Sleep quality and quantity may differ by design versus health science majors at Philadelphia University

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Abstract

Sleep deprivation in college students leads to a diminishment in motivation, ability to retain information, and shortens attention span which combined leads to lower academic performance. While some students may resort to caffeine or substance use to increase productivity, others forego drowsiness and consequently suffer from sleep deprivation. Increased stress and screen time both aggravate this situation. We hypothesize that there is a relationship between work demands related to a student's choice of major and poor sleep quantity and quality. A 38-question survey was administered to 70 college students at Philadelphia University in March 2017 using Typeform, an on-line survey tool. Average response time was six minutes. The majority of the respondents were female (74%) and were either freshmen or sophomores (60%). Questions measured sleep quantity and quality, screen time before sleep, substance use and a rating of stress level, motivation and satisfaction with academic performance. Incomplete surveys and students with diagnosed sleep disorders were excluded from analysis (n = 5). Demographic information such as major, year in college, and gender were used to compare sleep behavior. Each student's answers were scored based on the Pittsburgh Sleep Quality Index (PSQI) in which any value over 5 is categorized as poor sleep quality. Results indicated that students studying in the architecture program had statistically higher scores compared to those in the Physician Assistant Program (t(23), t critical= 1.7138, p= 0.0155877). In addition design majors slept significantly fewer hours per night compared to science majors *(t* (59), t critical=1.671093, p=0.022712). While this is a small survey in proportion to the total student population of 2,798, it indicates that outreach to improve sleep strategies tailored to specific majors may be worth exploring further.

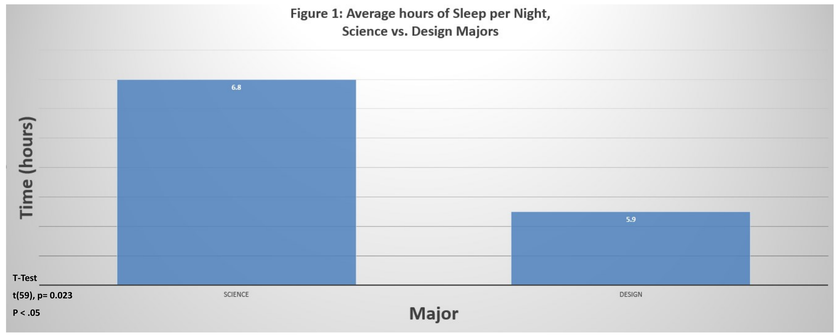
Introduction

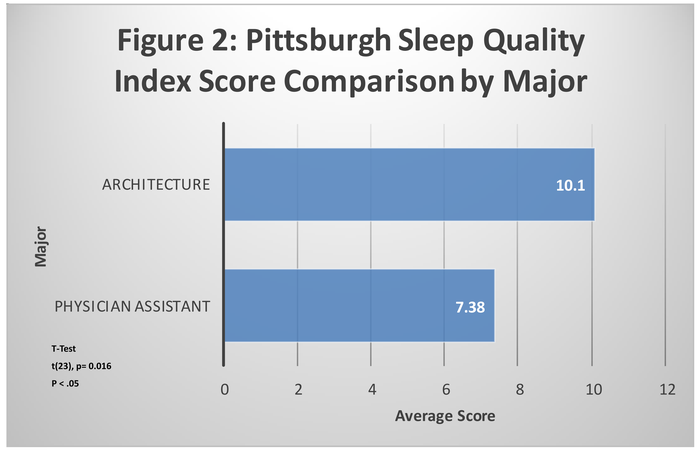
While sleep is a necessity for optimal mental, emotional, and physical health, many college students are among the most sleep deprived. This can be for many reasons; the most common are stress level, substance use, and electronic use before bed. Stress levels can increase heart rate and nagging thoughts may preoccupy the mind before falling asleep, thus decreasing the likelihood of acquiring effective sleep (Hall, 2000). Substance use, such as prescription medications, alcohol, and caffeine, can have a similar effect on the body (Bootzin & Stevens, 2007). Electronic device usage before bed exposes students to waves of blue light, which the body interprets as daylight, thus interfering with the body's circadian rhythm (Czeisler, 2013). A lack of sleep can lead to decreased energy and motivation, increased irritability, and an overall diminishment in scholastic performance. Although numerous college students experience sleep deprivation, not all majors experience the same degree of deprivation. Using the Pittsburgh Sleep Study Index as a guide and scale, this lack of sleep was determined across 5 majors including: physician assistant, architecture, health science, design, and fashion.

Materials and Methods

- Seventy-one undergraduate students enrolled in Philadelphia University participated in a 35 -question sleep survey through an online survey generator, Typeform.
- The survey consisted of three main parts: the Pittsburgh Sleep Quality Assessment (PSQI), quality of life, and demographics.
- The PSQI questions, which focused on sleep habits, were asked in reference to the past month.
- The participants scaled each question from 0-3. Subjects then answered questions regarding their level of stress, substance intake, and the use of screens before sleep.
- Participants gender, ethnicity, major and year in college was collected.

Results





- A total of 70 students were administered the survey designed for this study which included both the PSQI and many original questions designed by the researchers
- The survey included 35 questions and took the respondents an average of approximately 6 minutes to complete
- Of the respondents, 74% were female while 24% were male. The respondents reported their races as White/Caucasian (73%), Asian/Pacific Islander (14%), Black/African American (10%), and Hispanic/Latino (4%)
- The majority of the respondents were freshmen (43%), while sophomores accounted for 17%, juniors accounted for 27%, and seniors accounted for only 10% of all those surveyed
- Thirty-six of these students were enrolled in science majors while the remaining thirty-four were enrolled in design majors. The most common majors reported by respondents were Physician Assistant with 26% and Architecture 14%
- The disparity between hours of sleep per night was statistically significant in showing that science majors attain more sleep than design majors
- Using the Pittsburg Sleep Quality Index (PSQI), it was found that architecture majors attain a lesser quality of sleep compared to Physician Assistant majors
- A total PSQI score of 5 or greater is considered poor quality sleep. 89% of the architecture and Physician Assistant students were reported to have "poor quality sleep"
- 94% of the respondents used a screen device prior to going to sleep and only 50% of those use a blue light filter

Discussion and Conclusion

- The results yielded from our study directly supported the hypothesis that design and architecture majors, on average, slept a lesser amount than science majors and also attain a lesser quality of sleep. Although the science majors attained a greater quality of sleep than design majors, almost all of the respondents to the survey at large were classified to have "poor sleep quality" according to the criteria of the Pittsburg Sleep Quality Index (PSQI).
- The data obtained from survey questions regarding the effects of caffeine use, screen time before bed, and drug use did not show any disparity between the majors or grade levels. These factors are already scientifically proven to negatively affect sleep quality and the majority of the respondents reported to have partaken in at least one, if not more, of the listed sleep-inhibiting activities or substances. In a sleep study that compared the correlation between college students' sleep quality and alcohol intake it was concluded that the higher weekly alcohol intake, the lower quality of sleep for the student (Kenney, Paves, Grimaldi, & LaBrie, 2014). In another study done by Hershner and Chervin it was found that caffeine and stimulants affect students' quality of sleep. Students utilize stimulants in order to increase alertness. These drugs increase the time it takes someone to fall asleep and they suppress REM sleep. The stages of REM sleep are crucial to learning and if students are not sleeping long enough, they lose a portion of sleep dedicated to learning and memory. "Students who consistently receive less than 8 hours of sleep" are eliminating the crucial last 2 hours of REM sleep (Buboltz, Brown & Soper, 2017). Additionally, researchers found the effects of caffeine lasted 5.5–7.5 hours which suggests that caffeine consumed could impair someone's ability to fall asleep later that night. Caffeine, overall, increases arousal. Caffeine acts as a suppressor for sleep-promoting pathways in the hypothalamus which inhibits the ability to fall asleep (Hershner & Chervin, 2014).
- Almost all of the respondents expose themselves to LED screens prior to sleep and only half of those respondents use a blue light filter on a regular basis. Blue light is emitted in high frequencies and promotes daytime alertness. Frequent use of cellphones around bedtime correlates with difficulty falling asleep, repeated awakenings, or waking up too early. Melatonin is suppressed by light and this light projected from screens increases stimulation and alertness prior to bedtime (Zeitzer, Dijk, Kronauer, Brown, & Czeisler, 2000). Therefore, the use of technology before bed encourages late bedtimes and insufficient sleep. In order to counteract this, people can utilize a yellow light filter, found in many settings and apps, which is on a warmer spectrum and is easier for the eyes to process.
- Spreading awareness of studies on the brain in regards to the relationship between sleep quality and all of the above inhibitory factors would be beneficial in increasing the overall quality of sleep attained by students at Philadelphia University, and could apply to students at other colleges as well. Universities should also offer resources for those students who are struggling with time management and sleep deprivation. According to the University of Minnesota Journal of Psychology, sleep deprivation can conclude a negative correlation with grade point average. In order to combat this, they suggest that aspiring students should become more aware of specific ways to utilize sleep habits. (Lowry, Dean, & Manders, 2010). Students should be informed about the blue light filters, efficient study habits, and healthy alternatives to caffeine.
- Despite the lack of correlation between the factors and the respondents' majors, the overall poor quality of sleep can be partially attributed to actions including but not limited to caffeine consumption, stress levels, daily academic workload, and screen time before bed without a blue light filter. According to the findings, college students overall display a lack in quantity and quality of sleep. In tandem with other studies, it has been found that a way to combat this culture of sleep deprivation would be to arm students with the resources necessary to gain better sleep habits.

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