Objective sleep disturbance in nightmares: Is prolonged sleep onset latency a proxy for fear-of-sleep-related arousal?

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Nightmares are associated with a host of negative health outcomes \(^1\text{--}^4\) including insomnia \(^2,^5\text{--}^7\), the co-occurrence of which conveys worse overall symptoms \(^2,^8\). Although we understand those who suffer from nightmares report frequent nighttime awakenings and prolonged sleep onset latency (SOL) \(^9\), the data on the *objective* sleep characteristics of nightmares remains inconsistent \(^10\text{--}^12\). This gap in knowledge precludes potential insights into the night-to-night physiology underpinning nightmare production which might otherwise inform preventive and treatment efforts.

To address this issue, Paquet and colleagues (2024) collected novel data from four nights of in-lab polysomnography (PSG) recordings in three groups of participants: good sleepers \((n = 142)\), individuals with chronic insomnia disorder \((n = 126)\), and individuals with comorbid nightmares and insomnia \((n = 24;\ reporting\ at\ least\ monthly\ nightmares\ for\ the\ past\ year)\) \(^13\).

Among other findings, the authors reported individuals with nightmares + insomnia had longer SOL across all four nights \((M_{\text{minutes}} = 51.92 \text{ minutes} \pm 3.73)\) than the chronic insomnia group \((M_{\text{minutes}} = 39.79 \text{ minutes} \pm 1.63)\) and more variable sleep fragmentation (wake after sleep onset (WASO) and stage 1) compared to both the chronic insomnia group and good sleeping controls \(^13\).

Their finding that individuals with comorbid nightmares and insomnia had the most difficulty falling asleep comports with subjective reports \(^6\) and might reflect a number of underlying processes, including a fear of sleep, pre-sleep arousal, or (likely) both. A fear of sleep reflects a fear of being vulnerable and unsafe during sleep and can develop in response to nightmares \(^14\text{--}^16\). Individuals with a fear of sleep may engage in safety behaviors to cope with their fears that interfere with sleep onset, such as maintaining nocturnal hypervigilance (e.g., “I tried to stay as alert as I could while lying in bed”) \(^14\). Such fear and accompanying behaviors
can promote hyperarousal 17–19, including pre-sleep somatic arousal (e.g., racing heart, shortness of breath) 18, and thus may partly explain the longer SOL reported by Paquet and colleagues. This prolonged SOL could also be due, at least in part, to pre-sleep cognitive arousal (e.g., worry, rumination) 21. For example, according to the Nightmare Cognitive Arousal Processing (Night-CAP) model, the risk for nightmares increases when pre-sleep cognitive arousal delays sleep onset, as this creates more opportunity for worry and rumination before sleep that imbues dream content with negative emotion 22,23.

Yet, Paquet et al. found evidence nightmares likely did not occur overnight while in the sleep lab 13. Thus, could the putative pre-sleep arousal in the nightmare group reflect a trait vulnerability to experience nightmares? For instance, the SOL of those with nightmares + insomnia demonstrated almost perfect stability across the four nights (intraclass correlation coefficient = .82), suggesting this phenomenon was not state-dependent 13. Indeed, findings from a recent study suggest cortical hyperarousal may be a trait among individuals reporting at least one nightmare a week 24. This mirrors the insomnia literature 25 and implies nightmare sufferers might exhibit premorbid cognitive-emotional hyperarousal similar to those at-risk for insomnia 26 (see also the Differential Susceptibility Framework 27). Perhaps the comorbid nightmares + insomnia presentation acts to compound the cognitive-emotional hyperarousal of both disorders (e.g., creating an amalgam of fear-of-sleep-related arousal and rumination), leading to a longer SOL in this group relative to those with insomnia only.

Taken together, the authors’ exciting findings underscore sleep continuity (i.e., SOL, WASO) as the primary feature that distinguishes the objective sleep of those with comorbid nightmares and insomnia from good sleepers and those with insomnia alone. This insight might partly explain the deleterious impact of nightmares on mental health, as sleep continuity
disturbances are a hallmark of psychopathology. Future studies can build on this important work by recruiting a larger group with comorbid nightmares and insomnia and participants reporting more frequent nightmares (e.g., \( \geq 1 \) night per week for the past month) via a structured interview or a brief screener such as the Nightmare Disorder Index. Moreover, the use of ambulatory methods is a compelling approach that could facilitate future recruitment efforts and advance the methodology of this literature overall. For instance, ambulatory data collection offers the advantage of reliably detecting nightmares as they occur at home as opposed to an overnight PSG, during which nightmares are historically not observed. Ambulatory measures can also elucidate the psychophysiology preceding nightmare occurrence and undergirding fear-of-sleep-related arousal (e.g., by measuring skin conductance response to the bed). Ultimately, the valuable contribution of Paquet et al. takes us one step closer toward understanding the objective sleep disturbance in those with nightmares and, in doing so, opens new horizons for future investigators.
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References


11. Woodward SH, Arsenault NJ, Murray C, Bliwise DL. Laboratory Sleep Correlates of Nightmare Complaint in PTSD Inpatients. BIOL PSYCHIATRY.


21. Kalmbach DA. Nocturnal cognitive arousal is associated with objective sleep disturbance and indicators of physiologic hyperarousal in good sleepers and individuals with insomnia disorder. *Sleep Medicine.* Published online 2020.


