Sleepy? Self-Regulated? Successful? Sleep Deprivation, Self-Regulation, and Student Performance in Undergraduate Biology

According to the Centers for Disease Control and Prevention (CDC), it is recommended that adults aged 18-65 get a minimum of 7 hours of sleep per night, yet more than one third of adults in the U.S. fail to do so (Liu, Wheaton, Chapman, Cunningham, Lu, & Croft, 2014). A study conducted on sleep patterns of college students revealed that many have sleep problems that may interfere with daily activities, including academic functioning (Forquer, Camden, Gabriau, & Johnson, 2008). For example, undergraduate students' sufficient sleep quantity has been shown to be positively associated with end-of-semester grades (Kelly, Kelly, & Clanton, 2001).

Additional research on sleep has shown that individuals with good sleep habits are better able to exercise self-regulatory strategies (Barber, Grawitch, & Munz, 2013). Self-regulated learning is a process by which students develop goals, select strategies, and monitor performance to complete certain tasks (Zimmerman, 2008). Previous studies have shown the benefits of engaging in self-regulated learning strategies designed to increase students’ achievement in gatekeeper courses such as introductory science (Lopez, Nandagopal, Shavelson, Szu, & Penn, 2013). Because students’ academic performance is an important predictor of post-college outcomes such as internship and career opportunities (Baird, 1985), sleep deprivation may negatively affect students’ ability to reach their potential both in college and beyond.

Purpose of the Study

The purpose of this study is to examine the relationships among sleep deprivation, self-regulation, and academic performance. The research questions (RQ) are: On average, how much sleep do students enrolled in an introductory biology class report getting? Do students with
different sleep patterns report different levels of self-regulation? Do students with different sleep patterns perform differently in class?

Method

Participants were undergraduate students \((N = 324)\) enrolled in an introductory biology course. During the first week of the course students completed an online survey assessing self-regulation, motivation, and sleep habits. At the end of the semester, students completed a follow-up survey in which they reflected upon their achievements. Sleep deprivation scores were calculated as a habit of sleeping less than seven hours nightly per week. Self-regulation was measured on a 12-item instrument adapted from the Motivated Strategies for Learning Questionnaire \((\alpha = .77; \ Pintrich \ & \ DeGroot, \ 1990)\). Students’ end-of-course grades were collected from instructors.

Results and Discussion

To answer RQ1, we ran descriptive statistics. Mean sleep time was calculated \((M = 8.13 \ \text{hours/night})\); three sleep categories were determined by adding and subtracting one standard deviation \((SD = 1.59)\) from the mean. “Over sleepers” \((n = 46)\) slept 9.72 nightly hours per week, “average sleepers” \((n = 230)\) slept 8.13 nightly hours per week, and “under sleepers” \((n = 48)\) slept 6.49 nightly hours per week. Figure 1 illustrates the average hours of nightly sleep among groups. To answer RQ2, we conducted a one-way ANOVA to examine mean differences in reports of self-regulation among the sleep
SLEEP, SELF-REGULATION, AND ACHIEVEMENT
groups. Results of the ANOVA were not significant. In other words, there were no significant
mean differences among groups in reports of self-regulation. To answer RQ3, we conducted a
one-way ANOVA to examine whether there were mean differences in class performance among
the sleep groups. Results of the ANOVA were not significant. In other words, there were no
significant mean differences among groups in their class performance.

The majority of undergraduate students sampled reported getting seven or more hours of
sleep per night, which was unexpected given previous findings that college students generally do
not get enough sleep (Forquer et al., 2008). The CDC recommends at minimum seven hours of
sleep (Liu et al., 2014), and previous research has shown undergraduate students' sufficient sleep
to be positively associated with end-of-semester grades (Kelly et al., 2001). Therefore, no mean
difference among sleep groups, especially “Average sleepers,” in final course grade was
unexpected. We were surprised to find no mean difference in reports of self-regulation
particularly given that researchers have suggested that individuals with good sleep habits are
better able to exercise self-regulatory strategies (Barber et al., 2014). Our findings suggest that
except for extreme hours, sleep does not make a difference in self-regulation and final course
grade.

Students' sleep patterns were measured at the beginning of the semester, which may not
have given an accurate measure of how students sleep throughout the semester, specifically prior
to exam dates. This may have exaggerated students’ sleep ratings and led to spurious findings.
Future studies should ask students to report their sleep patterns at different points throughout the
semester. Also, future studies should enlist a more representative sample of students.
References


