

- Mark your confusion.
- Purposefully annotate the article (1-2 mature, thoughtful responses per page to what the author is saying)
- Write a 1+ page (250+ word) response to the article.

The Walking Dead by Maria Konnikova, *The New Yorker* 7/09/15

Did you get enough sleep last night? Are you feeling fully awake, like your brightest, smartest, and most capable self? This, unfortunately, is a pipe dream for the majority of Americans. “Most of us are operating at suboptimal levels basically always,” the Harvard neurologist and sleep medicine physician Josna Adusumilli told me. Fifty to seventy million Americans, Adusumilli says, have chronic sleep disorders.

In a series of conversations with sleep scientists this May, facilitated by a Harvard Medical School Media Fellowship, I learned that the consequences of lack of sleep are severe. While we all suffer from sleep inertia (a general grogginess and lack of mental clarity), the stickiness of that inertia depends largely on the quantity and quality of the sleep that precedes it. If you’re fully rested, sleep inertia dissipates relatively quickly. But, when you’re not, it can last far into the day, with unpleasant and even risky results.

Many of us have been experiencing the repercussions of inadequate sleep since childhood. Judith Owens, the director of the Center for Pediatric Sleep Disorders at Boston Children’s Hospital, has been studying the effects of school start times on the well-being of school-age kids—and her conclusions are not encouraging. Most adults are fine with about eight hours of sleep, but toddlers need around thirteen hours, including a daytime nap. Teens need around nine and a half hours; what’s more, they tend to be night owls, whose ideal circadian rhythm has them going to bed and waking up late. As schools have pushed their start times earlier and earlier—a trend that first started in the sixties, Owens says—the health effects on students have been severe. “It’s not just sleep loss. It’s circadian disruption,” Owens says. “They have to wake up when their brain tells them to be deeply asleep. Waking a teen at six in the morning is like waking an adult at three at night.”

The result is a kind of constant jet lag—and one that is exacerbated by sleeping in on the weekends. Executive function and emotional responses get worse, hurting everything from judgment to emotional reactivity. The ability to make good decisions can suffer, and kids can become more prone to act out and get depressed. In fact, the rise in A.D.H.D. diagnoses may, in part, be the result of inadequate sleep: in children, symptoms of sleep deprivation include hyperactivity and impaired interpretation of social cues. Owens has seen many such misdiagnoses in her clinical practice. The effects are physical, as well. Children who undersleep are more likely to gain weight and become obese. Even for infants as young as six months, amounts of sleep can predict weight gain three years later.

Schools with healthier start times, on the other hand, see an increase in attendance, test scores, G.P.A.s, and health. In one study in which an intervention pushed start times later, it wasn’t just academic outcomes that improved; car crashes went down by as much as seventy per cent, and self-reported depression rates fell. Even a delay of as little as half an hour, Owens has found, improves outcomes. “It should be about the health and well-being of the students,” she told me, “and not the convenience of adults.”

As we age, unfortunately, our quality of sleep only gets worse. If you sleep six hours a night for twelve days, Adusumilli says—and that’s about how much many Americans sleep all year round—your cognitive and physical performance becomes virtually indistinguishable from that of someone who has been awake for twenty-four hours straight. (The same effect is produced by six days of four-hour nights.) And the performance of someone who has been awake for twenty-four hours straight is similar to that of someone with a blood alcohol level of 0.1 per cent. In other words, “normal” amounts of sleep deprivation have us acting like we’re drunk. (Charles Czeisler recalls presenting these facts to a *Times* journalist; when the journalist handed in the story, the editor said it couldn’t possibly be true. Most people in the newsroom were sleep-deprived, and they still managed to produce the *Times* every day. Surely an intoxicated

newsroom would be incapable of such a feat.)

In the short term, these types of deficits have a significant effect on our performance across the board. Perception deteriorates, along with motor skills: in one study of college basketball players, well-rested players performed better than those who followed their usual schedules. Emotional control suffers—the connection between the prefrontal cortex (where we make executive decisions) and the amygdala (which is associated with fear and other emotions) degrades—and we become more impulsive and prone to depression. And our ability to think and to make sound decisions plummets. We become worse at learning, memory, and simple tasks of arithmetic and analytic reasoning. The rate of accidents and errors rises. In one study, which compared first-year interns at Brigham and Women's Hospital who worked on a regular schedule to those working on shorter, sixteen-hour shifts that included a nap, the sleep-deprived residents made more than double the number of attentional errors at night—a result that has been replicated multiple times.

Equally troubling are the health impacts in the long term. We become more prone to metabolic and endocrine problems, including weight gain, with a resulting increased risk of diabetes and cardiovascular disease. We decrease our immune function and could increase the risk of multiple types of cancer. We speed up our cognitive decline and increase the risk of dementia.

Even if you start sleeping more today, you may be too late to avoid some of the impacts of sleep deprivation. Because kids' brains are growing and changing so rapidly, they are more vulnerable to the effects of sleep deprivation than adults; those effects may well follow them throughout life, no matter their habits later on. As for adults, we can recover from relatively short bouts of sleep loss: in one study, the University of Pennsylvania sleep researcher David Dinges found that one night of good sleep was enough to help you rebound from five nights of too little sleep. But recovery from truly chronic sleep deprivation relies on the quality of sleep you are getting. It can take weeks, and sometimes longer, to recover—and we often don't have the luxury of sleeping ten hours a night for even as much as a week.

Ironically, many of us don't want to "catch up" on sleep even when we can. We honestly don't realize that we're sleep deprived; many of us think we're just fine with five or six hours a night. We earnestly believe that we're fully awake and at our best. The fact is, however, that we are very bad at knowing how much sleep is enough.

In one of her studies, Elizabeth Klerman, a sleep scientist at Brigham and Women's Hospital, allowed people to follow their own sleep schedules for two weeks; they chose how many hours they wanted to be awake, and how many hours they wanted to be asleep. Then, they went into the sleep lab. Klerman was interested in two things: sleep latency, or how long it took them to fall asleep, and sleep duration, or how long they slept. On the second night and during the second day, she told me, they slept an average of twelve and a half hours out of a possible sixteen hours of sleep opportunity, demonstrating a severe sleep deficit. On the first day in the lab, during testing of sleep latency, some fell asleep before the technician had even left the room. Many of the subjects, in other words, were pathologically sleepy. Yet they'd thought they were fully awake and at their best. We all have our "chosen level of uncomfortableness," Klerman says, but that doesn't mean we're actually doing well.

Charles Czeisler has found that we are only aware of the impact of sleep loss on our performance for the first one to two days. After that, we no longer realize that we're not functioning at our best. "Then, it's just the new you," he says. Klerman recalls one participant in another study, which restricted the amount of sleep that subjects were allowed. The subject came back once he was able to sleep normally because he wanted a second chance to fill out the forms that asked him to rate his mental acuity and how well he was functioning. He'd filled them out wrong the first time, he said: after catching up on sleep, he'd realized how impaired he'd been, and wanted a chance to downgrade his ratings. "He'd forgotten what alert felt like," Klerman says. At the time, he thought he was fully awake and capable. "Why would you expect the brain to be able to police itself?" she asks.

Taken together, the current research on sleep offers us a valuable lesson. We all want to be productive and

effective at what we do. But when we try to boost productivity by expanding our waking hours, we aren't doing anyone any favors. We lose more by skimping on rest than we can ever gain back by adding a few hours to our days. We are less productive, less insightful, less happy, more likely to get sick. And we have no idea just how much we've compromised our abilities and health in the process: ask most anyone and they will tell you they do just fine with five, six hours. We systematically undervalue sleep, and yet it is fundamental to our present and future performance. And unlike most anything else, sleep is one of the few things we have to do ourselves. No one can do it for you.

Possible response options:

- What changes can you make in your life to help you to get better sleep.
- Summarize for students one year younger than you what this article said and why it matters to them. Give them some advice on getting better sleep.