Examining Differences in Stress-Based Factors Between First-Generation and Continuing-Generation Doctoral Students

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Abstract

For college students, research suggests that being a first-generation student (i.e., someone whose family has not previously attended college) can make achieving an undergraduate degree more difficult. To achieve a graduate degree, more specifically a Ph.D., the journey for first-generation students may be even harder. First-generation graduate students may be more prone to specific stressors and difficulties in schooling than their continuing-generation counterparts. Continuing generation students likely also experience typical stress but to a lesser extent than first generation students. The current study focused on identifying whether any differences emerge in stress-based factors between first-generation and continuing-generation doctoral students**.** Contrary to my hypotheses, the results of the study generally did not reveal significant differences among student generation groups in stress-based factors. Further research is necessary to uncover why differences between student-generational groups among graduate students are not as apparent as differences among undergraduates.

Introduction

For individuals who decide to attend graduate school, the life of a graduate student can be very challenging. This journey is full of many ups and downs that can affect a student when striving to complete a doctoral degree. These "ups and downs" can be also be particularly impactful to a student's mental state as a first-generation student in a graduate program in science, technology, engineering, and math (STEM), which in turn can lead to students withdrawing from their Ph.D. program. This is due to complex difficulties and stressors that first-generation students may have to deal with more than continuing-generation students. Within STEM major fields and other disciplines, competition as well as pressure from academic work can be overwhelming for some students. Continuing generation students may not experience these same stressors the same way as first-generation students. As a result, first generation students may have greater stress than continuing generation students.

In comparison to first-generation students, continuing generation students have parents who have completed and earned a degree at either an undergraduate level or at a graduate level. As a result, these students tend to be more advantaged financially and even psychologically, than first-generation students. Social class tends to correlate to parental education within society, which is notable since, in comparison to continuing-generation students, first-generation students tend to come from working class families. (Harackiewicz et al., 2014). This means that it is more likely for first-generation students to have fewer positive role models in a position in which they see themselves in in the future. Additionally, first-generation students are typically older and from lower socioeconomic backgrounds than continuing-generation students, and they typically receive post-secondary degrees at lower rates than their continuing generation counterparts (Nunez & Carroll, 1998).

Some first-generation graduate students may feel more secluded or experience a culture shock in their Ph.D. program because of not having immediate family with higher education experience. Higher education is an environment that is reflective of the middle class, a status that many first-generation students may not have experienced until they have reached the undergraduate level of schooling (Herrmann & Varnum, 2018). This novel climate in turn can lead to issues with identity conflict which can also add another dimension of stress and complexity to the experiences of first-generation students.

In addition to the stressors of a novel academic environment, finances can be also be an obstacle. First-generation undergraduate students may be under more pressure financially and must do things such as hold a job and work longer hours than a continuing generation student may have to. Although many universities provide doctoral students with financial support (e.g., teaching assistantships), not every student is able to obtain financial support while attempting to balance a life outside of school (for example, if a graduate student had a child to care after). For most graduate students (including students pursuing other degrees besides the Ph.D.), as reported by Collegeboard, loans are a key aspect for paying off their schooling. In the 2016-2017 academic year, 63% of students borrowed money from the federal government; 22% of students received some type of institutional grant from their place of schooling; 9% received money from private and employer grants; and less than 5% received funding from each of federal education tax credits and reductions, state grants, federal grants, federal work-study, and veterans and military grants (Baum, Ma, Pender, & Welch, 2017). Thus, loans are a common part of graduate school life, broadly defined.

When added on top of the loans that a student will amass during their undergraduate student education, first-generation students may end up having to pay back a major bill at the end of their graduate school career. Although FAFSA provides eligible students with grants to offset this financial burden, its reach is limited, as under 5% of graduate students use FAFSA grants. Moreover, these grants generally do not fully cover the costs of undergraduate and graduate school, given the program's relatively small budget, which amounts to about two million dollars per year in federal funding nationwide for students (Baum et al., 2017). First-generation students may have relatively less of a financial backing from families, so having a safety net is most likely not an option outside of university funding. Without proper support systems in place, first-generation students most likely must figure out how to receive funding and income by themselves in addition to completing the work that is expected of them during their Ph.D. program. Thus, first-generation Ph.D. students may begin their doctoral program with a greater debt burden and with greater stress from having to navigate the complexities of the financial system.

Researching first-generation doctoral students provides insight into a group of students who have largely been overlooked. Understanding the specific stressors that affect first-generation graduate students will lead to insights that can ultimately help to improve students' experiences. In academia, it is important to not only consider how students are impacted at an academic level in class or in the lab but through personal factors. Stress can take many forms including what people report about themselves, as well as how much they sleep and exercise, and how much they compare themselves to others (Pilcher & Ott, 1998).

For instance, research has suggested over time that exercise can help to reduce stress in individuals (Rimmele et al., 2007; Nabkasorn et al., 2006). For undergraduate college students, exercise is typically not a routine activity or priority amongst most students as most students tend to spend their time elsewhere (Boyle & LaRose, 2009) (Haberman & Luffy, 1998). When reviewing previous psychological studies, information on the physical activity levels of graduate students seems to be largely unavailable. In relating exercise to graduate students and stress, reviewing the amount of exercise that students participate in is essential because exercise can be used to connect which student generation status groups may or may not be more stressed than the other groups.

Sleep is another factor commonly linked to stress levels. Stress has been suggested to be a cause of sleep disruptions, which, when regarding this study, means it is appropriate to associate lower sleep levels with higher amounts of stress (Åkerstedt, 1987). Stress has also been associated with sleep disorders which also gives further credibility to the connection between each other as stress-based factors (Partinen, 1994). As most research has shown for graduate students, it is difficult to find previous studies that review sleep levels and how that can directly affect college students at the graduate level. Nevertheless, one possibility is that students experiencing more stress may sleep less.

For first-generation students, it is expected that they may be more stressed than their continuing-generation counterparts. First-generation students often come from working-class families to a middle-class research institution, without having academically-oriented social support systems. They must pave the road through higher education themselves. It would be foolish to discount the stress that continuing-generation students may experience as well but in comparison, it appears that first-generation students may experience these stressors more often and with more intensity.

In sum, first-generation students seem to be at a disadvantage in relation to continuing-generation students in undergraduate education, but little research has studied whether such discrepancies also apply to first-generation graduate students. This study examines whether first-generation students experience more stress than their continuing-generation counterparts. Specifically, I look at whether first-generation students may experience more stress, as indicated by self-reported daily stress and from reports of their sleep, exercise, and social comparison.

Method

Participants

Participants for the study were Ph.D. students attending the Pennsylvania State University. Participation in the study was not limited to a specific field but STEM majors were mostly recruited. A total of 131 participants completed a first baseline survey, and 90 of the 131 baseline participants completed a second, smartphone survey phase.

For the baseline survey, the 131 participants were mostly STEM majors with an average age of 27 years old. For the self-identified ethnicity and race demographic, 0.8% of the sample reported being of Native American descent. Asian participants accounted for 28.2% and Black participants accounted for 3.8% of the sample. Latinx participants represented 11.5% and White participants accounted for 61.1%. Mixed race participants made up 1.5% of the sample while only 0.8% identified other as Lur and Filipino in the sample. First-generation students accounted for 24.4% of the sample while continuing-generation graduate students consisted of 42% and continuing-generation undergraduate students consisted of 33.6%.

The primary focus of the research was the 90 participants who completed the smartphone survey. The average age of the smartphone participants was 27 years old. The smartphone sample was almost equally split between men and women (44 male, 46 female). First-generation students accounted for 26.7% of the sample while continuing-generation graduate students consisted of 35.6% and continuing-generation undergraduate students consisted of 37.8%.

For the self-identified ethnicity and race demographic, Native American students represent 0.9% of the sample. Asian participants accounted for 26.7% and Black participants accounted for 4.5% of the sample participants. Latinx participants represented 12.2% and white participants accounted for 46.8%. Mixed race participants made up 1.8% of the sample only 0.9% identified as Lur and Filipino which represented of the sample.

Design

This study was a 1-week correlational field study in which doctoral students were participants. In addition to a web-based baseline survey, participants completed daily smartphone-based surveys that focused on their day-to-day thoughts and feelings over a period of 7 days.

This study examines differences in stress-related variables among three distinct groups of graduate students: First-generation students, continuing-generation undergraduates, and continuing-generation graduate students. First-generation students were students who reported at baseline that they considered themselves to be both first-generation undergraduate and first-generation graduate students. There were two groups of continuing-generation students. Continuing-generation undergraduate students were those who reported being first-generation graduate students but not first-generation undergraduates, whereas continuing-generation graduate students reported being neither first-generation undergraduate nor graduate students.

Procedure

Participants were recruited from various programs across Penn State's Ph.D. programs. With the assistance of the departmental graduate directors and coordinators, emails were sent to students inviting them to complete the baseline survey. Within STEM disciplines, the study was open for participation. The baseline survey assessed participants' academic backgrounds and demographic information, as well as various psychological variables (e.g., social comparison). The baseline survey also asked participants about their interest in participating in the smartphone study on a 10-point scale. Participants who indicated interest of at least 8 out of 10 were invited to participate in the smartphone surveys.

Participants chosen for the smartphone study were sent a second email notifying them of their selection and describing the smartphone study. The email also contained information on how to install MetricWire, the smartphone app used for the daily surveys, as well as how to access the study in MetricWire.

After participants registered for the study, participants completed a survey in which they indicated the approximate times they woke up and went to sleep on a typical day in 1-hour windows ("Before 7am," "8am-9am," etc.). This information was used to schedule the morning smartphone surveys and evening surveys around participants' daily schedules. Specifically, the morning surveys were prompted at the end of the wake-up window of time that was selected by the participant (e.g., if "7am-8am," was chosen, the survey would come at 8 am) and remained active for three hours before the prompt expired. The surveys were prompted two hours before participants' typical bedtimes and remained active for six hours before the survey expired. Finally, participants completed four "activity" surveys at quasi-random times throughout the day. Participants could receive activity surveys beginning two hours after their wake-up time until the evening survey. The activity surveys could randomly come at any point in this window. Activity surveys also could not happen within an hour of each other, allowing for more variability throughout the day and minimizing the possibility of getting two activity surveys near each other. Each activity survey remained active for thirty minutes.

For compensation in participating in the study, participants were given monetary rewards for completing surveys. For completing the baseline survey, participants were given $15.00. Participants who completed their morning surveys and evening surveys were awarded $1.00 for each survey completed every day. Participants who completed the four activity surveys throughout the day were awarded $0.75 for each completed survey. Bonus incentives were also given to participants who completed a certain proportion of the smartphone surveys as well as a web-based survey for the end-of-week survey.

Smartphone Measures

Stress levels. Stress levels were assessed in the morning smartphone surveys using a single-item lab-generated measure ("How stressed do you feel right now?") on a scale from 0 (*Not at all stressed*) to 100 (*Very stressed*). These scores were averaged across the 7 days the study was active for the analysis.

Sleep levels. Sleep levels were assessed every morning during the smartphone surveys. Amount of sleep was measured with the item "Approximately how many hours of sleep did you get last night?" Quality of sleep was reported on a 5-point scale from "Very poor" to "Very good" Sleep hours and sleep quality were both averaged across the 7 days for the sake of the analysis.

Exercise levels. Participants reported the amount of time, in minutes, that they exercised every day during the evening survey of the smartphone survey. The responses were measured through a lab-generated scale in which participants responded to three items, "How many minutes did you spend today doing _____ exercise", with the blanks filled with "Light", "Moderate", and "Vigorous." Participants responded on a sliding scale in which participants could mark a specific number of minutes from 0 to "120 or more."

Baseline Measure

Social Comparison. Social comparison was assessed in the baseline survey. Participants gave responses based on three items: "Thinking about the past week, how often have you compared yourself to others in your field and thought you were doing _____?", with the blank filled with "Better" (i.e., downward social comparison), "Worse" (i.e., upward social

comparison), and "About as Well". Participants reported their answers on a Likert scale from 1 (*Never*) to 5 (*Constantly*).

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Results
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Stress Levels

  A one-way ANOVA was conducted to compare the effect of stress levels ($M = 41.41$, $SD = 19.34$) on student generation status. In the analysis of stress, the main effect between the groups was not statistically significant, $F(2,87) = 0.18$, $p = .839$. Although the effect is nonsignificant, it is notable that between the three student groups, the group with the highest reported stress was the first-generation group ($M = 42.65$, $SD = 20.35$), while continuing-generation graduate students ($M = 39.79$, $SD = 17.11$) and continuing-generation undergraduate students ($M = 42.04$, $SD = 21.00$) had somewhat lower levels (see Table 1 and Figure 1). Essentially, these results suggest that there is a nonsignificant effect difference between the three groups of students, but first-generation students still had the highest average reported stress in the study.

Sleep Levels

  A one-way ANOVA was conducted to compare the effect of sleep. Sleep levels were measured using two items and so, there are two separate results for amount of sleep ($M = 7.25$, $SD = 0.75$) and sleep quality ($M = 2.64$, $SD = 0.49$). Results were nonsignificant for both sleep quality, $F(2, 87) = 0.34$, $p = .715$, and sleep hours $F(2, 87) = 1.07$, $p = .349$. The group that had the lowest number of hours asleep was the continuing-generation graduate group ($M = 7.12$, $SD = .72$), then the continuing-generation undergraduate group ($M = 7.24$, $SD = 0.66$). Unexpectedly, though again, not significant, the group who had the highest amount of sleep was the first-generation ($M = 7.42$, $SD = 0.90$; see Table 1 and Figure 2).

  The groups that had the lowest quality of sleep was the first-generation group ($M = 2.61$, $SD = 0.48$) and continuing-generation undergraduate group ($M = 2.61$, $SD = 0.55$). The group with the highest quality of sleep was the continuing-generation graduate students ($M = 2.70$, $SD = 0.45$; (see Table 1 and Figure 3).

Exercise Levels

  A one-way ANOVA was conducted to compare the effect of student generation status on exercise levels. As noted above, exercise levels were measured (in minutes) with three separate variables: light exercise ($M = 33.37$, $SD = 22.89$), moderate exercise ($M = 11.34$, $SD = 15.022$), and vigorous exercise ($M = 7.83$, $SD = 12.69$). Regarding light exercise, the comparison of generation groups turned out to be nonsignificant, $F(2,87) = 0.96$, $p = .389$. First-generation reported the least amount of light exercise ($M = 28.11$, $SD = 22.87$). Continuing-generation graduate ($M = 34.04$, $SD = 18.348$) and continuing-generation undergraduate groups ($M = 36.46$, $SD = 26.495$) both reported lighter exercise than first-generation.

  Regarding moderate exercise, results were marginally significant, $F(2,87) = 2.40$ $p = .097$. Continuing-generation undergraduate students ($M = 7.51$, $SD = 9.86$) had the lowest levels of moderate exercise in comparison to first-generation students ($M = 11.22$, $SD = 20.61$) and continuing-generation graduate students ($M = 15.49$, $SD = 13.98$).

Regarding the last aspect of exercise levels, vigorous exercise, it was not statistically significant, F (2,87) = 1.23, p = .297. First-generation students (M = 5.18, SD = 10.61) had the lowest scores across all three groups. Continuing-generation graduate students (M = 10.42, SD = 13.63) had the highest scores while continuing-generation undergraduate students (M = 7.26, SD = 13.026) were the middle group (see Table 1 and Figure 4).

Social Comparison

A one-way ANOVA was conducted to compare how participants view themselves between student generation status. Upward social comparison was the only measure analyzed for the results (M = 2.90, SD = 1.15). As a reminder, higher scores on this variable indicate that participants more frequently compared themselves to others and felt that they were doing worse. Results revealed a statistically significant difference in upward comparisons between groups, F (2,128) = 4.23, p = .017. The group that compared themselves as worse than others in their field the least was first-generation students (M = 2.75, SD = 1.01), followed by continuing-generation graduate students (M = 3.09, SD = 1.12). The group that compared themselves as worse than others in their field the most was continuing-generation undergraduate students (M = 3.11, SD = 1.01; see Table 1 and Figure 5).

Discussion

In the past, research has shown considerable differences in first-generation status compared to continuing generations in performance and other variables at an undergraduate level. However, in contrast with my hypothesis, these differences did not appear in stress-related variables among graduate students in this study. Instead, students across all student generational groups had comparable levels of stress-based factors. Students attending graduate school may be uniquely different in the way they experience and, possibly more importantly, cope with stress. Overall, results did not suggest overly high levels of stress, as the mean of the self-report of stress was below the scale midpoint and participants seemed to be getting typical amounts of sleep.

Self-reported stress levels and sleep levels both emerged as showing no differences among graduate students of different generational status. First-generation students showed higher overall stress levels as well as the lowest overall quality of sleep, but the differences were not as apparent as previously thought to be. This may be because across all student generational groups, regardless of which group, the experiences of working as a graduate student is overall stressful. It is my belief that being in a research institution for graduate school—in the case of this study, The Pennsylvania State Graduate School—has significance into why these differences between groups were not apparent. It is my belief that for students to attend graduate school, specifically a school that is known for its intense and prestigious work such as Penn State, stress-based factor differences in generational status become less apparent due to having to possess characteristics of determinism and grit (Duckworth, 2016) to be successful in graduate school.

Light exercise and vigorous exercise both showed no significant differences between the student generational groups, although interestingly, first-generation students had the lowest levels of both. Moderate exercise was the only variable in the collection of the exercise data that suggested marginal significance between groups. Continuing-generation graduate students reported the most vigorous exercise, while first-generation students reported the least. Taken together, first-generation students reported the least amount of every type of exercise, although not always by a significant margin.

Nevertheless, when viewing exercise as a function of stress, first-generation students did partially support my hypothesis for exercise and, to the extent that exercise reduces daily stress, may thus operate with more stress on a daily basis than continuing generation students. Additional research may be needed to uncover whether this is a reliable pattern.

Although social comparison was not a primary focus of the study but in the collection of stress-based data it was the only variable in the study that suggested statistical significance between student generational groups. In my analyses, I focused on upwards social comparison, which was defined as when people compare themselves to people who are doing better than them and feel worse about themselves. I found that continuing generation undergraduate students engaged in the most upward social comparisons, whereas first-generation students engaged in the least amount. It is my belief that this topic is worth considering again for the sake of research into the different student generational groups in graduate school. This may be important because it can lead to insight into how the perception of others can or, in the case of this study, not affect overall stress levels in graduate students. Regarding why the continuing-generation group may experience this social comparison more than the other groups, that is a topic worth further research. On the topic of why the first-generation students compare themselves less than the other groups, it is also my belief that this is due to having constant pressure to succeed within themselves. I believe that self-motivation is such an essential aspect of their academic journey as students that there is not much value in comparing themselves to others in their field of study. First-generation students may be more prone to these comparisons before entering graduate school, but I believe by the time first-generation students enter graduate school, their confidence and grit within themselves does not allow for these comparisons among classmates as often.

It is important to answer the question as to why these student generational groups did not show many differences between them. However, it is important to shed light on the fact that even though most of these results did not show to be statistically significant, they do support my hypothesis to an extent. First-generation students reported higher levels of stress, lower levels of light and vigorous exercise, and the lowest levels of sleep quality between the student generational groups. My findings show that student generational groups have similar levels of stress-based factors, but what is it about first-generation students that makes it possible to continue their path to achieving a Ph. D., as students, regardless of the stressors in their lives? With that in mind, it may be worth conducting future research that investigates the resiliency and/or the coping strategies of graduate students.

Limitations

The choice of gathering students from Penn State could be a unique limitation in this research. As Penn State's Graduate School is such an intensive and prestigious institution, students from this school may not be representative of other Ph.D. granting institutions. This may be why differences in student generational status probably do not matter as much for Penn State students: because these students are naturally high-academic achieving individuals. Because of this, stress-based level differences may be diminished between the student generational groups as opposed to students who attend another university for graduate school that may be less competitive. The number of participants was also a key limitation in the aspect of this research. There were only 131 participants who completed the baseline survey, and that number was narrowed down even further to 90 participants for the smartphone phase of the study. A sample with more participants could lead to more accurate results, because the limited number of participants available for the study limits confidence in the findings.

With this is mind, it is more difficult to be sure that my findings are accurate. It may also be noted that for participants who are in an isolated college town such as State College, Pennsylvania, the responses could differ from participants who attended a school in an urban setting such as Temple University in Philadelphia, PA.

Another limitation is the amount of time used to survey these participants, which was only one week. For a study focusing on stress-related variables, only capturing self-reported stress levels for a week can be limiting because seven days is a relatively short time to survey. If the survey had lasted for a longer period—for example, a month— there likely would have been high variability between weeks. Essentially, this means that data could come out more accurate if the study were completed over a longer period instead of having the time for survey responses limited to only a week. It is also noteworthy that this survey was conducted in April, around the end of the school semester, which is around the time of finals. A few participants noted not being happy with the timing of the study due to how busy they were during this week of school.

Another limitation could be in the inclusion of mostly STEM Ph.D. program participants into the study. There may also be differences in the way that STEM students process stress and address coping strategies, as opposed to how students in majors relating to business, communications, etc., would deal with stress.

Conclusion

First-generation students are a very specific but prominent group of students within higher education. Previous research has shown differences between first-generation and continuing-generation undergraduate students. By contrast, differences in stress-based factors at the graduate level seem to be relatively less across student generational status groups. These results may be because of uniquely high levels of determination and grit among graduate students. This research has shown that there may be more variables in play when understanding differences in stress-based factors between these student generational groups than previously thought.

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TABLE 1: STRESS BASED FACTORS AS FUNCTIONS OF STUDENT GENERATION STATUS

VARIABLES	n	1G M(SD)	2G M(SD)	2U M(SD)	p
STRESS LEVELS	90	42.65(20.35)	39.79(17.11)	42.04(21.00)	.841
SLEEP HOURS	90	7.42(0.903)	7.12(0.715)	7.24(0.661)	.349
SLEEP QUALITY	90	2.16(0.447)	2.70(0.448)	2.61(0.550)	.715
LIGHT EXERCISE	90	28.11(22.87)	34.04(18.35)	36.46(26.50)	.389
MODERATE EXERCISE	90	11.22(20.61)	15.49(13.98)	7.51(9.86)	.097
VIGOROUS EXERCISE	90	5.18(10.61)	10.42(13.63)	7.26(13.03)	.297
SOCIAL COMPARISON	131	3.09(1.118)	3.11(1.113)	2.75(1.014)	.017

Legend:

FG = First-Generation Graduate Students
2G = Continuing-Generation Graduate Students
2UG = Continuing-Generation Undergraduate Students

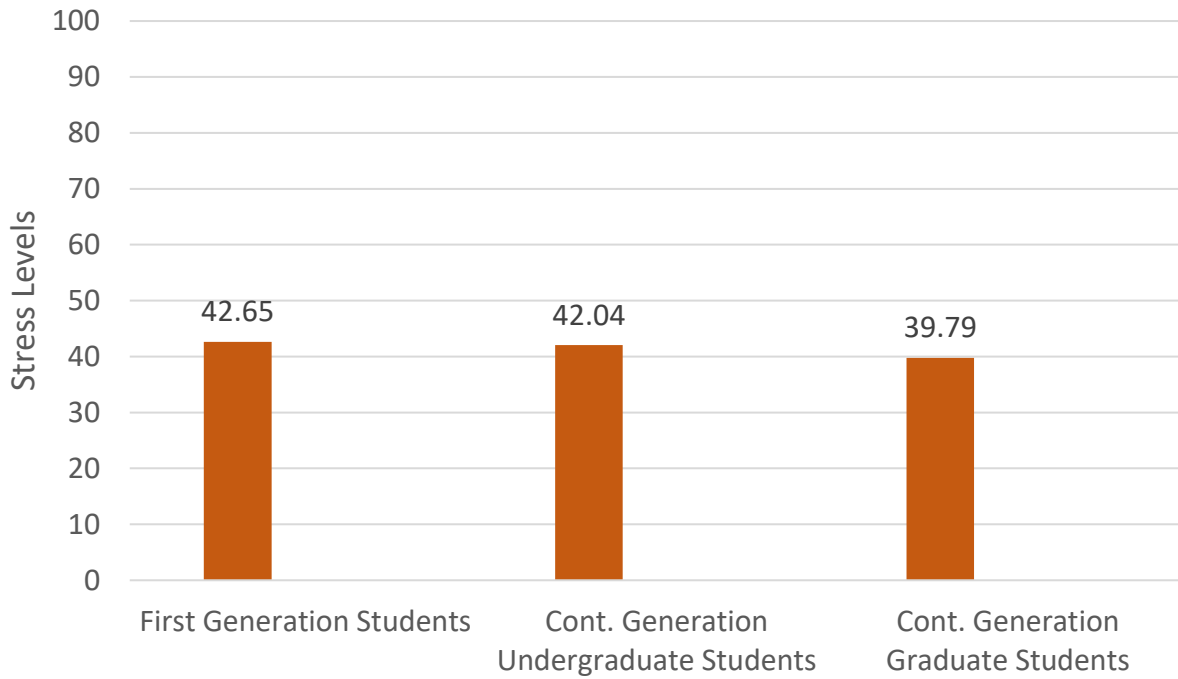Figure 1: Stress as a Function of Student Generation Status

Figure 2: Sleep Quality as a Function of Student Generation Status
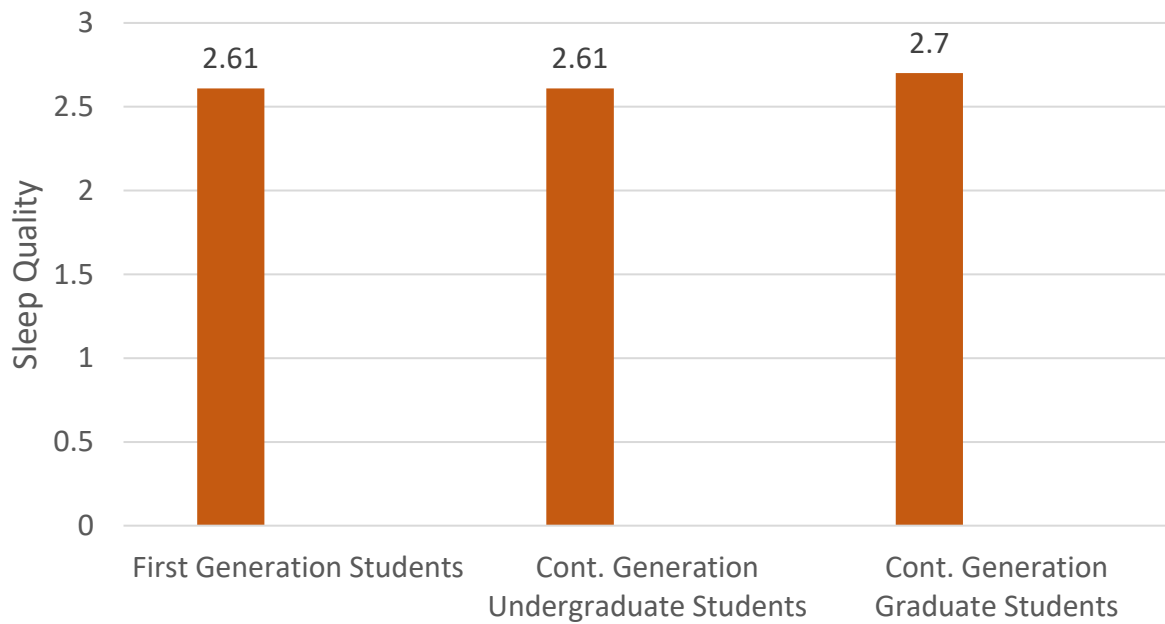
Figure 3: Sleep Hours as a Function of Student Generation Status
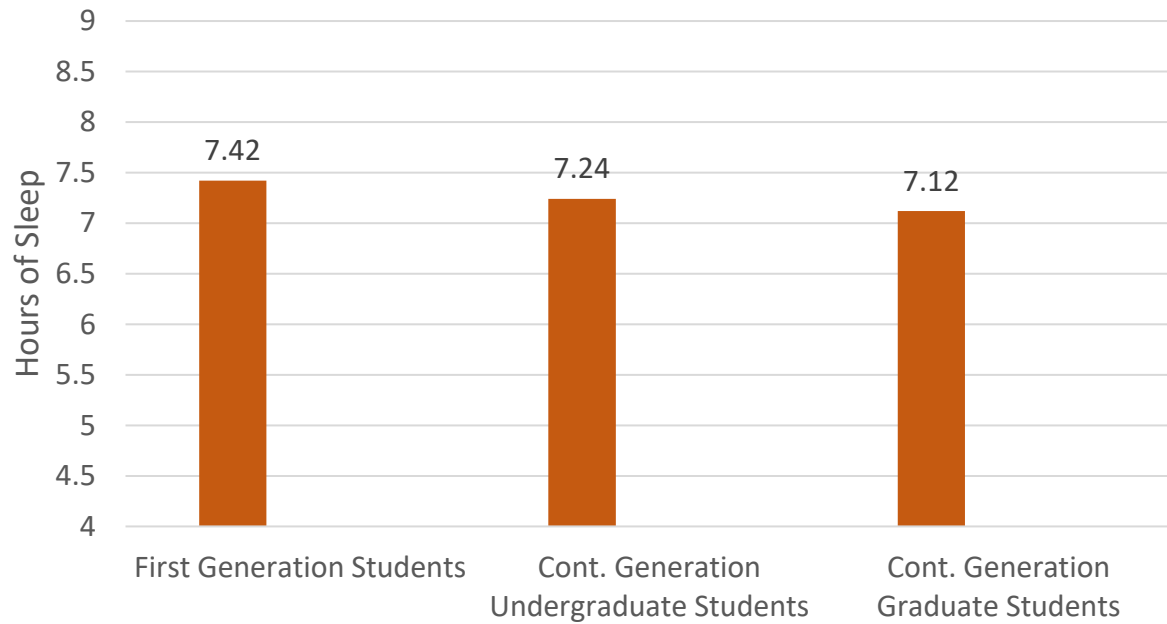

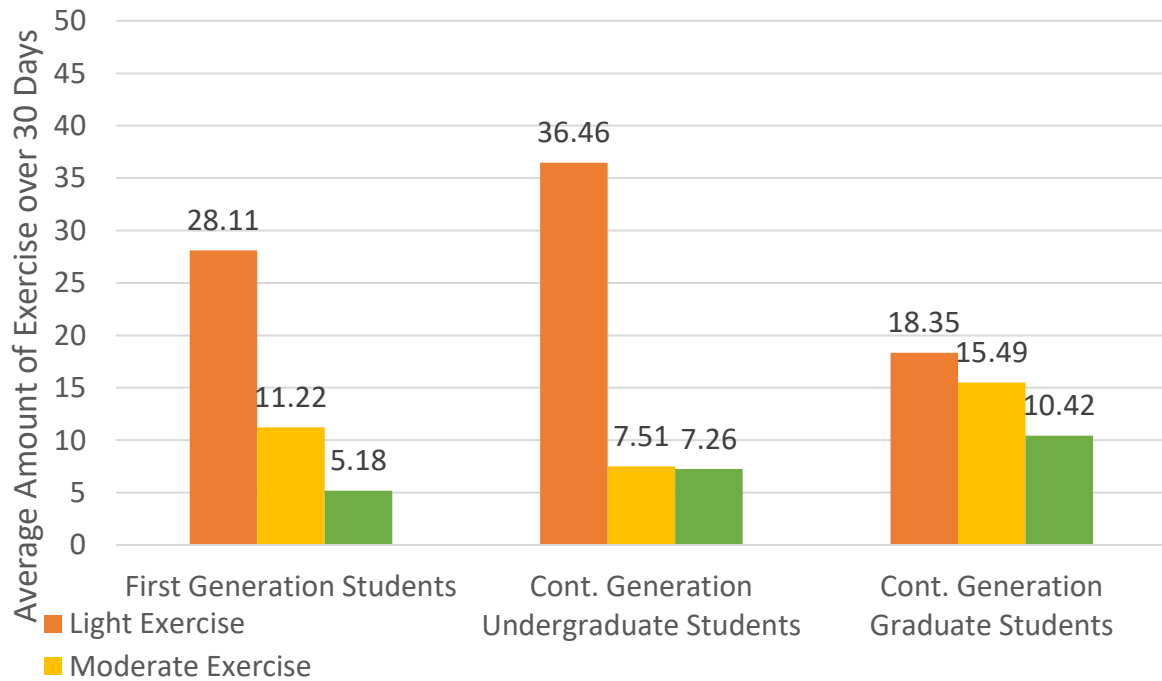Figure 4: Exercise as a Function of Student Generation Status

Figure 5: Social Comparison as a Function of Student Generation Status