

The Sleeping-Learning Connection:



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Three Sleep Mistakes That Can Wreck Your GPA

Most of us acknowledge the prevailing wisdom that students of all ages need optimal sleep to function in school, but we don't always think about sleep as an integral part of the actual learning process. But we should! It's fairly obvious the acts of acquiring new information and recalling previously-learned information both occur while we are awake. But there is a third aspect of learning called consolidation. Consolidation is the process that occurs in the brain while we sleep to solidify our memory of anything we recently learned. It turns our recent memories into long-term memories. It also connects recently-learned information with previously-learned information to enhance our understanding. When the process of consolidation is disrupted by lack of sleep, learning is impaired. With that in mind, here are three common sleep mistakes that impact the learning process and the benefits of overcoming them:

Sleep Mistake #1. Overnight Study Sessions

Most students at some point have pulled an all-nighter cramming for a big test. And many have even gotten an A on it. Unfortunately, that "A" is a temporary illusion of learning. If we don't sleep after studying new information, we may not be able to remember the information a week later. Why? Because it may not have been consolidated into long-term memory — a process that happens during sleep. Not only does sleeping after learning help consolidate the information to long-term memory, it also protects the newly-learned information from being overwritten by any subsequent learning. In essence, it protects the information from interference from distractions after waking.

How can you optimize your chances of retaining and protecting what you've learned? Sleep on it! Toss out the idea of staying up all night to study. The best way to learn

a lot of information for a test is in chunks over time. Study a little bit every day in the days leading up to the test. But if cramming is your only option, even a 90-minute nap after studying most of the night can help consolidate and cement recently-learned information to long-term memory.

Key benefits of sleeping after learning:

- *We remember what we just learned for a longer period of time.*
- *What we learn is protected from distractions.*
- *New information is connected to previously-learned information.*

Mistake #2. Sleeping Fewer Than Eight Hours a Night

Not only do we need to sleep after we learn new information, we also need to sleep before we learn something new. The American Academy of Sleep Medicine recommends 8-10 hours of sleep a night for teens and adults. Less sleep than that has a significant impact on learning. In fact, research has shown that sleep deprivation significantly impairs our ability to learn new information by up to 40%. Why? Sleeping prepares the brain to form memories. And because sleep deprivation can impair attention and concentration, the ability to acquire new information is also impacted.

When sleep deprivation causes difficulty with focus, learning becomes inefficient. We take in fewer details and our brain struggles to determine where the information should be stored. Lack of sleep overworks our neurons and keeps the synapses excited for too long. This inhibits neuroplasticity, or the brain's ability to grow and change with new experiences.

But there is another function of sleep in the learning process. According to the homeostatic theory of sleep, our brain works while we sleep to prune unnecessary connections between neurons created during the day to free up space for learning new things the next day.

Finally, an interesting study with college students showed that lack of sleep significantly reduced performance on creativity tasks. The part of the brain we use for creative thinking — the hippocampus — is directly impacted by lack of sleep. In fact, sleep deprivation reduces synaptic plasticity in the hippocampus, preventing it from growing and changing by learning new things.

Key benefits of sleeping before learning:

- *Increases focus, attention, and creativity*
- *Helps us pay attention to details*
- *Maximizes neuroplasticity*
- *Makes room in the brain for new information*

Mistake #3. Not Having a Consistent Sleep Schedule

Staying up later some nights, waking up early some days, and sleeping in on weekends to catch up, sounds like a fairly typical schedule for many students. But a recent study conducted at Harvard found that students with irregular sleep schedules performed worse academically than students with regular sleep schedules. One reason may be that having a set schedule makes it more likely to get sufficient sleep. And we know sleep deprivation inhibits learning.

But another reason may be that irregular sleepers have less light exposure during the day and more exposure to light at night which can disrupt their internal circadian clock regulated by the sleep hormone melatonin. Light, especially blue light from electronics, suppresses melatonin, so onset of sleep is delayed. Delayed sleep means less sleep. And that impacts our capacity for learning!

Key benefits of a consistent sleep schedule for learning:

- *Enhances academic performance*
- *Promotes a regulated circadian clock*
- *Increases likelihood of getting enough sleep*

The connection between sleep and learning is well established, and research continues to reveal the importance of both the quantity and quality of sleep for learning, memory, and academic performance for students of all ages. Wondering what the first step to improving learning capacity should be? Sleep on it! 

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