

FIREFIGHTERS, SLEEP & IMPULSIVITY

By Alissa Miller &
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Study shows that a lower quantity & quality of sleep results in more impulsive behaviors

We all crave (and require!) sleep. Most Americans simply don't get enough of it, and firefighters' atypical schedules make them especially prone to sleepless nights.

It's easy to forget the importance of sleep, so consider this about your nightly ritual: However much you look forward to the peaceful, restful, blissful sleep ahead, your body has another goal in mind. While your consciousness tunes out, your body commences a several-hour routine of rejuvenation, maintenance and circadian clock-timing. It could be said that sleep regulates everything happening in our bodies and minds.

STUDY ORIGINS

Firefighters are keenly aware of how sleep deprivation affects them when it comes to activity levels, alertness, motivation and logic—but only on an individual level. So the questions become, what do we know about these relationships and how do they affect firefighter on-the-job behaviors?

To explore these questions, in the summer of 2010, we—Alissa Miller of Washington State University, Pullman, and Stacey Rucas, PhD, of California Polytechnic State University, San Luis Obispo—embarked on a research project with the CAL FIRE- Riverside Unit and Riverside County (Calif.) Fire Department firefighters to test the relationship between sleep quantity and quality and various behaviors in firefighters. This article will highlight one topic in particular: how sleep affects *impulsivity* in firefighters.

GAUGING IMPULSIVITY

Impulsivity tends to get a bad rap by psychologists. And why not? After all, it's a symptom of an astounding array of psychological disorders, ranging from behavioral to emotional or cognitive impairments, Attention Deficit Hyperactivity Disorder (ADHD) being a prime example. Even the very definition of impulsivity—to act without thinking—echoes amorality.

To test for the impulsivity warning



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signs, a typical psychologist would ask how well you identify with a battery of statements, such as, “I often do things on impulse that I later regret” and “I would like to go SCUBA diving.” You may have immediately noticed a potential problem here: The questions hint that different psychological traits—in this case, urgency vs. sensation-seeking—are being used to test impulsiveness.

In fact, this impulsivity test actually lumps together *four* separate but related psychological dimensions into a single, all-encompassing measure. These four dimensions:

1. High urgency (includes the motivation to “do it now”);
2. Low premeditation (to act without thinking things through);
3. Low perseverance (inability to stay on task and complete activities); and
4. High sensation-seeking (inclination to engage in risky activities).

As researchers, we are unconvinced that these four unique dimensions should be collapsed together, because each dimension may cause firefighters to behave differently.

So what does this mean for you? The influence of too much or too little sleep, or being sleep-deprived for several nights in a row, a concept known as sleep debt, impacts impulsive tendencies in different ways. Additionally, contrary to popular thought, impulsivity is not always a bad thing. For example, if a couple awakens due to a fire but cannot motivate themselves to climb out the window to safety, the lack of impulse could result in injury or death.

To further investigate these tradeoffs, we engaged 80 willing participants (both male and female) from the Riverside Unit in a battery of online impulsivity tests and questionnaires pertaining to self-reported nightly averages of sleep quantity and quality. Demographic variables such as age, sex, income, job title and years on the job were also obtained and used as control variables in statistical analysis. Regression analysis was used to test whether sleep significantly impacts individual impulsivity scores.

We expected to find that a lower quantity and quality of sleep would result in higher impulsivity scores. This is because most individuals should only be willing to subject themselves to continuous sleep deprivation in the presence of risky, dangerous or other types of environments that may signal uncertainty.

STUDY FINDINGS

It’s no surprise that the firefighting career is subject to these conditions, and this fact should result in a whole-scale redistribution of decision-making processes, essentially emphasizing the value of acting now over later.

Our research showed that, in short, sleep-deprived people tend to see the time needed to make decisions as more costly than they do when they have sufficient sleep, resulting in more impulsive behaviors, all due to the fact that the immediate (not future) circumstances require urgent and rapid decisions and actions.

Additionally, as expected, our data analysis confirmed that, regardless of age, firefighters who sleep more and have higher quality sleep generally exhibit lower overall impulsivity scores. However, there may be reasons to expect that sleep quantity and quality will have varying effects on the different dimensional concepts of impulsivity bulleted above. Most importantly, what is expected is that to be urgent and sensation-seeking (characteristics 1 and 4) trades off against premeditation and perseverance (characteristics 2

IMPROVE YOUR SLEEP

Tips for regulating your sleep rhythms & obtaining sound sleep both in the station & at home

Regulate your melatonin secretion (the hormone that induces sleep propensity and drowsiness) with the following tips:

- A hot shower before bed will raise melatonin, making you sleepier.
- Exposure to bright sunlight during the daytime will result in later increases in melatonin at darkness. Therefore, a daily outdoor duty regime could be helpful.
- The sleep environment should remain as dark as possible to regulate your melatonin profile, as dose-dependent nighttime light exposure can suppress melatonin secretion. If you find that lights are often flipped on by others while you’re sleeping, invest in a comfortable eye mask.
- Develop a sleep schedule and stick to it, thereby developing a solid sleep rhythm.

Other Sleep Tips:

- Avoid all fluids (and especially caffeinated beverages) at least 2 hours before bedtime.
- Perform meditations or other rituals designed to lower stress.
- Set your room temperature between 60–65 degrees.
- Avoid doing other activities in your station bed beyond sleeping (i.e., no laptops, TV or eating). In other words, designate your bed for sleep only.
- The depressant effects of alcohol make it attractive to some as a sleep aide; however, the effects are short-lived and actually interrupt deeper sleep.
- Exercise greatly promotes better sleep, but must be done no later than 3 hours before sleep.
- Most prescription sleep aides are habit-forming with serious side effects, including impaired judgment. Exhaust all other ways of improving sleep before turning to this option.

Examples of Innovative Technological Solutions to Better Sleep

- A high-tech pillow that pulls heat away from your face while sleeping could be particularly effective for firefighters who feel like the room is too hot to promote good sleep.
- Silk sleeping bags may promote comfort, are easily packable and can travel anywhere.
- White noise machines can mask background noise distractions.

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and 3). Here's why: When you're being awoken, your bodily and psychological systems are anticipating risk and threats, which for firefighters, are fires and other emergencies. Upon awakening, you're subsequently motivated to act quickly with an inclination toward some level of risk in order to accomplish survival tasks, such as saving lives while protecting your own life and those of your fellow comrades.

But with the need to act quickly and discount the future costs of such urgent decision-making, premeditation is largely abandoned in the interest of saving time. Sleep-deprived individuals should also tend to abandon singular tasks, instead focusing on multi-tasking or rapid task switching, so that they can better deal with

the unpredictable nature of the current environmental threat. This is otherwise known as low perseverance.

Contrary to prevailing wisdom, our data indicated that while lack of sleep for worry-related insomnia resulted in lower perseverance, lack of sleep from greater call volume actually *increased* perseverance, indicating that lack of sleep from worrying could be treated psychologically different than risk-related insomnia, or that firefighters may experience fewer negative effects on task perseverance than those suffering from lack of sleep from worrying.

THE TAKEAWAY

What can be gleaned from these outcomes? More sleep and better quality sleep will tend to make you more premeditative and possibly more perseverant; however, it will cost you in urgency and risk inclination. And unfortunately, if you can't be motivated to act, then negative outcomes during emergency events could occur. On the other hand, plenty of data also indicates that more impulsive people have more accidents—something we plan to investigate further.

With our findings in mind, we offer the following suggestions: Be aware of your sleep patterns, and understand that sleep profoundly affects decisions and choices. Contextual knowledge of these relationships could improve on-the-job safety among firefighters who choose to consciously alter on-shift behaviors in response to what they now know about the relationship of impulsivity to sleep deprivation. Also, you may need to adjust your sleeping routine in order to maximize your safety and the safety of those around you, allowing you to strike a better balance between urgency and risk inclination on the one side and premeditation and perseverance on the other. 🌙

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This research is part of a larger project aimed at investigating the impacts of sleep deprivation on firefighter behavior and health. Both authors continue to collaborate on future research projects that further the understanding of human sleep in ecological and behavioral contexts.