reasons for actions of characters (theory of mind)	Many friends and my husband are present. <u>They believe very strongly that they have to get away from me.</u> So they are leaving me. <u>I have been very cold and indifferent to them, so they have given up on me.</u>
Making inferences about internal states of other character (theory of mind)	The elderly man wants to dodge the figures, but goes down. The figures catch him and beat him with the sticks. <u>But he does not seem to suffer very much.</u>
Asking clarifying questions	I see a primitive man. Is he an Indian? A cannibal?
Asking brainstorming questions	The house was used by his family for storage. His son, a twin, came to me and started talking about a contract. He laid out some terms that were not acceptable to me, and I did not want to store my vehicle under those conditions. But I feel stuck. <u>Where else could I store the vehicle?</u>
Satisfying curiosity and focusing on discovery making	I am in the city of Bariloche with my wife, in a house made of material that was somewhat modern. Suddenly, the house starts to fall apart, starting with the top part. I see it start to fall and I see debris scattered for a few blocks. But I don't panic. <u>I am somewhat curious about how the house was made. I don't feel tremors from the earth, and I think the house must have been well constructed. I think the foundation must have been made of hard material.</u> My wife and I leave the house and nothing happens to us.
Reaching conclusion	I fall through and go deep into the ocean, down, down, down, so deep. Then I pop up fast and am back on the ship. I run through the halls looking for friends to tell. Two, a man and woman, are fooling around in a small anteroom and are not interested in me. Others are talking and drinking. <u>The point becomes clear. No one is interested in what happened, but I am ecstatic!</u>

ing to accomplish with this strategizing effort? 6. What kind of explicit phenomena are occurring within this particular strategizing effort in comparison to the strategizing effort of different dreamer? 7. What could be the most appropriate name for the cognitive phenomenon that is occurring within the specific type of strategizing effort? 8. What could be the most appropriate name for the psychological or emo-

tional phenomenon that is occurring within the specific type of strategizing effort? 9. What is the dreamer doing in terms of mental effort in the content of this particular strategizing effort? 10. Within each coded group of strategizing thought processes, beside effort forward resolving the problem, what is the dreamer mentally trying to accomplish by this particular thinking strategy? 11. When comparing this par-

Table 4: Decision-Making Executive Thought Process, Its Specific Properties, and Examples

Explicit properties	Examples
Emotion-driven	He says this is the new military and it helps people. The jail building has many flaws in its blue gray, concrete walls. <u>I don't trust the officers</u> and use every trick in the book to get out.
Selection between two options with substantiated reason for particular time-based preference	<u>Finally I decide to take a pair of shoes, not top boots. The boots will wait for later because now I need a nice pair of shoes.</u>
Reasoning based on self-protection with anticipation of possible outcome	Then I remember that I left something at the school, so I have a good reason to go back. <u>But I decide against it because I don't want to walk back alone.</u>
Weighing in possibilities	I am swimming in the sky. I am comfortable and am with someone. He tells me I'll have to swim well or I'll drop from a high place to a lower place. I see the woods through the clouds. <u>I do not want to go too low or I will drop. But if I go too high, I will not see the woods.</u>

ticular strategizing effort with strategizing effort of a different dreamer, what other distinguishing phenomena/markers could be found other than cognitive, psychological, or emotional ones? (For memo, see Appendix B)

From the secondary constant comparative analysis emerged the taxonomy of strategizing efforts; these processes are distinguishable and nuanced across the range and within each process by one or more characteristic properties. In some cases, it became evident that one dream contains more than one strategizing effort (e.g., in analytical thought process, dreamer used comparison of situation with internal religious belief system; at the same time, in this dream, the dreamers acknowledged her identity by interpretation of symbolism and independence from out-group).

The individually stimulated thinking/strategizing possibilities, deliberate choices dreamers made, or individual reactions to problems, difficulties, concerns, threats, or curiosities that dreamers approached in the strategizing mode the researcher termed core aggregate of executive thought; it consists of the following types of thought processes: (in alphabetical order): (a) analytical, (b) decision-making, (c) defense mechanisms, (d) evaluative, (e) goal-oriented/goal-directed, (f) interpretative, (g) motivational, and (h) self-determinative.

The results of analysis are expressed in a form of descriptions (Henwood & Pidgeon, 2003). Each of the eight depictions of strategizing thought processes can be seen in the accompanying Tables 3-10 that are also a part of the analytical procedure. The underlined sections represent thought processes of executive function and its delimited properties.

1. Analytical executive thought process is characterized by (a) using the attentional process of noticing; and (b) engaging the central faculties of comparing, contrasting, synthesis of thesis and antithesis, cause-and-effect reasoning, sense-making, asking questions, focusing on satisfying curiosity and discovery making, using theory of the mind, and reaching conclusions (Table 3).

2. Decision-making executive thought process encompasses a selection between options, reasoning about options with anticipation of outcome, emotion-driven deciding, and weighing-in possibilities (Table 4).

3. Defense mechanisms of executive thought utilize attitudes and protective elements of pretending, lying, wishful thinking, omnipotence/superiority, detachment, indifference, rationalization and justification of aggression, identification with aggressor, reality check within a dream situation, anticipation of outcome of imagined situations (Table 5).

4. Evaluative executive thought process uses the function of appraising the values and determining the significances in the problem-solving instances that prompt a dreamer to (1) express aesthetical sensibility; and (2) evaluate (a) facts of the situation and facts with the final goal in mind; (b) priorities and time orientation; (c) feasibility of the plan and its emotional consequences; (d) one's own progress, abilities, mental state, degree or level of emotional engagement with the scene; (e) one's own safety; (g) swiftness of rescuing efforts by others; and (h) retrospective combination of evaluating time element, loss, and regret (Table 6).

5. Goal-oriented/goal-directed executive thought centers around immediate and future tasks and includes (a) intentional goal setting with emotional evaluation of the situation and the evaluation of possibilities and chances of reaching the goal; (b) taking a personal perspective of the problem created by oneself and planning the remedy by using volition and intentionality; (c) mental rehearsal and visualization of future action; (d) planning or setting a step-by-step plan and anticipation of personal injuries during execution of the plan; (e) self-reflectiveness; (f) continuing to make forward-action-based decisions despite the experience of previous failure; (g) considering options under a specific offered condition; and (h) telepathy as a means of reaching the goal (Table 7).

6. Interpretative executive thought process focuses on (1) explanations of (a) sensory impressions and (b) projected disowned feelings linked to protection of own self-esteem; and (2) using abilities of (a) instances of intuitive knowing; (b) mindreading; (c) sensing; and (d) interpreting nonverbal communication such as reading a character's gestures (Table 8).

7. Group of motivational executive thought processes consists of contemplation of personal preferences; asking existential and self-awareness/introspective questions; in-

Table 5: Types of Defense Mechanisms of Executive Thought and Examples

Variety	Examples
Anticipation of the outcome of imagined situation	I start to go through and get stuck. I fear someone may of steal my wallet but I know I will have to take off my clothes to make it through. <u>Even then, I will be bruised and cut.</u> I am just about to make it through when I wake up.
Reality check within the dream situation	I am with Boris, my boy friend who I sleep with. But in the dream there is a strained relationship between the two of us. We are in nature, under the sky and the stars. It should be the perfect setting for making love. <u>But Boris says he has to go to run an errand for his parents. I think it is odd that he has to wait on them at this time of the night.</u>
Pretending	There are belongings everywhere and I must figure out which are mine. <u>I am trying to pretend that I am okay, but I am really overwhelmed and confused.</u> Then I find some chocolate and pretend <u>that it is very nice. I give it to people thinking they will not be so angry with me.</u>
Lying	The woman puts ordinary Soviet coins under the beams, and the coins turn into gold and silver ones. I hear a tap of heels from the staircase. I know that it is the woman guard. The other woman, with the loaf, says, „We must stop now. I will call you again next time.“ We leave the room and go in different directions. That woman from the staircase, approaches me and asks, „What did you do there?“ <u>I put my hand palms up, side by side, near my breast and say. „Just nothing.“</u>
Wishful thinking	It is dark, but I see the tower well. The belfry draws my attention and my feelings. It seems that it keeps a great power. <u>I feel like something very important slipped out of my memory and the bell tower will bring it back.</u>
Avoidance (of responsibilities)	I dreamed I was a child on my way to study with children six to twelve years of age. <u>But then I wanted to play.</u> Later in the dream, I was with college students and we were 18 to 22 years of age. We were studying something together. <u>Once again, I wanted to play instead of studying with the other students.</u>
Rationalization and justification of aggression	I am working very hard in my office. I am in pain because the work is so hard. I start giving orders to a man I know who works in a subordinate position to me. <u>I am aggressive in my remarks to him. I think that if I am in pain, he is going to get hurt too.</u>
Omnipotence, feeling of superiority	A woman puts a finger into my watch bracelet. Immediately, I start to beat her. <u>Nobody can stop me.</u>
Identification with aggressor	It is the Middle Ages. I am going down a street of a city block. The houses are colorful; some are lavender. Then someone starts shouting at people who are walking on the sidewalk. It is a bloody scene. There is blood all over the street. Some people are dead. Others are wounded. There is anguish, fear, and grief that the survivors are expressing. <u>I think that I am a king or member of the royal family.</u> I am indifferent to all of this. My body does not register any emotion. The soldiers use sharp weapons to cut the people up. <u>I think the royal family sent the soldiers out to kill the townspeople.</u> The survivors are very sad.
Detachment	My father was with me, and told me he was fatally ill. He said he did not know if he could go with me. In fact, he plunged into the water and sank. <u>I was not afraid. I did not pity him. I took his death as it was.</u>
Indifference	Then someone starts shouting at people who are walk on the sidewalk. It is a bloody scene. There is blood all over the street. Some people are dead. Others are wounded. There is anguish, fear, and grief that the survivors are expressing. I think that I am a king or member of the royal family. <u>I am indifferent to all of this. My body does not register any emotion.</u>

trospection motivated by contradiction between action and internal belief; questioning one’s decisions and actions; dialectic between wanting to die and to live—wanting attention and to be found, rescued, and understood (Table 9).

8. Executive thought processes of psychological self-determination include (1) autonomy in the sense of (a) quest for independence, (b) individuation, (c) differentiation from group identity and expression of agency followed by action, (d) emotional autonomy and existential realization; (2) knowing one’s own personal destiny; and (3) moral reasoning about one’s act of aggression (Table 10).

4.2. Substantive Grounded Theory of Executive Function in Non-Lucid Dreaming

According to guides for working with grounded theory (e.g., Glaser & Strauss, 1967; Henwood & Pigeon, 2003), the next level of descriptive analysis could ensue in forming a substantive grounded theory. Based on articulated executive thought processes that create a core aggregate of execu-

tive function, the present author proposes specific testable substantive grounded theory of the executive function in dreaming:

“When dreamers specifically use a thinking/strategizing mode for finding a solution during the perturbing and problematic situations or for satisfying curiosity in contexts that occur within their dreams, they might use one or more of the currently delineated eight specific executive thought processes (analytical, decision making, defense mechanisms, evaluative, goal-oriented/goal-directed, interpretative, motivation, self-determinative). These processes—building blocks of volitionally pursuing a self-selected goal—could be called a core aggregate of executive thought in dreaming and represent a currently know taxonomy of executive function in non-lucid dreaming The initiation of executive function requires a specific condition to be present in a dream: An occurrence of novelty in a form of a dreamer-detected presence of a problem, dilemma, perturbation, or feeling of curiosity.

The core group or aggregate of purposive executive men-

Table 6: Evaluative Executive Thought Process, Its Specific Properties, and Examples

Explicit properties	Examples
Personal aesthetic sensibility of object	At last I find a nice pair of top boots, <u>but the moment I put them on they seem ugly.</u>
Factually-based evaluation, earlier-made decision with compromise as a goal	It is night. I am walking back to my dormitory with some of the other girls after a class. Halfway back, <u>I regret my decision. But there was no futon in the school, so I could not have gone to sleep. And in the dormitory, all the girls ke reminds me there is no extra bed for me at the dorm. ep talking and I can't get any sleep.</u>
Priorities setting with time orientation	Finally I decide to take a pair of shoes, not top boots. <u>The boots will wait for later because now I need a nice pair of shoes.</u>
Evaluation of emotional consequences of plan	<u>It is dangerous to cross the embankment but it is possible.</u>
Evaluation of situation based on facts	This seems to be a radioactive wall and it is coming closer to the house. I snatch my daughter from the crib <u>but there is no place to take her.</u>
Evaluation of one's own progress	I'm watching and <u>finding that I have picked up his rhythms.</u>
Evaluation of one's own abilities	I am in Gasshuku, a retreat camp. I am taking an exam in which I am supposed to perform a routine dance in the river. <u>Although I know I am fairly good at this performance, I cannot catch up with the tempo of the other examinees because I often become exhausted and sometimes feel a stabbing pain in my feet.</u>
Evaluation of one's mental state	The lectures that I usually give off the top of my head at the training sessions are difficult. <u>I have a loss of memory</u> and become unable to give the lectures.
Evaluation of safety	I see my mom has extinguished the fire by water. The fire disappears. <u>Everything is fine. My teddy bear sits safe and sound.</u>
Evaluation of swiftness of rescuing efforts	I shout: "Let's go to the hospital, then! Let them sew me up and repair me!" <u>I am not satisfied with the pace. I hurry him, but we keep going slowly.</u>
Emotional evaluation of situation	He keeps flying faster without my assent. I ask rend to stop. I shout. <u>The situation is desperate.</u>
Retrospective evaluation with time element, loss, and regret, and time element	I suddenly realize that I am in California. <u>I have stayed in San Francisco for three days but didn't go to any nightclubs. I feel badly. This is ridiculous, as I may never get to San Francisco again. It's too late.</u> I am on the train and it's leaving San Francisco.

tal processes in dreaming is prompted by the felt-need to act; it serves four specific purposes, namely: (a) information gathering (analytical, evaluative, and interpretative thought processes); (b) psychologically stepping into a resolution-based mental space by using conscious judgment for purposes of coming to a conclusion to act or not to act (decision-making); (c) protecting oneself against current or future psychological and emotional loss, anxiety, or unfavorable outcome, but also planning for maximizing the chances for success (defense mechanisms); and (d) using volition and intentionality; directed/focused thinking; being aware and exercising agency and autonomy, motivating oneself to move forward (goal oriented/goal directed, motivational, and self determinative thought processes)."

5. Discussion

The investigation's emphasis was on defining a taxonomy of executive thought processes (higher-order cognition) as one of the psychological features of non-lucid dreaming consciousness that has been previously deemed unsupportive of executive function in dreaming (Hobson et al., 2000; Hobson & Voss, 2010). The conclusions about presented core aggregate of dreaming executive function could be drawn in conceptual and psychological terms.

The contemporary proposition about dreaming emphasizes that it "represents the cornerstone of higher level consciousness;" this notion, however, has been proposed

exclusively in the context of lucid dreaming as a hybrid of waking and dreaming consciousness (Hobson & Voss, 2010, p. 164). The taxonomy of dreamers' strategizing capacities in non-lucid dreaming without their awareness of their dreaming state, without ability to signal the awareness to outside observers, and without controlling the content of the dream demonstrates non-lucid dreamers' capacity for secondary consciousness and higher-order cognition of executive function.

In published literature, the lucidity level of consciousness is termed self-reflective awareness, which includes (a) recognition of states of consciousness; and (b) volition and rational thought (Hobson & Voss, 2010). Based on evidence of thinking/strategizing from the present study and sporadic studies in the past (e.g., Glucksman & Kramer, 2004; Greenberg et al., 1992; Revonsuo & Valli, 2000), the following question could be posed: How do strategizing processes of higher-order cognition, including rational logical thought and volition which require self awareness in secondary consciousness (Kozmová & Wolman, 2006), come to existence or emerge during non-lucid dreaming? The poignancy of the question is underscored by dreamers' consciousness or awareness and ability to notice salient elements of experiences (e.g., Kozmová & Wolman, 2006) while separated by sleep from realities and cognitive possibilities available within the external world of waking life or lucid dreaming.

When considering the results of study presented in the form of taxonomy of core aggregate of executive function

Table 7: Goal-Oriented/Goal-Directed Executive Thought Process, Its Specific Properties, and Examples

Explicit properties	Examples
Taking a personal perspective in recognition of problem created by oneself, planning the remedy by using volition and intentionality	I am on a huge turnpike approaching a large bridge. It feels like a Midwest turnpike. <u>After going over the bridge I realize that I have made a wrong turn. The only way to get back on track is to make a wide circle back.</u>
Intentional goal setting, with emotional evaluation of situation and chances to reach the goal	<u>My aim is to cross the bridge and get to the hills on the other side that connect with freedom. It is dangerous to cross the embankment but it is possible.</u>
Anticipation of personal injuries; defense used against potentially unfavorable outcome; setting step by step plan	I start to go through and get stuck. I fear someone may as steal my wallet but I know I will have to take off my clothes to make it through. <u>Even then, I will be bruised and cut.</u> I am just about to make it through when I wake up.
Mental rehearsal, visualization of future action	I dream that a band of bats is flying around me. It is night. <u>I know that to get out of trouble, I will have to fight them, and break the wings of some of these bats. But I am terrified of the bats and thought of having to fight with them.</u>
Planning, awareness of personal preferences, self-reflectiveness	I'm in Australia, surrounded by green vegetation. <u>I am about to paint a white wall the color I want it to be. It's a fine day. I have checked that house from all directions, then have prepared to re-paint it.</u> I put two stable ladders in place, put one board in between them, and sit on it to paint.
Choosing the best possible action-based decision despite the experience of previous failure	The next three questions are all about a fraction inside another fraction. <u>I don't remember how to solve these so I give up. Afraid of completely blowing my test, I decide to solve a question that takes up the entire space on the reverse side.</u> No luck there either.
Consideration of options under specific conditions	He laid out some terms that were not acceptable to me, and <u>I did not want to store my vehicle under those conditions.</u>
Telepathy	The most corpulent of them comes near us. Brian laughs at him, and I take hold of Brian so that he will not offend the fat man any further. The other men say that Brian has insulted the fat man. At this moment I see between the wooden planks of the arcade bear. It comes behind the three men as they prepare to assault Brian. They do not see the bear. I stare at the bear and see it looking down toward my feet. <u>I send a telepathic message to Brian to stay away from the bear.</u>

(Tables 3-10), conceptually it could be proposed that the emergence of nocturnal secondary consciousness (which accommodates rational thought, volition, and psychological agency as part of executive function) in non-lucid dreams requires the dreaming brain to be in a specific strategizing mode. The conditions of the strategizing mode could then lead to surfacing, giving rise to, or inducing one or more directed and rational thinking/strategizing processes of ex-

ecutive function in dreaming.

When further conceptualizing the situations suitable for the emergence of a strategizing mode in non-lucid dreaming consciousness, two sequential levels could be proposed: First, an internally originated stimuli such as sensations and feelings (also known as endogenous stimuli or intrinsic information input) need to be registered, noticed, and conceived in awareness. The evidence of core aggregate of executive function demonstrates that dreamers, however, do not stay

Table 8: Interpretative Executive Thought Process, Its Properties, and Examples

Key elements underlying interpretative thought process	Examples
Sensory impressions	I see a holy book and open it up. <u>As I read the pages, my hands start glowing. I think I now have the power in my hands to heal my lady friend.</u>
Intuitive knowing and interpreting without facts	A child was crying somewhere and I had to find him. The city had been bombed out, and the child was under the ruins. It was part of my destiny to try saving him. Then the cry stopped <u>and I knew the child had died.</u>
Sensing	<u>I sense they want me to undress.</u>
Projection of emotion linked with protection of self-esteem	Class starts and the teacher makes an insulting comment about me. <u>He tries to humiliate me by asking me difficult questions.</u>
Reading gestures (behavioral language/nonverbal communication)	<u>With a nod of his head I realized that he means for me to dance with him.</u>
Mindreading/telepathy	I am in a deep forest surrounded by many strange primal people. I am very afraid but I observe that they seem to be friendly, even though we don't speak a common language. Then I observe that by watching things carefully, <u>we can understand each other without speech.</u>

Table 9: Motivational Executive Thought Process, Its Specific Properties, and Examples

Properties	Examples
Contemplating personal preferences	There is a group of three of my male companions on the right. They are at a distance from the middle of the scene. My office is in the background of the scene. I need a great deal of strength to go there and turn on the light. <u>I would rather join my three companions and not return to work.</u>
Introspection/investigation one's own motivation, inquisitive questioning based on emotion	I walk quickly, and can't calm down and get rid of the thought, „ <u>Why did I meet them in Moscow? Why were they not together? Why are there lots of them?</u> “
Introspection motivated by contradiction between action internal belief	My father is late. I began to get angry. My friends are trying to pacify me, and are giving me something to eat and to drink. When my father comes, he is smiling. But I am irritated with his looseness. I throw my traveling bag at my father. I rage against him and beat him. I punch his body for a long time. I'm scared. <u>Why did I beat my father whom I respect?</u>
Asking existential rhetorical questions based on awareness of mortality	My body was put in a coffin and was carried to a cemetery. I felt unhappy being dead and thought, „ <u>Why should I die and let them bury me?</u> “
Asking self-awareness/ introspective type of questions	I am in a crowd of people, and am very confused, hot, and nauseous. I feel guilty about something. <u>Are the other people losing patience with me? Am I keeping people waiting?</u>
Questioning one's own decisions and actions	I decide to plant them just where I am loosening the soil. I start doing it, but the sand in the hole crumbles, and standing sprouts of onion fall down. I begin looking for another place for planting, and go around my friend's cottage and see many houses with many stories around me. <u>I don't understand why I go planting inside of town where there are no kitchen-gardens.</u>
Making plans for gaining human visibility and recognition, based on death wish, easing existential pain	I am sitting on a wall. <u>I want people to see me, to understand my pain.</u> But the cuts are only scratches and so nobody takes notice. I decide to look for someplace to die. I go to the toilets, <u>but I feel that I don't want to die there because I might not be found. I realize that I want to be found before I die.</u>

static or suspended in these internal problem-inducing psychophysiological states that are part and parcel of primary consciousness. Quite the contrary, in the second phase, the direct experience of novelties including internal sensations, feelings, cognitive dissonance, disequilibrium, and curiosity propels dreamers to interpret those as a part of a problematic or curiosity-inducing state of mind. The exclusively internally based interpretations then impel dreamers to do something about the immediate problem or curiosity. This consciously interpreted or unconsciously felt need or desire to do something then could give rise to variety of strategizing efforts (see Tables 3-10). In summary, the dreamers become part of the complex dynamic between subjective experiencing, an internal psychic event in simulated imaginative cognition of the dream environment, and the context of a self- or dream-created problematic or curious/inquiring scenario.

From a psychological viewpoint, it seems that in a specific agency dreams, a dreamer, without realizing his or her own separateness from the waking state of consciousness and accepting it as reality, becomes nevertheless cognitively/intellectually active. Based on results presented in Tables 3-10, it could be proposed that the individual dreamer who exercises strategizing mental abilities when confronted by the need to resolve situations first becomes “an independent recipient of impressions” (Kohut & Wolf, 1978, p. 414). Then, in order to reach the resolution or conclusion of the situation, the dreamer becomes an “independent center of initiative” (p. 414). Thus, subjectively, a dreamer utilizes autonomous mental maneuvering, strategizing, and prac-

ticizing of his or her own psychological agency (Wolman & Kozmová, 2007). Examples of these higher-order cognitive skills are noticing, analyzing, evaluating, making voluntary decisions, defending against situations, and using a host of other skills of secondary consciousness that lead to demonstration of psychological agency.

The sophisticated use of psychological agency dreamers exhibit in their dreams is closely connected with the same capacity individuals exercise during their awake time: It signifies “the capacity that an organism has to behave or believe in conformance with, in contradiction to, in addition to, or without regard for what is perceived to be environmental or biological determinants” (Rychlak, 1994, p. 308; see also Jenkins, 2001; Workman et al., 2000). It is noteworthy to remember, though, that this complexity occurs without discerning evaluation of one's own state of mind (Hobson & Voss, 2010), in this case, without awareness of dreaming or self-reflective awareness that one, upon awakening, will be in a waking state of consciousness.

The dynamic of the thinking/strategizing efforts based upon results of present study conceptualized as core aggregate of executive function could be contrasted with consciousness of descriptive dreams, in which an observational and noticing skills seem to be sufficient for images, scenarios, participations, or actions to be registered in awareness. Without a prompt to resolve, the observational skills do not seem to be adequate enough to give rise or emergence to strategizing secondary consciousness of executive function: Dreamers, other than taking in sensory information including visual, auditory, kinesthetic, gustatory, olfactory,

Table 10: Executive Thought Process of Psychological Self-Determination, Its Properties, and Examples

Explicit properties	Examples
Identity acknowledgment by interpretation of symbolism and independence from the out-group	I spin the bottle on my head until there are 20 glasses of red wine on my head. Then the wine spills over my body. There is silence in the room. Then I scream. <u>I realize that the red wine is Christ's blood, but I am a Jew. I scream „I am a Jewess!“</u>
Autonomy, quest for independence	<u>My aim is to cross the bridge and get to the hills on the other side that connect with freedom. It is dangerous to cross the embankment but it is possible.</u>
Differentiation from group identity, autonomy, agency followed by action	I get a prying bar and open the door. I talk with someone who inducts me into the military. <u>I don't want to be in the military!</u> Some man asks me why. <u>I say I don't want to kill people.</u> He says this is the new military and it helps people. The jail building has many flaws in its blue gray, concrete walls. I don't trust the officers and use every trick in the book to get out.
Autonomy, individuation	I am in school with classmates, girls and boys, I remember from many years ago. The male teacher tells us that it is not permitted to show one's feelings. <u>But I know it really is okay because I have grown up in the meantime.</u> I look like a little boy but inside I am an adult.
Making decision about one's own destiny	<u>I decide to look for someplace to die.</u>
Emotional autonomy, existential realization	I overcome my fear and leave by the window, which is a door, and climb without weapons downstairs, leaving the residence <u>because there is nothing there for me.</u>
Moral reasoning about aggression	I have a very strong sensation as I kill him, it is very acts of disagreeable, and very realistic. <u>But I had to do this to save my life.</u>
Knowing one's destiny	A child was crying somewhere and <u>I had to find him.</u> The city had been bombed out, and the child was under the ruins. <u>It was part of my destiny to try saving him.</u>

kinesthetic, and other percepts, sensations, memories, and feelings (e.g., Farthing, 1992), go along with scenery and actions (see Table 1). In this primary and sometimes secondary mode of consciousness, they are able to summon enough thinking skills to comment on the ongoing scenario and thus create a reflected experience (Kahan, 1994; Kozmová & Wolman, 2006). This distinction further suggests that using a non-strategizing type of thinking (e.g., reflective awareness or metacognition, e.g., Kahan & Sullivan, 2011) differs from the executive faculties needed for dealing with dilemmas, difficulties, or curiosities dreamers spontaneously or with self-creation encounter during dreaming.

5.1. Implications and Future Directions

The oneiric examples of dreamers exercising their own psychological agency by using a variety of thinking solution seeking strategies (Tables 3-10) call for reconceptualization of executive cognition in dreaming. The previously proposed "executive cognitive system" (Fosse & Domhoff, 2007, p. 66) in dreaming presumed lack of support of neural networks for such sophisticated cognition known to exist in the waking state of consciousness or lucid dreaming. Hence in hindsight, the theorists did not have a chance to fully appreciate dreamers' abilities. The current findings of eight different strategizing efforts of executive thought processes classified into a core aggregate of executive function with its four purposes occurring in a strategizing mode (see posited substantive grounded theory of executive function in non-lucid dreaming) demonstrate dreamers' volitional pursuits. The descriptive results allow for incorporation of current findings into future theoretical propositions including theorizing and conceptualizing levels of lucidity as organizers of dreaming consciousness (e.g., Barrett, 1993;

Moffitt et al., 1988).

Dreaming has been recently characterized in a Linnaean classification as a phenomenon belonging to a class of imaginative cognition within the order of a spontaneous imagery (Nielsen, 2011). In this classification, dreaming is considered to be a phenomenon distinct from hallucinations known from the waking state of consciousness. The current findings indicate that the notion of dreaming as a hallucinatory state with cognition conceptualized as state-dependent, deficient, deluded, and irrational without directed or secondary thought (Hobson, 2009, 2010; Hobson & Voss, 2011) do not seem to fit with the mental abilities of dreamers who act in a volitional manner to resolve their difficulties or to satisfy their curiosities. The taxonomy of core aggregate of executive function based on subjective experiences might, however, fit the aspirations of science of subjectivity (Hobson, 2011).

The developed taxonomy of core group of executive thought processes of higher-order cognition indicates that specific thinking within secondary consciousness indeed comes into existence during non-lucid dreaming. The dream reports with executive thought classified in in the present study present a research challenge. The previous theories (e.g., Fosse & Domhoff, 2007; Hobson et al., 2000) and neuroimaging findings highlighted deactivated neural networks with the notion of sleep preventing higher-order cognition to become active during dreaming (e.g., often-cited Braun et al., 1997). In addition, the researchers previously stipulated the need for articulation of neglected psychological features of dreaming (Hobson et al., 2003); these features include thinking. The present study offers to the possibilities of technical sophistication in a research of consciousness a complex taxonomy of specific strategizing cognition presented

as a core aggregate of executive function. The results then suggests the need to define which active neural networks participate in active goal- and agency-oriented volitional processes of executive function within here-and-now strategizing moments of non-lucid dreaming consciousness.

In designing future studies of executive thought in non-lucid dreaming, one needs to take in consideration possible ethnocentric biases that might divert attention from promotion of diversity within and across cultural groups (e.g., Nelson & Prilleltensky, 2010).

5.2. Limitations of the Present Study

It is conceivable that the present research of mental processes investigated within operationally selected archival agency dreams of individuals from different cultures who were motivated enough to be open to new experiences within their quest for learning (as could be inferred from the sample's participation in non-gratis workshops) represents research with a highly biased sample. It could be that dreams from motivated individuals with a presumed waking life attitude of gaining knowledge might have unsuspectingly assisted in discovering and defining the parameters of a core aggregate of executive thought processes.

6. Conclusion

The present study elucidated executive thought as one aspect of dreaming consciousness that cumulatively represents the currently known range of mental possibilities that this non-lucid altered state of consciousness allows for when dreamers feel propelled to resolve their problems, difficulties, and concerns or satisfy their curiosities. The developed taxonomy of core aggregate of executive function is most likely to find its home within the conceptualization of dreaming as an imaginative cognition understood as "a convincing simulation of waking reality experience" (Nielsen, 2011, p. 596). From this viewpoint, it could be proposed that instrumental imagery of waking life with its family of imaginal problem-solving (Nielsen, 2011) could be contrasted with the immediacy of nocturnal problem-solving abilities dreamers exhibit, in particular, in self-created or unsolicited situations within dreams. Both realms of creativity certainly have the potential to enhance awareness or to enrich one's life in finding creative solutions to challenges in living.

For future research, this previously underappreciated nocturnal thinking/strategizing mental ability requests a psychological demarcation within the function's activities during one's lifetime. In conclusion, both core aggregate of executive thought and its purposes await to be included into the science of subjectivity (Hobson, 2011) with the support and combination of complimentary neurobiological tools of cognitive science.

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Appendix A: Summary of Discrete Segments of Working with the Method of Grounded Theory

1. Open-coding to capture the detail, variation, and complexity of the basic qualitative material (sometimes also referred to as substantive coding);

2a. Constantly comparing data instances, case, and categories for conceptual similarities and differences (the method of constant comparison);

2b. Sampling new data and case on theoretical grounds as analysis progresses (theoretical sampling to extend the emergent theory by checking out emerging ideas, extending richness and scope, and in particular to add qualitative variety to the core data included within analysis);

2c. Writing theoretical memoranda to explore emerging concepts and links to existing theory;

3a. Engaging in more focused coding (including focused, axial, and theoretical coding) of selected core categories;

3b. Continuing to code, make comparisons, and sample theoretically until the point at which no new relevant insights are being reached (theoretical saturation); and

4. Additional tactics to move analysis from descriptive to more theoretical levels: for example, grouping or reclassifying sets of basic categories; writing definitions of core categories, building conceptual models and data displays, linking to the existing literature; writing extended memos and more formal theory. (Henwood & Pigeon, 2003, p. 136)

Appendix B: Example of Working with the Secondary Constant Comparative Analysis, Memo about Evaluative Thought, Partial List

Dream	Type of thought, plan to use in vivo language if possible,	Difference	Explicit property; name, dreamer's mental accomplishment or implicit/explicit goal; is there any subjective (feeling, one's own psychology) or other (cognitive, psychological, emotional) phenomenon occurring?
The next three questions are all about a fraction inside another fraction. I don't remember how to solve these so I give up. Afraid of completely blowing my test, I decide to solve a question that takes up the entire space on the reverse side. No luck there either. It's the end of the day and today's exams are over.	Goal-oriented	Focus on accomplishment of something	Resigns and comes back Fails, chooses the best possible option Choosing the best possible action-based decision despite the experience of previous failure
I cannot swim, nevertheless, I move effortlessly toward the shore.	Analytical	Notices contradiction between own realities and swimming despite not knowing how to do it	Notices the reality of situation Noticing contradictions between one's own abilities and reality of dream situation
With a nod of his head, I realize that he means for me to dance with him.	interpretative	Does not evaluate, is able to "read" the person's intention	Nonverbal communication through behavior, reads nod of head-gesture Reading gestures (behavioral language/nonverbal communication)
I undergo an operation. The surgeon is a man, dressed in black, but not like a doctor. He says, "We will lay her open to the bone and extract what is needless." He cuts my arm below the elbow from the external side, but there is no blood there. The blood starts spurting from the back of the hand. I shout: "Let's go to the hospital, then! Let them sew me up and repair me!" I am not satisfied with the pace. I hurry him, but we keep going slowly.	Evaluation of rescuing efforts, dissatisfaction with work done so far	Evaluates what is going on Time, slow	Need to feel safe-focus on safety Evaluation of swiftness of rescuing efforts
At last I find a nice pair of top boots, but the moment I put them on they seem ugly	evaluative	Evaluates against personal standard, beauty, personal aesthetics	Sensibility toward beauty, personally based evaluation; Personal aesthetic sensibility of object
At my work place, where I do hard work, things do not seem to be going like they are supposed to go. The lectures that I usually give off the top of my head at the training sessions are difficult. I have a loss of memory and become unable to give the lectures.	Evaluative in terms of now	Focuses on evaluation	Memory, evaluation of mental state? Psychological, cognitive, no emotions Evaluation of one's own mental state
We begin to make turns and somersaults, and he keeps flying faster without my assent. I ask my friend to stop. I shout. The situation is desperate.	evaluation	Evaluates	Emotional component Emotional evaluation of situation
I'm watching and finding that I have picked up his rhythms.	Evaluates progress, seems satisfied	evaluates	Dreamer is making progress Evaluation of one's own progress