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EDITORIAL

Sleep on it: exploring the psychology of sleep amidst contemporary challenges

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Throughout history, poets, scholars, and scientists have acknowledged the profound link between sleep and psychological well-being. The wisdom of “sleep on it”, ingrained in both Western and Eastern traditions, highlights the crucial role sleep plays in restoring and enhancing cognitive functions. In today’s fast-paced, highly-interconnected, technology-driven world, where cognitive demands are ever-growing, quality sleep has become both more vital and more elusive. This collection delves into the evolving role of sleep in maintaining psychological well-being amidst contemporary challenges. It brings together a diverse array of behavioral and brain imaging studies from researchers across the globe, focusing on three key areas: the beneficial effects of sleep on learning and education, the detrimental consequences of sleep disruption on mental health, and the rising prevalence of sleep disruption in vulnerable populations. These studies offer compelling insights, revealing, for instance, how sleep consolidates conceptual networks of knowledge, how sleep disruption can signal suicidal tendencies a month before suicide attempts, and how heatwaves negatively affect infant sleep. This body of work not only underscores the cognitive benefits of sleep but also illuminates how contemporary challenges—such as climate change, poverty, and shift work—undermine sleep health. It calls for targeted interventions to improve sleep health and psychological well-being in response to these contemporary challenges, urging scholars and policymakers to prioritize sleep health as a foundational element in building a healthier, more resilient society.

Keywords Sleep, Psychology, Learning, Sleep disruption, Autism, Mental health, Infants, Vulnerable populations, Socioeconomic challenges, Climate change, Education, Public health, Social science

Historically, sleep has been regarded as a cornerstone of psychological well-being. As early as the fifth century BC, Sophocles described sleep as “a stranger to anguish” with the “power to heal”¹. In the first millennium AD, Ovid referred to sleep as “the spirit’s comforter, router of care”². Moving to the seventeenth century, William Shakespeare recognized sleep as the “balm of hurt minds”³ and attributed special value to dreams⁴. In the nineteenth and twentieth centuries, researchers, notably Marie de Manacéine, proposed that sleep and dreaming are crucial sources of intellectual inspiration, emphasizing the notion of “sleep on it”⁵. This notion is deeply embedded in the collective wisdom of various cultures, as reflected in proverbs such as “we must always sleep over an important resolution” and “morning is the time to make up one’s mind”⁵. It highlights the crucial role sleep plays in restoring and enhancing a wide range of cognitive functions⁶, such as decision-making, problem-solving, emotion regulation, memory, learning, all of which are fundamental to psychological well-being^{6–10}.

As we advance into a fast-paced technological age, with growing socioeconomic and environmental challenges, maintaining quality sleep becomes both increasingly important and increasingly difficult. Navigating the demands of this highly interconnected world requires optimal cognitive performance and new cognitive strategies, which can only be sustained through quality sleep. However, contemporary stress often leads to reduced sleep time, creating a paradox where we need sleep more than ever but have less of it. This dilemma raises new research questions along two lines. First, what role does sleep play in supporting new cognitive and

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learning strategies needed for navigating contemporary society? Second, how do the challenges of contemporary society affect sleep and mental health?

Articles in this collection address these key questions, providing new evidence on sleep's role in maintaining psychological well-being, while also shedding light on the adverse impacts that contemporary society imposes on sleep. Although our *physiological* need for sleep remains unchanged, the *psychological* necessity for high-quality sleep has intensified with contemporary challenges. This collection focuses on the link between sleep and psychological well-being, distinct from the important but separate theme of sleep physiology. Our call for papers was answered by researchers across the globe, whose work addresses the psychology of sleep from various angles, including learning, education and mental health. They also examine sensitive and timely issues, such as the impacts of poverty and climate change on sleep, providing valuable insights for public health bodies and policy makers. We highlight some of these findings below (see Fig. 1 for a word cloud summary of the topics covered).

The beneficial effects of sleep on learning and education

Sleep is essential for cognitive development; it helps the brain integrate new and existing knowledge, making learning long-lasting rather than transient⁸⁻¹⁰. Building on previous research, articles in this collection provide new insights into the role sleep plays in learning and memory, with implications for education.

Using an innovative teletransportation paradigm, Feld and colleagues¹¹ discovered that sleep enhances memorization of conceptual links between items, facilitating the construction of internal knowledge networks. Vidal and colleagues¹² showed that memory reactivation during sleep can improve the consolidation of complex classroom knowledge, demonstrating the educational benefits of memory reactivation techniques. Combining dream reports with an emotional picture task, Zhang and colleagues¹³ observed an active role for dreaming in emotional memory processing. Gonzales and colleagues¹⁴ found that early chronotypes exhibit greater prefrontal brain activity during a visuospatial working memory task, suggesting that early rising may protect brain function and cognitive reserve.

These findings open up new avenues for future research. In this highly interconnected world, memorizing conceptual links between knowledge is becoming increasingly important. Future research could investigate how the construction of knowledge networks differs between neurotypical children and those experiencing sleep disruption, such as autistic children, while controlling for IQ¹⁵⁻¹⁷. If autistic children perform better, this could point to compensatory (or alternative) mechanisms that enable the construction of knowledge networks despite sleep challenges. Such mechanisms might involve local sleep during wakefulness, where specific brain regions enter a sleep-like state while the individual remains awake and active¹⁸⁻²⁰. Understanding these mechanisms could help inform educational strategies that align with sleep patterns to optimize cognitive benefits.

The detrimental consequences of sleep disruption on mental health

Sleep disruption is a common comorbidity in many neuropsychiatric conditions, including autism, anxiety, and depression, each exhibiting distinct alterations in polysomnography profiles²¹. Previous research has linked sleep difficulties to internalizing and externalizing symptoms in adolescents²² and young adults. Articles in this collection provide further insights into how external (environmental) factors, such as the COVID-19 pandemic, and internal factors, such as suicidal ideation, influence sleep patterns in the youth population.



Fig. 1. A word cloud summary based on titles and abstracts of articles in this collection.

Rolling and colleagues²³ investigated sleep patterns in adolescents who had attempted suicide, discovering that, in the month preceding suicide attempts, these individuals experienced shorter total sleep time and longer sleep latency on school days. Bauducco and colleagues²⁴ found that during the COVID-19 pandemic, declining mental health in adolescents was closely tied to deteriorating sleep patterns. Reynolds and colleagues²⁵ compared young adults with and without shift jobs, revealing that sleep disorders, along with elevated levels of anxiety and depression, were more prevalent among young shift workers, regardless of their shift schedules.

An open question in the field is the direction of causality between sleep disruption and mental health disturbances. Recent evidence suggests that sleep disruption may precede mental health symptoms, with the early onset of low-quality sleep in infancy linked to atypical socio-emotional developmental trajectories²⁶. However, the shared genetic and environmental factors underlying sleep patterns⁸ and neuropsychiatric conditions²⁷ complicate causal inference. Access to large-scale genetic datasets could help uncover whether sleep disruption instigates mental health disturbances, or vice versa.

The escalation of sleep disruption amidst contemporary challenges

Understanding the effects of poverty and lower socioeconomic status on sleep is crucial, but research in this area, particularly from developing countries, is limited. Moreover, the impacts of climate change and rising urban temperatures on sleep remain largely unexplored. Articles in this collection explicitly address these knowledge gaps.

Berger and colleagues²⁸ discovered that infant sleep was significantly disrupted during a summer heatwave in the UK, with reduced total sleep, more fragmented sleep, and more frequent parental visits to the crib, compared to non-heatwave nights. Correia and colleagues²⁹ examined how socioeconomic status and stress level affected sleep in South African adults, finding that participants with safety-related fears reported poorer sleep quality, despite having relatively long sleep durations (over nine hours). This pattern contrasts with observations among African Americans in the U.S, highlighting the importance of identifying unique sleep disruption patterns in diverse populations.

Since sleep disruption can foreshadow mental health disturbances, understanding the effects of environmental and socioeconomic stressors on sleep, particularly in vulnerable populations, is essential for preventing long-term psychological issues. Findings in this collection suggest that interventions aimed at improving sleep quality should be tailored to specific populations and their unique circumstances. For instance, developing affordable and sustainable cooling solutions in urban areas could help low-income families mitigate the impacts of climate change on sleep. Similarly, community-based initiatives designed to enhance security and reduce stress might alleviate safety-related sleep disruptions in high-crime areas. Building on these findings, future research could incorporate genetic data to address how the interplay between genetic predispositions and environmental or socioeconomic factors shapes sleep patterns and psychological well-being³⁰.

Conclusion

Sleep is far more than a passive state of rest; it is an active process crucial to cognitive function and mental health. This collection highlights the beneficial effects of sleep on learning and education, as well as the adverse impacts of sleep disruption on mental health. It emphasizes that high-quality sleep is not merely a physiological necessity but a psychological one, essential for navigating the complexities of contemporary society. As socioeconomic and environmental pressures rise, ensuring equitable access to sleep becomes a pressing public health priority. By examining the psychology of sleep in the context of contemporary challenges, the field can move towards a more comprehensive and inclusive understanding of sleep's importance for psychological well-being, ultimately leading to better health outcomes and quality of life across diverse populations. This collection thus serves as both a call to action and a roadmap for future research, encouraging scholars and policymakers alike to prioritize sleep health for a healthier, more resilient society.

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