

Dream-Reality confusion: differential psychiatric diagnosis in narcoleptic subjects

Confusão sonho-realidade: diagnóstico psiquiátrico diferencial em narcolépticos

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ABSTRACT

Dream-reality confusion (DRC) is the consequence of hypnagogic content confusion with real events and memories. Narcoleptic subjects eventually have DRC and can be misdiagnosed as schizophrenic or with another disorder with delusional or hallucinatory symptoms. Although dream-related experiences and hallucinatory perception share neurophysiological pathways, they are phenomenologically distinct. The lack of phenomenological intentionality in Dream-related perceptions, the different cognitive pathways for delusion generation, and other differences between mental disorders psychopathology, and DRC-related phenomena are here discussed. The lived world and awake experience interpretation, and dream neurobiology in narcoleptic subjects related to DRC, might indicate some hints for the mind-brain gap issue that still exists in neurology and psychiatry.

Keywords: Dreams, Parasomnias, Delusion, Sleep, Narcolepsy

RESUMO

A confusão entre realidade e sonho (CRS) é a consequência da confusão do conteúdo hipnagógico com eventos e memórias reais. Sujeitos narcolépticos eventualmente têm CRS e podem ser diagnosticados erroneamente como esquizofrênicos ou com outro transtorno com sintomas delirantes ou alucinatórios. Embora as experiências relacionadas ao sonho e à percepção alucinatória compartilhem vias neurofisiológicas, elas são fenomenologicamente distintas. A falta de intencionalidade fenomenológica nas percepções relacionadas ao sonho, as diferentes vias cognitivas para a geração do delírio e outras diferenças entre a psicopatologia dos transtornos mentais e os fenômenos relacionados à CRS são discutidos aqui. A interpretação do mundo vivido e da experiência de vigília, e a neurobiologia dos sonhos em sujeitos narcolépticos relacionados à CRS, podem indicar algumas dicas para a questão do gap mente-cérebro que ainda existe na neurologia e na psiquiatria.

Palavras-chave: Sonhos, Parassonia, Delusões, Sono, Narcolepsia

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INTRODUCTION

Psychiatry and neurology diseases are operationally defined. Psychiatry follows DSM/ICD descriptive operational systems, with "criteria" composed of psychopathological signs. A diagnosis is set when a specific quantity is met (e.g. 2 of 4 major criteria and 2 of 8 minor is necessary for depression). Neurology follows the anatomopathological system used in general medicine: a disease is defined by a syndrome (signal plus symptoms) with an organic lesion and a "natural history".¹ Operational systems increase reliability but, as signs and symptoms are not exclusive for a single disease, misdiagnosis happens eventually. Hallucinatory and delusional phenomena related to abnormal dream physiology are examples of this confusion.

Modern dream research focuses on the manifest content abnormalities of dreams. The Dream-Reality Confusion (DRC) is an event or an experience that is difficult to separate from the conscious or dream period. These experiences are confounded with psychopathological signs, like hallucinations and delusions, resulting in misdiagnosis.

Some mental disorders are more related to DRC, like Post-traumatic Stress Disorder nightmares,² and dream-related self-disorder in schizophrenia.³ However, narcoleptic patients also present these experiences and suffer from DRC.⁴

The boundaries of wakefulness, sleep, and dreams are loose in psychiatric disorders and narcolepsy, but other neurological conditions present the same problem. Consequently, it affects how reality is experienced by the subject, raising questions about its influence on creativity or the presence of psychopathology.

Reality experience is related to neurologic hybridity. In the case of creativity, the remote associations between memories and reality experience depend upon neural activation and dissemination.⁵ Those connections variations might also relate to altered subjective experiences and evolutionary benefits to high creativity and "out of the box" thinking, as seen in schizotypy and autistic savant phenomena.⁶

We will here discuss hypnagogia, a hallucinatory state caused by prolonged sleep deprivation, sensory isolation, and drug use.⁷ The fundamentals of this subject are presented through the definition of perceptions and dreams, neuroanatomy, and dreams physiology, besides DRC that occurs in narcoleptic patients.

DREAM FUNDAMENTALS

Dream recall and constitution according to sleep stages

Dreaming is possible in all stages of sleep, while principally associated with rapid eye movement sleep (REM). REM is consistently associated with higher dream recall than non-REM, but dream study methodology variations, sleep stage duration, and night period influence the content or increase the frequency of dream recall from

non-REM. In general, the quality of non-REM and REM dream reports differs consistently. Non-REM dreams are typically shorter, more fragmented, and thought-like.⁸ In contrast, REM dreams are longer, more emotional, and bizarre. Dreams length, bizarreness, and perceptual vividness for non-REM and REM reports increase across the night⁸. However, REM dreams continue to be more emotionally and perceptually vivid than non-REM dreams.

Narcolepsy

Narcolepsy is classified as type I or II according to the International Classification of Sleep Disorders 3rd edition. The presence or absence of cataleptic attacks, different degrees of somnolence, and sleeping crisis are the main differences. Both types might present many parasomnias, altering dream subjective experience (Figure 1).

Narcolepsy impairs the general behavior and functioning of the patient. Some of its symptoms, like cataplectic attacks, are triggered by emotions, such as joy or anger, limiting daily activities and social interaction. Cataplexy neuropathophysiology and neurochemical findings suggest the involvement of emotional brain circuitry.⁹ Impaired emotion processing in narcolepsy-cataplexy, can be a coping strategy behavior to prevent or reduce the frequency of cataplexy attacks.⁹

Patients with Type 1 narcolepsy have frequent rapid transitions to REM. Successful dream recall is associated with increased EEG desynchronization in REM and non-REM corresponding areas.⁴ Narcoleptic patients have frequently associated sleep-wake symptoms such as sleep paralysis, hallucinations (visual, auditory, and tactile), increased frequency of dreams, nightmares, lucid dreams, and enacted dreams.¹⁰

Some patients confuse the memory of a dream with real experience and form sustained delusions about significant events, a phenomenon called "dream delusions".¹¹ These are false memories induced by a vivid dream leading to false beliefs and could persist for days or weeks. These memories are pervasive and severe in patients with narcolepsy. Still, "dream delusions" are semiologically distinct from hypnagogic and hypnopompic hallucinations. Dream delusion is an altered content idea, while hypnagogic and hypnopompic hallucinations are perceptual disturbances occurring in sleep/wake transition.

Perceptions, hypnagogia, and dreams

Perception is the process of regulating and subjectively understanding sensory input. Explaining subjective experiences in terms of brain processes is a major issue in consciousness science. It is unknown if the neural basis of perceptual consciousness and the neural basis of cognitive mechanisms of conscious experiences are independent. Particularly, DRC of dreamed events and real experiences, suggests the occurrence of attribution errors between these systems.

Illusory and hallucinatory phenomena may either be or not be related to diseases. However, hallucinations have real perception qualities, indicating a common neurological pathway between perception input and this psychopathological event.⁷ The DRC results from these shared neuroanatomical and neurochemical bases.¹¹

However, dream sensory perceptions and hallucinations are distinctly experienced, even if sharing an anatomical basis. Dreams sensory events are immersive and primarily detached from reality, while hallucinations are discrete and overlap with real perceptions.

Dreams and hallucinatory activity are also related to different consciousness states.⁷ Sleep is a physiological state of reduced consciousness, which decreases the ability to integrate perceptions. So, sleep sensations are possibly the consequence of a perceptual engram, where the physically stored memory of a previously perceived object becomes represented as a perceptual experience.

Non-physiologic reduced consciousness states such as sleep deprivation, sensory isolation, and sub-hallucinatory doses of LSD or mescaline are also associated with hallucinations. Some organic stressful situations, like toxemia, stress, exhaustion, and dehydration are also related to hallucinations, despite awake consciousness activity.

Hallucinations are not uncommon in healthy individuals. It can be experienced in awake states as an isolated feature without pathological meaning.¹² However, it is also a symptom of psychosis.

Clinically significant hallucinations can manifest as a consequence of combined factors. Hereditary and cultural predispositions, excessive excitement in anxiety, panic, and dissociative mechanisms are some examples. Those factors harm or distort perceptions as a frightening or threatening social environment.²

Despite dreams and hallucinations similarities, they are fundamentally different, subjective and phenomenologically. Wake experiences are apprehended through the lenses of intentionality, and qualitatively different from the altered sensorium phenomena in dreams. Such qualitative difference is the reason for thought processes in the hypnagogic state, to be radically different from ordinary wake thought. Many artists, writers, scientists, and inventors attributed their creativity to hypnagogia-related states, as a consequence of the altered perceptive states lived during the wake-sleep transition.⁶

From a biologically oriented approach, waking and dreaming experiences share brain activity similarities. The differences are observed in neuroimaging and EEG studies, comparing wake brain activity with REM sleep. In this state, subjects are most likely to report dreams with perceptive content, while some areas are active, and others inactive.¹³

Particularities about the reality monitoring processes also contribute to dream/reality sensory discrimination. In particular, the medial prefrontal cortex is an important region for reality monitoring and is activated during the retrieval of self-generated information. Such cerebral regions may be responsible for discriminating information generated internally from externally.

Many people with narcolepsy have hypnagogic/hypnopompic hallucinations. Those hallucinations might be similar to those of the REM dream perceptions but occur when someone is only half awake. Likewise, many people with narcolepsy have very vivid and intense dreams and nightmares while sleeping and, for young children with narcolepsy, it is difficult to differentiate vivid dreams from reality.¹¹

Like sense-perceptive phenomena and hallucinations in dreams, dream delusions are not the same experience as true delusions. Dream delusions originate from vivid dream experiences confounded with memories. True delusions may arise from a delirious interpretation, as observed in memory disturbances related to self-disorders. However, that is not the usual pathway for delusion formation.¹⁴

True delusions seem to be the final consequence of many logical processes trying to explain self-disorders and other common-sense disturbances.^{14,15} Consequently, true delusions are usually permanent in schizophrenia spectrum disorders and oscillate with the treatment in mood disorders. Dream delusions are solved once their oniric origins are perceived by patients or by social calling to a shared reality, being ontologically diverse from true delusion. The organic pathway for both disturbances must be elucidated to clarify this mind-brain gap issue.

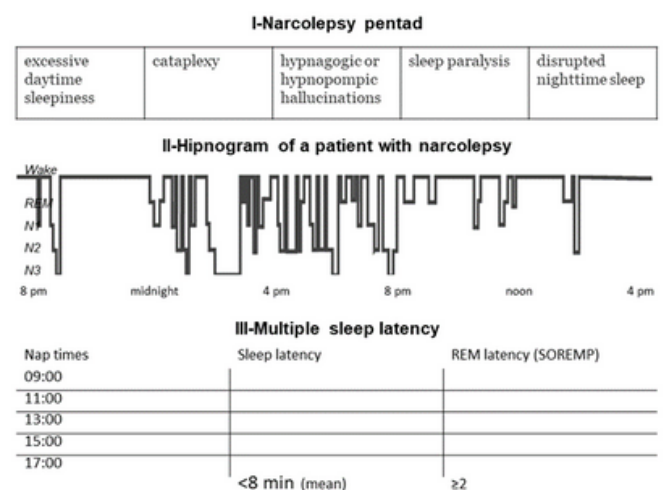


Figure 1. Narcolepsy-cataplexy, clinical and polysomnographic aspects (Narcolepsy type 1). I-Clinical symptomatology; II-Hipnogram shows fragmented sleep, rapid entry into Sleep-Onset REM Period (SOREMP), and numerous naps during the day that include REM sleep. III-Multiple sleep latency test results in patients with narcolepsy, in which patients are asked to take five short naps separated by 2 hours over a day. Narcolepsy type 2 is a diagnosis of exclusion requiring ancillary tests ruling out other causes of excessive daytime sleepiness.

CONCLUSIONS

The hypnagogia can be confused with a realistic perception, or a misunderstanding of dreams and memories confounded with real experiences. Hypnagogia is a common occurrence in patients with narcolepsy due to frequent episodes of SOREMP. These patients' perception experiences contribute to a better understanding of the mechanisms of the levels of consciousness and their different perceptions, including hallucinatory ones, from the simplest to the most complex.

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Data Availability Statement: All data generated or analyzed during this study are included in this article [and/or] its supplementary material files. Further enquiries can be directed to the corresponding author

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