

The Complicated Relationship Between Sleep, Social Media, and Mental Health in Adolescence: A Review

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ABSTRACT

Sleep is an incredibly important aspect of physical health and mental wellbeing in adolescence. Quality sleep can improve mood and cognition and allow adolescents to perform better in day to day activities. However, adolescents' sleep is often undercut by other activities, such as screen time on digital devices. With technology like smartphones becoming ubiquitous, time spent on screens is higher than ever, negatively affecting the sleep quality of teens. This review examined why sleep is so important in adolescence, as well as how screen time and social media are associated with poor sleep in adolescents. Mental wellbeing suffers as a result of poor sleep and screen media. Conclusions showed that considerable adverse health effects arise from poor sleep hygiene and excessive screen time is associated with less sleep. Additionally, there were direct links between various forms of screen media, especially social media, and the mental wellbeing of adolescents. Proper sleep hygiene should be better prioritized in today's age of pervasive technology.

The Importance of Sleep and the Adverse Effects of Poor Sleep

There are a myriad of reasons for the rise in poor sleep, especially in adolescents, whose minds are still developing. Adolescence is a period of prime brain growth and development, which means not only that sleep is especially important, but also that patterns of sleep vary significantly within the age group (Bruce et al., 2017). Essentially, sleep requirements and patterns can be vastly different for younger adolescents and older ones, which makes it even harder to accommodate. Not only are external factors like school and extracurriculars giving less leeway for students to sleep, but also, as they grow older, teens prefer evening activities and staying up late more in general (Colrain & Baker, 2011), leading to less sleep. *Delayed sleep phase syndrome*, also known as delayed phase preference, is another phenomenon exhibited by adolescents that might explain differing sleep patterns, as well as less sleep overall (Crowley et al., 2007). Delayed sleep phase causes the sleep patterns of adolescents to shift to later bedtimes and wake up times – while in normal circumstances this wouldn't be problematic, society today often requires early wakeup times, resulting in less sleep overall for teens. All of this contextualizes that poor sleep is indeed a problem among adolescents in today's society.

Sleep Deprivation and Cognition

Cognition is as important in teens as it is any human, referring to their ability to complete basic tasks, learn, comprehend, etc. Sleep deprivation has a negative effect on cognitive performance and focus, especially in emotional processes in the brain (Killgore et al., 2010). Although areas of alertness and vigilance can be restored

through commonly used stimulants like coffee, a remedy that many sleep-deprived teens employ to combat sleepiness, there is still an overarching detraction from cognition in teens as a result of sleep deprivation.

Emotional-cognitive processes play a huge factor in certain areas of cognition, and sleep deprivation notably hinders these processes (Killgore et al., 2010). Studies analyzing brain activity in the amygdala region (the area responsible for emotional processes) support this, as sleep deprivation has is associated with an increased amygdala activity (Gregory & Sadeh, 2012); this may be why a commonly cited symptom of sleep deprivation is increased irritability. The effects of poor sleep are so significant to mood that there are speculations as to whether sleep deprivation is more directly related to mood disorders like bipolar disorder, rather than just co-occurring with them (Yoo et al., 2007). Another interesting factor to consider is that emotional cognitive disturbance can often cause sleep quality to deteriorate as well in adolescents, because of worry and anxiety; these thoughts can delay sleep start times, and lead to earlier wake up times due to the arousal of the emotional cognitive brain regions (Brand & Kirov, 2011). This may mean that the relationship between sleep quality and emotional cognition is bidirectional, where a poor quality of either can cause the other to detract in turn.

Sleep Deprivation and Mental Health

Sleep deprivation is shown to have significant adverse effects on mental health in many different ways, usually as a result of its effect on other functions of the human brain. Gangwisch et al. (2010) found that adolescents in grades 7-12 whose circumstances forced them to have a bedtime of 12:00am were significantly more likely to suffer from depression and experience suicidal ideation than those able to go to sleep at 10:00pm. Sampasakanyinga et al. (2020) determined that adherence to Canada's 24-Hour Movement Guidelines for Children and Youth – which recommended 8-10 hours of sleep for 14-17 year olds – resulted in noticeably less anxiety and depression symptoms – and that the reverse would result in a higher psychological distress. The kids going to bed at midnight rather than 10PM were likely to get less sleep than their peers; since poor sleep is also associated with symptoms of emotional distress and lesser cognition, it is plausible that these could eventually evolve into depression and anxiety.

Sleep Deprivation and Risky Activities

Poor sleep in teens is also associated with increased participation in risky activities, like violence, as well as alcohol and marijuana use (McKnight-Eily et al. (2011). Almost 70% of the students participating in the study remarked on not receiving enough sleep on a school night; these associations with risky activities can only exacerbate the other negative effects that sleep causes.

The Effects of Screen Time and Social Media on Sleep and Mental Health

One of the main culprits of sleep deprivation is increased screen time, which can be detrimental to sleep time and therefore quality. In addition to this, screen time can directly affect adolescent mental health, such as through social media (Scott & Woods, 2019). Multiple sources of screen time have a large influence on sleep quality, especially smartphones; there are also distinctions between gender on the influence of certain forms of screen time.

Sleep time and sleep quality are closely tied together, and screen time has an adverse effect on both; in a systematic review of 67 studies from 1999 to 2014, 90% of them found an adverse association between screen time and sleep quality, mainly because of delaying the time sleep started, and the total hours slept (Hale & Guan, 2015). This goes back to the delayed phase preference discussed earlier; many teens are likely to go to bed later because of their screen time, but are forced to wake up early for school or other obligations, reducing

the total time slept. In the case of all forms of screen time – whether it be social media or computer and console games – further evidence shows how they can negatively affect sleep. Further evidence from a 2017 Youth Risk Behavior Survey found that students were significantly more likely to have insufficient sleep if they engaged in “excessive screen-time behaviors”, which are characterized by more than three hours of non-school related electronic device use. Almost 75% of the 14,000 adolescents surveyed reported getting fewer than 8 hours of sleep on a school night; almost half of them engaged in excessive screen time (Baiden et al., 2019). There is a clear correlation between the excessive screen time behaviors and a lack of sufficient sleep time, in this case 8 hours; considering the previous study’s findings on how there is an adverse association between screen time and sleep quality, it’s safe to say that there is causation in this correlation.

A cohort study in the UK in 2015 found that although many different forms of screen media impacted sleep, technology that allowed social media or internet browsing was the most pervasive (Hisler et al., 2020). The same study highlighted that a higher (>2 hours) amount of time spent on social media resulted in a significant increase in depressive symptoms and an increased chance of self harm for girls, while in boys there was no significant correlation with social media use; interestingly, for neither gender were there associations to gaming, texting/emailing, and TV/video (McAllister et al., 2021), implying that social media is the paramount primary damaging screen media source. Though the study did not speculate why social media was harmful for girls and not boys, it is possible that the reason is due to the type of content viewed by each gender. Przybylski & Weinstein (2017) points out that girls report using smartphones more, while boys report spending more time playing computer and console games; as social media is primarily browsed on smartphones, girls may be even more vulnerable to the harmful effects of social media on sleep and mental health.

Furthermore, a study which surveyed 467 Scottish adolescents found that increased social media (as opposed to general screen time) use among adolescents led to lessened sleep quality, along with the aforementioned adverse mental health symptoms of depression and anxiety (Scott & Woods, 2019). Thus, social media is especially pervasive in that it both affects mental health directly, – especially in girls – and also reduces sleep time, which causes its own mental health problems.

In the case of video games, time spent reaching six hours was associated with significantly higher anxiety (Chen et al., 2022); so, in some cases, video games do have their own adverse effects on mental health. However, it is clear that the effects of social media are more plainly detrimental.

Sleep, Social Media, and Mental Health: The Big Picture

The myriad of negative health effects of poor sleep are exacerbated by screen time, both through its effect on sleep, as well as the direct effects that screen time has on mental health. Therefore, screen time, especially social media and video games, can be especially pervasive to adolescent mental health. There is a clear nuance in the gender difference of adolescents, as, in general, there seems to be more evidence for social media directly negatively affecting teen girls than boys. Because of this discrepancy between which form of media is more commonly used by each gender, as well as the specific effects of each form, there is even more complexity to this issue; if future research really wants to dig deeper into the effects of sleep, screen time, and mental health, a good place to start may be in these gender nuances.

Another limitation shared by many studies on screen time and adolescence is that most analyze screen time as a scalar quantity, rather than its own complex field, in which many forms of content exist and can have their own effects (Scott & Woods, 2019). In other words, screen time is often measured just as a quantity of hours, when there are in fact many different types of screens, and different types of content on those screens that can have their own psychological effects. For example – there are new, extremely pervasive forms of social media on the rise, most notably, short videos on TikTok, YouTube shorts, and Instagram Reels. These videos are unique because they are especially short and full of stimuli, in order to quickly grab the attention of consumers. Because of the addictive nature of these videos, they pose a new concern when considering the role of

technology in adolescents' lives. Many of the adverse effects on sleep caused by screen media is due to the time spent on these devices, which reduce the amount of hours of sleep overall with later start times and earlier wake up times; thus, the implications of short-form content are concerning, and, considering the lack of research, should be explored more extensively by studies in the future.

Considering the many negative effects of poor sleep, there should be interventions in schools or homes to ensure that adolescents get quality sleep. However, since many teens themselves decide the quality of the sleep they get through the decisions they make regarding screen media, there should also be more education around this topic to encourage better sleep hygiene among adolescents. Changing schools is understandably difficult, considering the logistics of transportation, parents' job start times, extracurriculars, among other things. However, with how detrimental poor sleep can be, an increased emphasis on sleep hygiene education is crucial. As more research is done, there is hope for a better understanding of the constantly-evolving intersection of adolescent sleep, screen time, and social media.

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