

To sleep ... perchance to reset your brain

By Larry Rosen, Ph.D.

Recently I spent two days at a private high school talking to the teachers and the parents. In advance the school sent out a link to an online, anonymous survey that I created to assess technology use and sleep in addition to other interesting information from the ninth, tenth, eleventh and twelfth graders. Nearly half of the students responded and the results were both astounding and a bit unsettling.

Typical high school students told us that they got a tad more than six hours sleep a night on school nights and 10.3 hours on weekend nights. With the recommendation that teenagers need nine hours of sleep a night, these students were piling up a 12-hour sleep debt per week! Worse yet, when students were asked, "How often do you get a good night's sleep?" eight in 10 said they rarely or never got a good night's sleep during the school week.

Equally important, more than half the students reported they had been awakened by a text message, phone call or email on their smartphones because they sleep with them on vibrate or ring next to their beds. Sure, they claim that they use their phone alarm and need it close by, but the bottom line is that they are using technology all day and all night long. Even while they sleep they are ready to be awakened by an all-important nighttime missive from a friend.

The students also told us how much technology they used on a daily basis as well as what they used in the hour before sleep. In addition they completed a survey about their preference for completing single tasks before moving onto other ones or switching back and forth, aka "multitasking." BTW (text lingo for "by the way") 80 percent told

us that they switch back and forth from studying to checking in with their technology somewhat often or very often with half of them saying "very often."

It turns out that they are using a lot of technology in the hour before sleep with the most popular pre-sleep activities including being on the Internet (66 percent), doing schoolwork on the computer (57 percent), texting (51 percent) social networking (49 percent) and listening to music (43 percent).

So, I asked the question: What, if any, uses of technology before bedtime might lead to a bad night's sleep? The answer was interesting. If you just consider activities during the hour before sleep, the best predictors of a bad night's sleep were doing schoolwork, using a smartphone and multitasking.

If you consider all technology activities during the day you get a second glimpse of why teens are not sleeping. The best predictors of who is not sleeping much or well during the school week include those who spend more time doing such general Internet activities as Facebook activities and electronic communication (texting, email, etc.)

Why is sleep important? During the day our brains are inundated by sensory information, now more than ever. Technology beeps, buzzes, vibrates and screams for our attention. It is constantly offering myriad distractors and even when we are without our technology we are being distracted from within our brains wondering who might be trying to reach us or who might have posted on Facebook. Maybe you don't feel that way, but teenagers definitely distract themselves from outside and inside.

Research has started to show the effects of technology on our brains using fMRI technologies to monitor the impact of surf-

ing the web, playing video games and other tech activities. It turns out that technology appears to overactivate our brain, moving chemicals and oxygen to more areas than other activities. (NOTE: this research is very new and just starting to show consistent results across populations. None of it is definitive but for more information check out brainblogger.com.)

During the day everything we perceive leaves a mark on our brains by creating new connections, which may include new axons and dendrites that protrude from neurons or nerve cells. This is a simplified version of what actually happens, but as we receive information the nerve cells transmit molecules across the synapses between axons and dendrites. This constitutes the coding of information in the brain. At night, our brains use the time to assess the future value of these connections, pruning the ones it feels are useless and consolidating and strengthening the ones it feels are valuable and important.

If we are not getting a good night's sleep, the processes of pruning and consolidation are not working at 100 percent efficiency and our learning suffers. And caffeine, which is now being consumed in larger and larger quantities by our teenagers, not only does not help the process of learning and memory, but also can negatively impact those critical nocturnal activities.

So, we have a dilemma: Our kids are not getting enough sleep and while some of the problem is that they are doing homework late at night, that's not the whole story. They are distracting themselves to sleeplessness both from their use of technology during the day and, most importantly, in the last hour before sleep.

More specifically, their use of smartphones during the evening, and on into the night, is disrupting their sleep and helping them accumulate an enormous sleep debt. Neurologically, it is disrupting the all-impor-

tant processes of pruning and consolidation that are critical for learning and memory.

What is the solution? My new book, *iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us*, discusses strategies for people to use to avoid what I call an iDisorder. An iDisorder is where our use of technology and media makes us exhibit signs and symptoms of various psychiatric disorders including narcissism, OCD (how many times do you pat your pocket to make sure your phone is safely tucked away?), depression, social phobia and more.

The strategies are simple and straightforward and all involve calming or resetting your brain. It's not about giving up technology. Trust me; I am a huge techno-geek who has to have all the newest stuff the first day it is released. It is about taking time to reset your brain in order to help your brain process the onslaught of information.

A final note for parents: It appears that television has a relatively calming influence on the brain compared to other tech activities, so encourage your children to put their phones on silent and deposit them somewhere other than right next to their beds and watch a little TV in the hour before sleep. It will reset their brains and, let's hope, lead to a continually reduced sleep debt.

Larry Rosen, Ph.D., is the author of five books including his latest, *iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us*, which came out at the end of March. He is a professor at California State University, Dominguez Hills and also the author of *Rewired and Me*, *MySpace*, and *I*, which deal with educating and parenting our high-tech children, teens and young adults. He may be reached by email at LRosen@CSUDH.EDU. His website is DrLarryRosen.com.