Stress Among Undergraduate College Students: A Comparison of Freshmen, Sophomores, Juniors, and Seniors

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ABSTRACT

This paper discusses an experiment conducted with efforts to understand stress levels among the different undergraduate college year levels. Stress is a pervasive problem among college students with real-life, negative implications on those dealing with it. A questionnaire survey was conducted with a sample of undergraduate college students from all college year levels, with the goal of accessing stress levels among each college year level. The results were analyzed using various statistical techniques. The findings show that although the spread of the variability of stress levels decreases across one's undergraduate career, there is no statistically significant difference between the amount of stress the student deals with each year in college. As a result of these findings, it is recommended that colleges take initiative to implement programs targeted at mitigating widespread, ever-present stress levels among its students.

INTRODUCTION

The transition from high school to college for many students is an experience fraught with new challenges and opportunities. With this sharp increase in responsibility, college can be a stressful time for students, who have a lot on their plates. While many of these new factors may only affect first-year students (freshman), the causes of stress persist and change throughout college. Some of most common stressors in college include, but are not limited to, living away from home, academic demands, financial responsibilities that come with college expenses, post-graduate plans, and time-management (Hansen, n.d.). As a student navigates through their undergraduate years in college, the factors that fuel stress in their lives constantly change. While a freshman may be more concerned about the heightened housekeeping that comes with their first experience living away from home, a senior may be more concerned about their career path and securing a job offer to be prepared after graduation.

In 2018, 91% of undergraduate college students reported facing average or more than average stress levels (American College Health Association, 2018). This shows that the prevalence of stress among college students is remarkably high. With such a strong prevalence of stress, it is important to acknowledge that this stress comes with several adverse effects. Stress can impact a person's body – causing headaches, muscle tension or pain, chest pain, fatigue, indigestion, and sleep problems. In addition, stress can have effects on a person's mood – surfacing as anxiety, restlessness, lack of motivation, overwhelming emotions,

irritability, anger, sadness, or depression. Lastly, stress can impact a person's behavior – leading to overeating, undereating, angry outbursts, drug or alcohol misuse, tobacco use, social withdrawal, and a decreased amount of physical exercise (*Stress Symptoms: Effects on Your Body and Behavior*, 2021). Given all these negative effects that stress can bring upon a person, it is imperative to address the levels of stress among college students.

This study was conducted on the topic of stress among undergraduate college level students. The goal of this study was to measure stress levels among undergraduate college level students, and from there determine if there is any relationship between the year of college a student is in and their stress level. Moreover, this study was undertaken with efforts to understand if there is a difference in stress levels among different college year levels, and if there was a certain college year level(s) that faces the highest amount of stress, compared to the rest. In this way, data regarding stress across all college year levels could used to understand if there are any trends of stress a college student faces throughout their undergraduate career.

RELATED WORK

Impact of Stress Levels on Eating Behaviors among College Students

Research conducted by Jinkyung Choi examined the relationship between stress levels and dietary behaviors among college students. The study explored the link between stress and eating and exercise habits of college students, as a change in dietary behaviors can be a symptom of stress. The study was carried out in 2019 by distributing questionnaires on a university campus in Korea. The study collected 393 samples for their data collection process and aimed to get a fair, representative sample from the total college student population. On the questionnaire, there were nineteen questions pertaining to physical activity and dietary habits such as "I usually exercise regularly each week" and "I usually eat more than two pieces of fresh fruit per week" (Choi, 2020). Along with the questions about diet and physical activity, there were ten questions to gauge each of the participating student's stress level. Lastly, biometric, and other demographic, data was also collected from each participant to compute the participant's body mass index (BMI), and to establish if the participant was on a diet.

From the 393 samples of data, male participants comprised 45.2% and female participants made up the other 54.8% of the total. At the time of the data was collected, 24.2% of

participants reported to be on a diet. The average BMI calculated for all the participants was 20.85, thus it was in the normal weight range (Choi, 2020). The average stress score computed was 18.43. Participants with a score lower than this mean were classified in the 'low stress' group, while participants with scores higher than the mean were classified in the 'high stress' group.

There were some results found that were shared among all the participants in the study. Overall, most of the students did not exercise regularly. In addition, one-third of the students skipped breakfast almost daily. Multiple t-tests were done on the dietary and physical activity behaviors of the low stress and high stress groups. From this, it was seen that the high stress group did less regular exercise than the low stress group. Additionally, the high stress group exhibited a higher frequency of 'stress-eating' - eating to release stress. Moreover, the high stress group was found to be eating fast food, ready-prepared meals, and processed snacks more frequently than their counterpart (Choi, 2020).

The study acknowledges that the abundance of food, at cafes, vending machines, and dining halls on a college campus, add a layer of difficulty when trying to manage a balanced, nutritious diet for college students. The study suggests that stress management programs should be offered to college students, and that programs should be provided to help first-year students adjust to the college environment to promote healthy dietary behaviors.

While this study did have some limitations, such as collecting data on a single college in Korea which leads to a geographical limitation, the study's findings support the claim that increased levels of stress leads to worse dietary behaviors and lower levels of physical activity.

A qualitative examination of the impacts of financial stress on college students' well-being

A research study conducted by Andrea Moore et al. aimed to study the effect of financial stress on the well-being of college students. The study's motivation for exploring financial stress is rooted in the increasing financial burden college is for so many students. It is cited that the cost of attending college in the United States has risen by 31% in the past decade (National Center for Education Statistics, 2018). As the prevalence of stress among college students is high as it is, stress caused by financial factors was attempted to be isolated in this study in order to study how it was impacting college students. The study was conducted in 2019 by holding four focus group sessions – each lasting around an hour – at a large, urban, private university in the United States. There were 30 college students who participated in these focus groups. The researchers aimed to collect a representative sample of participants that came from all different socioeconomic classes. To select a sample of participants who face financial stress, purposeful sampling was used to select students who demonstrated experiencing financial stress through an online questionnaire. Participants were about evenly split into 56.7% domestic and 43.3% international students. Similarly, 46.7% were first-generation students. Participants' annual family income varied, with 16.7% of participants reporting less than $25,000 USD and 13.3% of participants reporting greater than $100,000 USD annual family income. 40.0% of students were receiving financial aid (Moore et al., 2021).

In the four focus group sessions, qualitative data was collected by a trained observer. Plus, the focus group sessions were recorded, and the audio files were transcribed to text. These transcripts were analyzed by two additional members of the research team. After all the focus group sessions were completed, all the data and observations were synthesized, and two main themes emerged on the impact of financial stress on the student participants. First, from the participants' experience, their financial status hindered their ability to succeed academically. Secondly, their financial stress brought challenges to their social lives (Moore et al., 2021).

The first theme, the negative impact on a student's ability to succeed academically, revolved around their concern and worry about their financial situation. One example of this observed in the study was the inability to or difficulty purchasing course materials, such as textbooks, lab materials, or the technology required. These purchases contributed to a constant worry for students who face high levels of financial stress, and without access to course materials, it was commonplace for students to fall behind or not be able to participate in class. Another example of the first theme surfacing was when students had to prioritize their job over their studies. For many financial stressed students, a part-time job was necessary to stay afloat. For some, consistently working long hours is a must, but also takes time away that would be dedicated to schoolwork and studying. A final way academic performance is hindered by financial stress is due to the stress being an overall distraction from academics. Students expressed their inability to fully devote attention and effort to academics when their thoughts are preoccupied with their expenses, the rent that's due, the upcoming tuition or student bill, etc.

The second major theme discovered in the study about the impact of financial stress was dealing with how it impacted a student's social life. Students with high levels of financial stress strongly felt the impact of it in various aspects of their social lives. For instance, students frequently compared their financial situation to their peers, finding it unfair that they had to work harder, such as balancing a part-time job, to achieve the same end result as other students. Furthermore, the social comparison perpetuated feelings of ostracism and separation between the 'haves' and the 'have nots'. These feelings of separation had implications such as inability to purchase expensive tickets to sporting events, going to vacations with friends, or just an overarching feeling of embarrassment and frustration.

The study uncovered how financial stress adversely affects two key areas of a college student's well-being: their academics and social lives. There were limitations to this study, such as the nature of data collection relying on student actively voicing their opinion and their participation in the focus group sessions. Another limitation was that this was a large, private university in the United States, which would result in a geographic limitation. The study addressed possible solutions or considerations to alleviate some of the financial stress of negative impacts of it. For example, university-sponsored events, especially those tied to the "core" experience of the school, such as sporting events, could be offered free of cost. Other strategies could include interventions to help students manage their finances, support services to address mental health concerns, and policies to reduce the financial burden of attending college.

METHODS

Population

In this study, undergraduate college students at the University of Nebraska – Lincoln were targeted as the population aimed to study. Data would be collected from college students from all college year levels: freshman, sophomores, juniors, and seniors. The University of Nebraska – Lincoln is a large, public university with an undergraduate population of around 20,000 college students (*Fall 2022 Enrollment Sees Increases in Undergrads From Across the U.S.*, 2022). From participating undergraduates at the university, data that would be collected would be from a series of questions that a participant would answer, from which the stress level of the participant could be assessed. This series of questions would be collected through an online questionnaire, using the online form tool Google Forms. This online form could be accessed and completed through any device that can connect to the internet, such as a smartphone, laptop, or computer. The results of the form would also be submitted online, and these results would be collected and organized.

Data Collection Method

To reach a wide array of undergraduate college students from all college year levels, several methods were used to distribute the online form through which data was collected. Firstly, a link to the online form questionnaire was sent to two group messaging chats, containing approximately 130 and 30 members in each, respectively. The chat with around 130 members was the group chat of all the current undergraduate students in the Jeffrey S. Raikes School of Computer Science and Management at the University of Nebraska – Lincoln. The second group chat, consisting of around 30 college students, was a group chat for a group of student workers who all work at the Campus Recreation Center at the University of Nebraska – Lincoln. In these group chats, members in the group chat, could access the questionnaire through the link sent and could complete and submit it. The second method used to distribute the online

questionnaire was done through the use of QR codes. A QR code was generated for the questionnaire. Upon a user scanning the QR code through a smartphone, the user was navigated to the webpage of the online questionnaire to then be completed and submitted. Multiple copies of the QR code were printed out to be put out for display around the university campus, in efforts to attract participants to scan the code and complete the questionnaire. The strategic choice was made to tape the print outs of the QR codes inside the elevators of the on-campus residence halls and the university library. Elevators were chosen as the location to put up the QR codes because multiple college students utilize the elevator in their residence hall and library on a daily basis. Additionally, placing them in on-campus buildings only ensured that most, if not all, people who scan the QR code would be college students at the University of Nebraska – Lincoln. Plus, putting up the QR codes in multiple locations around campus aided this study reach college students from all around campus to participate in this study. Moreover, a typical elevator ride is less than a minute, and the scanning of a QR code takes less time than that, so college students could pull out their smartphones, scan the QR code, and complete the questionnaire. This method of hanging up QR codes around the campus residence halls and library proved very effective in collecting a lot of responses on the online questionnaire in a short period of time.

Data was collected through the online questionnaire for a two-week (14 day) period from 11/07/2022 to 11/20/2022. Every time a response was submitted through the questionnaire, Google Forms, the tool used, recorded that response, and kept track of all responses in an online spreadsheet, which updated as responses came in. At the end of the two-week period, the online questionnaire stopped accepting responses, and all the data collected in the spreadsheet was downloaded. In total, 101 undergraduate college students completed the questionnaire, making up this study's total sample size.

Data Collection Questionnaire Design

The questionnaire used to collect data from each participant was a completely anonymous form. It consisted of ten required questions for each participant to complete, and from the responses to these questions, the stress of the participant could be accessed. The ten questions to access stress were modeled after the Perceived Stress Scale. This test was initially developed by Sheldon Cohen from Carnegie-Mellon University, who devised this test, along with his team, to be an instrument for measuring the perception of stress for an individual. The questions in the Perceived Stress Scale ask about the participant's feelings and thoughts during the last month for the participant (Cohen, 1983). While it was developed in 1983, it is still the most widely used psychological tool utilized to understand how different situations affect one's perceived stress and to gauge stress levels overall. The ten questions in the questionnaire used in this study are listed below.

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and stressed?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that happened that were outside of your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

All the questions were multiple choice questions, with the following options to choose from: Never, Almost Never, Sometimes, Often, Always. There was also a final multiple-choice question that asked the participant for their college year level, which had the following options to choose from: Freshman, Sophomore, Junior, Senior. As per the Perceived Stress Scale, from the responses to the ten questions, a stress score can be calculated for each participant. To calculate the stress score for a participant, a collection of their responses to each of the ten questions must be gathered. From there, for questions 1, 2, 3, 6, 9, and 10, assign values to each response based on the Figure 1 (Never = 0, Often = 3, Always = 4, …). For questions 4, 5, 7, and 8, assign their value as 4 – value listed in Figure 1 (Never = 4, Often = 1, Always = 0, …).

Figure 1: Value Assignment Table

Response	Value
Never	0
Almost Never	1
Sometimes	2
Often	3
Always	4

Once all ten responses have been assigned their correct value based on their question number, add up all ten of the values to get a total stress score. Stress scores range from 0 to 40. Scores from 0 to 13 are considered low stress, 14 to 26 considered moderate stress, and 27 to 40 considered high stress (Cohen, 1983).
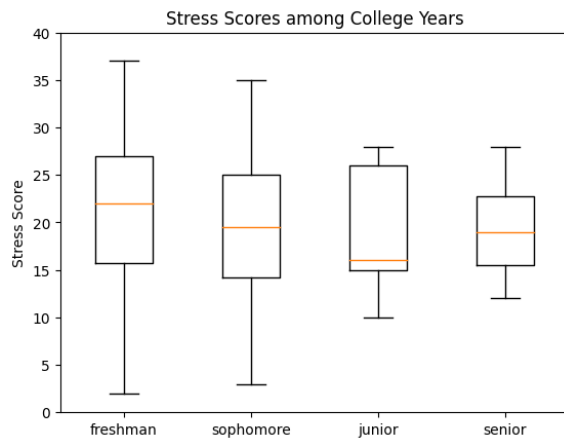
Analysis

Utilizing the Python programming language and the Pandas Python library, the stress score for all 101 participants were calculated and stored in a new data file. In this way, all the data collected was condensed down so that the new data file only contained the stress score and college year level for each of the participants. This was the data file that was utilized for the remainder of this investigation.

The data of all the participants' stress scores was separated into four groups by college year level. There were 36 freshman, 38 sophomores, 13 juniors, and 14 seniors among all the participants. A couple measures of central tendency – mean and median – were computed for all four different college year levels. From there, box plots for each were plotted which gave a visual representation of the spread and range of each group's data, how their medians compare to one another, and displays any possible outliers. A one-way analysis of variance (ANOVA) test was done because there was one independent variable – college year level – and one dependent variable – stress score. The ANOVA test was used to determine if there was a statistically significant difference between the data among the four groups. To compare each combination of two groups of two different college year levels, a T-test was used to compare their sample means if the data was normally distributed. If their data was not normally distributed, a Mann Whitney U test was used since it is the non-parametric alternative to the T-test. Throughout this study, a p-value of less than 0.05 was used to indicate statistical significance in results.

RESULTS

To being with, the mean and median, both measures of central tendency, were computed for each of the four groups of different college year levels. The mean stress score for the different groups were as follows: freshman = 21.14, sophomore = 19.55, junior = 19.46, senior = 19.36. The median stress score for the different groups were as follows: freshman = 22.0, sophomore = 19.5, junior = 16.5, senior = 19.0. Based on these results, it appears that a freshman undergraduate college student may have the most perceived stress. However, there is no strikingly higher or lower statistic that would immediately jump out to indicate statistically significant difference between any particular college year level. To get a better understanding and visualization of how the different groups compare, the box plots for each group were plotted, seen in Figure 2.
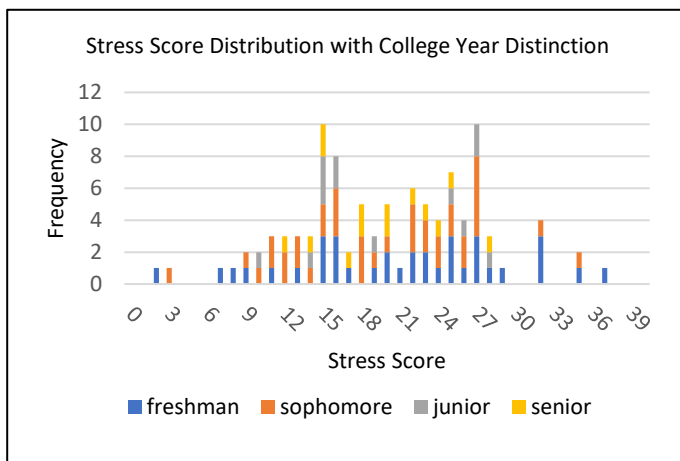
Figure 2: Stress Score box plots for College Years

Stress Scores among College Years

From the box plots, it is seen that the spread of the data among freshman and sophomore students is much greater than that spread among junior and senior students; the spread is determined by accessing the length of the boxplot, measuring from bottom to top whisker. Upon close examination, it is seen that there is a decreasing trend in the spread and range of the stress scores as the college year advances, from freshman to senior. This observation is supported by looking at the standard deviation of each group. The standard deviation among the groups are as follows: freshman = 8.11, sophomore = 6.95, junior = 5.97, senior = 4.47. Since the standard deviations are decreasing each college year level from freshman to senior, this supports the claim that the spread of stress scores decreases along a student's undergraduate career. The box plot also shows the median for each group, represented by the orange line. Again, while the freshman appear to have a higher stress score, nothing among of the rest appear statistically significant, thus further analysis must be done.
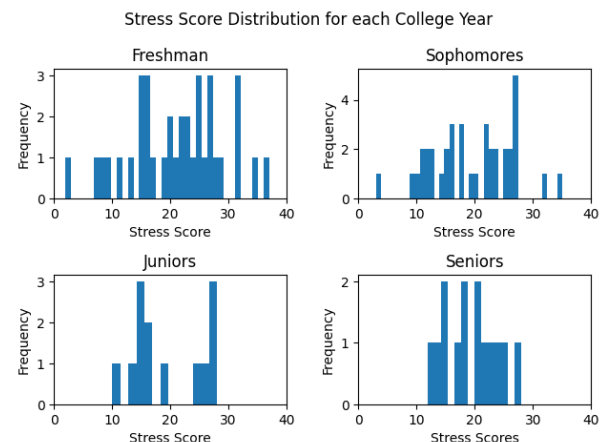
Another visualization that is comprehensive of all the participants, but also displays distinction among each college year level is the stacked bar graph seen in Figure 3.

Figure 3: Stress Score Distribution stacked bar graph

Stress Score Distribution with College Year Distinction

From this stacked bar graph, the colors for each group indicate the responses and the frequency that college year level had on a certain stress score. It appears the freshman and sophomores are the only college year levels of the high and low extremes, which supports the claim from the box plots about their larger spread. Aside from that, there does not appear to be any striking anomaly regarding the distribution of frequencies among the different college years. However, it is apparent that the data is not normally distributed, but rather has two peaks (around the stress scores of 15 and 27) and a considerable dip between those two peaks. By graphing each individual college year's data, as seen in Figure 4, it is seen that none of them are normally distributed. Due to this, a Mann Whitney U test will be used to compare two groups. However, the freshman and sophomore data could be argued to be the beginning of a normal distribution, but just lack an adequate number of samples per the Central Limit Theorem. Additionally, the number of samples of juniors and seniors in the study is far less than freshman and sophomores, so the same argument could be made for these two groups also. Because of this, a T-test will also be included alongside the Mann Whitney U test whenever comparing data of two college year levels.

Figure 4: Stress Score Distributions for College Years

Stress Score Distribution for each College Year

To determine if there is statistically significant difference between the four college year level's stress score, a one-way analysis of variance was conducted. The null hypothesis in this case would be that the mean stress scores among all four groups are the equal. The ANOVA test results were an F-statistic of 0.41 and a p-value of 0.74. This means that given our null hypothesis is true, there is a 0.74 probability that we obtain the results that we did in this study. With this, and our standard alpha measurement for significance, the p-value is too large to indicate any statistically significant difference among the stress scores of the four college year levels. We fail to reject the null hypothesis; there is no statistically significant difference among the stress scores for the groups. These results are supported by the comparison tests run between each combination of two college year levels and their stress scores. A T-test and Mann Whitney U test were

run for all six unique combinations of college year levels and the results are displayed in Figure 5, all with the null hypothesis that the two groups' mean stress scores are equal.

Figure 5: Results from T and Mann Whitney U Tests

College Year A	College Year B	T-stat from T-test b/w A & B	P-value from T-test b/w A & B	Stat from Mann Whitney U test b/w A & B	P-value from Mann Whitney U test b/w A & B
Freshman	Sophomore	0.89	0.37	770.0	0.35
Freshman	Junior	0.67	0.51	267.5	0.45
Freshman	Senior	0.76	0.45	297.0	0.34
Sophomore	Junior	0.04	0.97	242.5	0.93
Sophomore	Senior	0.10	0.92	272.0	0.91
Junior	Senior	0.05	0.96	90.5	1.00

Seen in Figure 5, all the possible comparisons between the college year levels resulted in too large p-values, meaning none of them meet the threshold to reject the null hypothesis for each test. Per the tests, the claim from the ANOVA test is supported that there is no statistically significant difference in the stress scores between different college year levels among undergraduate college students at the University of Nebraska - Lincoln.

LIMITATIONS

Several factors could have impacted the results of this study. The first factor is that participation in the questionnaire and this study was completely voluntary. This could lead to participation bias. With this, it is possible that multiple students scanned the QR code, but did not complete the questionnaire, while those who particularly felt stressed took the time to fill it out as they deemed themselves fitting for this study. A second factor that could have impacted the results found in this study is that the sample sizes among the different college year levels were small and, more importantly, unequal. There were more than double the amount of freshman and sophomores who participated, than juniors and seniors. This could have been a result of the data collection method since the QR codes were placed in residence halls, which primarily house freshman and sophomores, while several juniors and seniors may live off campus, in an apartment or house. A third factor that could have been a limitation to this study was that the questionnaires, used for data collection, were not completed in an administered, controlled environment. This could have resulted in fraudulent responses, such multiple responses from one participant. Lastly, there is a geographic limitation that comes with conducting this study only at the University of Nebraska – Lincoln, and the results can only be used for a population of undergraduate students at this university.

DISCUSSION

Through a series of data visualizations, computations, and statistical tests, a handful of results were obtained regarding the stress scores among the different college year levels of undergraduates at the University of Nebraska – Lincoln. While it appeared that freshman had a higher stress score than the other college year levels initially, it was later shown that there was not any statistically significant difference between freshman and the other college year levels, and also no statistically significant difference among the stress scores for all the different college year levels among undergraduate students at the university. One result that did emerge prominent was that the spread and range of stress scores decreased from freshman to sophomore to junior to senior – in other words, the spread decreased as a college student goes through their undergraduate career. A possible justification behind this is that students deal with the transition to college is very different ways. While some students have had older siblings experience college before them, other students come into freshman year as a first-generation college student. This varying level of experience and exposure to the college lifestyle could most likely have different impacts on the stress among freshman.

The later part of the statistical analysis showed that there is no statistically significant difference among the stress scores for all the different college year levels at the university. With this in consideration, a potential rationale could be that while the specific factors causing a student stress their freshman year may not last long, new factors enter in a student's life as they grow and progress through college. While the specific stressors may constantly be evolving, they are always present in some capacity, and the results found from in this study support this finding.

CONCLUSION

Although there was no conclusive evidence found in this study to argue that a certain undergraduate college year level experiences higher or lower levels of stress, there is still a high prevalence of stress throughout all years of undergraduate education. While a college student may get better at coping with their early, first-year stressors, new factors of stress will continue to surface with time and at different stages of their college careers. This evidence is convincing for colleges and universities to acknowledge the stress that pervades their campuses. With such a widespread problem, coupled with real-world harmful effects to a student's well-being, colleges should make the investment to implement programs for stress management, conversations with stress advisors, and social groups to address and help alleviate this problem.

It has been established that stress is here to stay and continue to be a part of the college experience. Looking ahead, it would be interesting to try to gather qualitative data on each college year level in efforts to pinpoint specific stressors in their life/certain college year level and aim to understand if and how these factors, which contribute to stress, change and adapt over one's college career.

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