

About Student Sleep Deprivation

I think high school is the real danger spot in terms of sleep deprivation. It's a huge problem. What it means is that nobody performs at the level they could perform, whether it's in school, on the roadways, on the sports field or in terms of physical and emotional health.

William Dement

Sleep deprivation is a common problem that can greatly impact a student's physical and mental health and school performance and may cause executive function impairments (leading to risk taking behaviors). A 2006 survey by the National Sleep Foundation reported that more than 87 percent of U.S. high school students get far less than the recommended eight to 10 hours. Moreover, the trend indicates the amount of time they sleep is decreasing. In 2014, the American Academy of Pediatrics declared the problem of tired teens a public health epidemic.

What Causes Student Sleep Deprivation?

The reasons for student sleep deprivation are many, including a wide range of social, cultural, environmental, and biological factors (e.g., personal interests and problems; involvement with “extracurricular” activities including technology and social media; academic demands; living conditions that interfere with sleep). For many teens, other facets of their lives seem more important than sleeping. For example, a large number of teens use social media before going to bed (Richter, 2015). And even if they do want to go to sleep earlier and sleep longer, their biological makeup and school schedules make it difficult for them. They have trouble falling asleep earlier, and they are woken up before their brain has had sufficient time to recover from the day before.

Biological Factors

There is a consensus that adolescent biological sleep patterns differ from adults and their younger counterparts. Research has established that teens have a biologic tendency to go to sleep as much as two hours later. The sleep cycle for teens shifts toward later times, and the push to fall asleep builds more slowly. Late night activities and teenagers tendencies to sleep late and wake up late on weekends further affect their sleep cycles. Studies suggest that late night activities send signals to the brain that it's not yet nighttime (via the retina to the section of the brain that controls the circadian clock). There is a delay in circadian nocturnal melatonin secretion. This increases the time required to fall asleep. Then, the melatonin secretion turns off later in morning, making it hard for students to wake up early. With their sleep cycle disrupted, they lose much of the deepest and most productive time for resting (Barnes, Davis, Mancini, Ruffin, & Simpson, 2016; Richter, 2015; Telzer, Goldenberg, Fuligni, Lieberman, Galván, 2015).

There are many daily living conditions that can disrupt sleep. In disadvantaged neighborhoods, for example, local violence causes individuals to fear for their safety. This can lead to hyperaroused, which makes it harder to fall asleep and reduces sleep quantity and quality (Bagley, Tu, Buckhalt, El-Sheikh, 2016).

A range of life-style and psychological factors also can interfere with sleep. For example, intake of stimulating substances and excessive use of social media also can play a role. And adolescents with significant anxiety problems report experiencing more disrupted and less satisfying sleep than their peers. Sleep disturbances are associated reciprocally with the regulation of behavior and emotion (Mullin, Pyle, Haraden, Riederer, Brim, Kaplan, & Novins, n.d.).

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Smart Phones and Social Media

The Pew Research Center survey indicates that over 90 percent of U.S. teens have smartphones, and 24 percent report being online “constantly” (Lenhart, 2015). Teens also have access to and simultaneously use other electronic devices. At night, 72 percent bring cellphones into their bedrooms and use them before they fall asleep. The National Sleep Foundation poll on electronic use found that almost 30 percent leave their phones on while sleeping and report being awakened at night by texts, calls, or emails. In addition, in the hour before going to sleep, some 64 percent use electronic music devices, 60 percent use laptops, 23 percent play video games, and more than half reported texting. Those significantly involved with their phones and social media were less likely to report getting a good night’s sleep and feeling refreshed in the morning and were more likely to drive when drowsy (Richter, 2015).

School as a Causal Factor

The many pressures and commitments that teenagers and college students must manage during school are likely strong contributors to sleep deprivation. Whatever their motivation and capabilities, school assignments, schedules, and accountabilities can be highly demanding and lead to making adequate sleep a lower priority. Involvement in extracurricular activities can compound the situation. So can excessive competitive pressures.

Students may stay up late to finish an assignment (and be less alert during the school day). And the problem can become cyclical, with students increasing their sleep debt falling more and more behind in school.

Relatedly, considerable attention is being paid to school start time for teens. School start time may require waking up before they are physically or mentally ready. And many skip breakfast in order to get up as late as possible and still get to school on time (or at least not too late).

What Role are Schools Playing in Addressing the Problem?

Besides a focus in extolling healthy life styles (including sleep hygiene), the main response in some schools is to consider later start times. Initial studies suggest positive outcomes for teens (but not elementary students) with respect to better achievement test scores and grades, fewer absences, less daytime sleepiness, tardiness, attention or concentration difficulties, a reduction in teen car accidents (Barnes, Davis, Mancini, Ruffin, & Simpson, 2016; Edwards, 2012; Lahey, 2014; Richter, 2015). For example, schools in Wake County (CA) delayed start time by one hour and reported an increase in standardized test scores by 2-3% (with the largest impact on students with below average test scores). They also had 25% fewer absences than those with earlier start times. Schools in Edina (MN) reported that a later start time was associated with students feeling less depressed, less sleepy, and more empowered to succeed. Attendance rates also rose. Rhode Island reported improved student alertness and mood and fewer car accidents.

As to healthy life style, the emphasis remains on such concerns as establishing and maintaining regular sleeping schedule and, just before bedtime, avoiding stimulants and generally curtailing activities that stimulate cognitive and emotional engagement likely to interfere with sleeping. Authoritative parent caring guidance, support, monitoring, and modeling are always suggested, as is avoidance of excessive pressure to perform and achieve.

Concluding Comments

Experts on sleep research conclude:

“Despite the known importance of sleep for brain development, and the sharp increase in poor sleep during adolescence, we know relatively little about how sleep impacts the developing brain.” In the first longitudinal study to examine how sleep during adolescence is associated with white matter integrity, Telzer, Goldenberg, Fuligni, Lieberman, & Galván (2015), caution that “greater variability in sleep duration ... is associated with lower white matter integrity above and beyond the effects of sleep duration, and variability in bedtime.... Thus, variability in sleep duration during adolescence may have long-term impairments on the developing brain. White matter integrity should be increasing during adolescence, and so sleep variability is directly at odds with normative developmental trends.”

Schools, families, and policy makers, of course, can't wait for conclusive findings from brain research. What seems clear at this juncture is that interventions to counter sleep deprivation must consider more than later school times for teens. Greater attention needs to be directed toward including productive sleep as part of the focus on promoting healthy development. Systems for addressing barriers to learning and teaching and re-engaging disconnected students must consider the role of sleep deprivation and its possible causes. Society must modify schooling and child-rearing practices that interfere with sleep (e.g., excessive pressure to perform and achieve; inappropriate homework assignments, insufficient guidance and support around daily living practices).

Clearly, everyone can benefit from a good night's rest.

References and Resources Use in Developing this Document

- Anderson, B., Storfer-Isser, A., Taylor, H.G., Rosen, C.L., & Redline, S. (2008). Associations of executive function with sleepiness and sleep duration in adolescents. *Pediatrics*, *123*. e701-e707. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4430079/>
- Bagley, E.J., Tu, K.M., Buckhalt, J.A., & El-Sheikh, M. (2016). Community violence concerns and adolescent sleep. *Sleep Health in Early Care and Education*, *2*, 57-62. <http://dx.doi.org/10.1016/j.sleh.2015.12.006>
- Barnes, M., Davis, K., Mancini, M., Ruffin, J., & Simpson, T. (2016). Setting adolescents up for success: Promoting a policy to delay high school start times. *Journal of School Health*, *86*, 552-557. <http://onlinelibrary.wiley.com/doi/10.1111/josh.12405/full>
- Colrain, I.M., & Baker, F.C. (2011). Changes in sleep as a function of adolescent development. *Neuropsychology Review*, *21* 5-21. <https://www.ncbi.nlm.nih.gov/pubmed/21225346>
- Dahl, R.E., & Lewin, D.S. (2002). Pathways to adolescent health sleep regulation and behavior. *Journal of Adolescent Health*, *31*, 175-184. <https://www.ncbi.nlm.nih.gov/pubmed/12470913>
- Edwards, F. (2012). Do schools begin too early? *Education Next*, *12*, 1-6. <http://educationnext.org/do-schools-begin-too-early/>
- Fuligni, A.J., & Hardway, C. (2006). Daily variation in adolescents' sleep, activities, and psychological well-being. *Journal of Research on Adolescence*, *16*, 353-378.
- Lahey, J. (2014). Students aren't getting enough sleep - school starts too early. *The Atlantic*, *online*. <http://www.theatlantic.com/education/archive/2014/08/surprise-students-arent-getting-enough-sleep/379020/>

Lemola, S., Ledermann, T., Friedman, E.M. (2013). Variability of sleep duration is related to subjective sleep quality and subjective well-being: An actigraphy study. *PloS one*, 8, e71292. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743871/>

Lenhart, A. (2015). *Teens, social media & technology overview*. Washington, DC: Pew Research Center. <http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/>

McKnight-Eily, L.R., Eaton, D.K., Lowry, R., Croft, J.B., Presley-Cantrell, L., & Perry, G.S. (2011). Relationships between hours of sleep and health-risk behaviors in US adolescent students. *Preventive Medicine*, 53, 271-273. <https://www.ncbi.nlm.nih.gov/pubmed/21843548>

Mullin, B.C., Pyle, L., Haraden, D., Riederer, J., Brim, N., Kaplan, D., & Novins, D. (2016). A preliminary multimethod comparison of sleep among adolescents with and without Generalized Anxiety Disorder. *Journal of Clinical Child and Adolescent Psychology*, 1-13. <http://www.tandfonline.com/doi/full/10.1080/15374416.2016.1220312>

O'Brien, E.M., & Mindell, J.A. (2005). Sleep and risk-taking behavior in Adolescents. *Behavioral Sleep Medicine*, 3, 113-133. <https://www.ncbi.nlm.nih.gov/pubmed/15984914>

Richter, R. (2015). *Among teens, sleep deprivation an epidemic*. Palo Alto: Stanford Medicine News Center. <https://med.stanford.edu/news/all-news/2015/10/among-teens-sleep-deprivation-an-epidemic.html>

Telzer, E.H., Goldenberg, D., Fuligni, A.J., Lieberman, M.D., Galván, A. (2015). Sleep variability in adolescence is associated with altered brain development. *Developmental Cognitive Neuroscience*, 14, 6-22. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4536158/>

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Sources for Resources

>**National Sleep Foundation** – www.thensf.org .
 >journal articles, videos, information – <https://sleepfoundation.org/search/node/resources>
 For example, see:
 >*Insufficient Sleep among High School Students Associated with a Variety of Health-Risk Behaviors* – <https://sleepfoundation.org/sleep-news/insufficient-sleep-among-high-school-students-associated-variety-health-risk-behaviors>
 >*Teens and Sleep* – <https://sleepfoundation.org/sleep-topics/teens-and-sleep>
 >**The National Center on Sleep Disorders Research (NCSDR)**
<https://www.nhlbi.nih.gov/about/org/ncsdr/>

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