



Short Communication

Are delusional contents replayed during dreams?



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ABSTRACT

The relationship between dream content and waking life experiences remains difficult to decipher. However, some neurobiological findings suggest that dreaming can, at least in part, be considered epiphenomenal to ongoing memory consolidation processes in sleep. Both abnormalities in sleep architecture and impairment in memory consolidation mechanisms are thought to be involved in the development of psychosis. The objective of this study was to assess the continuity between delusional contents and dreams in acutely psychotic patients. Ten patients with a single fixed and recurring delusional content were asked to report their dreams during an acute psychotic break. Sixteen judges with four different levels of acquaintance to the specific content of the patients' delusions were asked to group the dreams, expecting that fragments of the delusional thought would guide the task. A mathematical index (f,t) was developed in order to compare correct groupings between the four groups of judges. Most judges grouped the dreams slightly above chance level and no relevant differences could be found between the four groups [$F(3,12) = 1.297$; $p = \text{n.s.}$]. Scoring of dreams for specific delusional themes suggested a continuity in terms of dream and waking mentation for two contents (Grandiosity and Religion). These findings seem to suggest that at least some delusional contents recur within patients' dreams. Future studies will need to determine whether such continuity reflects ongoing consolidation processes that are relevant to current theories of delusion formation and stabilization.

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1. Introduction

1.1. Sleep-dependent memory consolidation in the healthy brain/mind

Dream content is thought to reflect several aspects of the dreamer's waking life and many laboratory studies have confirmed what is generally termed the continuity hypothesis of dreaming (Schredl & Hofmann, 2003). However, some authors suggest that universal aspects of dreams are wrongly attributed to individual experiences when they should be interpreted as generic responses to common brain activation patterns shared across the sleep of all human subjects (Hobson & Kahn, 2007). Consolidation of new memory traces into long-term storage has been proposed as a plausible

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function of sleep, whereby key elements of recent experiences are integrated with previously encoded remote and semantic memories (Wamsley & Stickgold, 2011). Some evidence seems to support the contribution of Slow Wave Sleep in consolidating hippocampus-dependent episodic memories, whereas REM sleep appears to be more important for procedural and emotional memory consolidation (for a review, see Diekelmann & Born, 2010). The progression from quiet waking to sleep onset, NREM and REM sleep, has been experimentally correlated to an increase in vivid, hallucinatory percepts that are bound together hyperassociatively in bizarre dream experiences (for a review, see Stickgold, Hobson, Fosse, & Fosse, 2001). Given this strong brain/mind correlation, the dream process itself could somehow reflect the activation and recombination of mnemonic elements during sleep (Schwartz, 2003). However, the mechanism through which this process contributes to the generation of a complex, multimodal sensory experience remains unclear. Indeed, hippocampal activity has been shown to increase during REM sleep in comparison to both wakefulness and NREM sleep but complete episodic memories are rarely found in dreams (Hobson, Pace-Schott, Stickgold, & Kahn, 1998). It has been proposed that dreams incorporate memory fragments relative to waking life experiences that have occurred 5–7 days before the dream at a greater rate than those from 2 to 4 days before the dream (Nielsen, Kuiken, Alain, Stenstrom, & Powell, 2004). This “dream-lag effect” was suggested by experimental findings developed on the basis of the well-known concept of *day residue*, defined by Sigmund Freud as the incorporation of waking life elements within the dream. The confirmation of this finding in several studies, some of which rigorously designed to overcome methodological shortcomings (for example, Blagrove, Henley-Einion, Barnett, Edwards, & Heidi Seage, 2011), supports the view that dreaming and wakefulness are continuous subjective experiences. Indeed, learning-related hippocampal excitability has been shown to last approximately 1 week in several animal studies, when excitation of neocortical neuronal complexes is observed (Nielsen & Stenstrom, 2005).

Two major obstacles have thus far delayed the possibility of correlating neurofunctional modifications to ongoing memory processing in dreams. First of all, direct access to the dream experience is not possible with the exception of lucidity, a rare phenomenon that has been hypothesized to be a hybrid state of consciousness (Dresler et al., 2011; Voss, Holzmann, Tuin, & Hobson, 2009). Dream reports, that are commonly used to infer knowledge on brain function, are memory reports that invariably involve two types of cognition, given that they are produced during sleep and reported during wakefulness (Schwartz & Maquet, 2002). Second, the possibility of accurately relating episodic or semantic memory fragments found in dreams to waking life experiences is limited by the broad variability of thoughts, emotions, interactions, events, etc. which characterize the dreamer's wakefulness.

1.2. Relationship between dream mentation and psychosis

Abnormal sleep architecture and impaired memory consolidation processes have been linked to the development of psychosis (Keshavan, Montrose, Miewald, & Jindal, 2011). The subjective experience of dreaming has been shown to share neurobiological and phenomenological similarities with psychosis (Limosani, D'Agostino, Manzone, & Scarone, 2011), but the relationship between sleep-dependent memory consolidation, cognitive deficits and psychotic symptoms found across diagnostic categories remains unclear. One possible approach is to explore the distinctive features of dream mentation during psychotic breaks. To the best of our knowledge, very few studies previously assessed the manifest content of dreams in Schizophrenia. Apprehension, death and mutilation-related anxieties as well as increased rates of ambivalent hostility were found to characterize the emotional tone of patients' dreams (Carrington, 1972; Kramer & Roth, 1973; Schnetzler & Carbonnel, 1976; Stompe et al., 2003). The increased rates of threats towards the dream Self found in comparison to control populations were intuitively correlated to delusional persecutory experiences in waking life (Carrington, 1972; Langs, 1966; Noble, 1951; Stompe et al., 2003). According to this line of research, generic delusional themes, i.e. Grandiosity or Persecution appear to recur within patients' dreams rather than specific contents. However, one Canadian group recently found that differences between the dreams of schizophrenic subjects and those of normal controls disappear after controlling for report length (Lusignan et al., 2009) and that “sleep stage cognitive style in schizophrenia is comparable to that observed in healthy individuals, with NREM sleep dream reports being more thought-like, less elaborate and less bizarre than REM sleep dream reports” (Lusignan et al., 2010). In most studies, dreams were collected from chronic schizophrenic subjects with varying degrees of active psychosis, so little or no inference can be made on the continuity between sleep mentation and waking thought processes during acute psychotic breaks.

1.3. Objectives

Two distinct experimental procedures were designed to assess the continuity of dream content with delusional thoughts in acutely psychotic inpatients. (1) Several judges were asked to independently group the dreams of 10 subjects selected on the basis of their remarkably fixed and recurrent delusion. We hypothesized that judges with both a professional knowledge of delusional thought formation and direct acquaintance with patients' specific delusional systems would recognize fragments more accurately within their dreams during an acute psychotic break. (2) The same dream reports were scored for the presence of typical delusional themes. Our objective was to confirm that correct identification of dreamers depended on the presence of delusional themes in their dreams.

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