

**Introduction:**

In recent years, stress levels among university students have become a topic of increasing concern, a need for a greater understanding of the factors contributing to student stress. This study focuses on assessing the stress levels of students at UCR, employing a simple random sampling approach with post stratification. The stratification was based on several factors that were used in the sample: students' college (such as BCOE, CNAS, and CHASS), the number of units they are currently taking, and their academic year. By considering these variables, the study aims to capture a comprehensive understanding of how different aspects of university life may influence student stress.

The analysis reveals that stress levels are relatively high across all colleges at UCR, with no significant differences. This suggests that stress is a prevalent issue affecting all students, regardless of their college. The analysis also reveals stress levels are higher when fewer units are taken. This suggests that students who take fewer units have harder classes, therefore resulting in higher stress levels. The findings emphasize the need for university-wide interventions and support systems to alleviate student stress. These results contribute valuable insights into the ongoing conversation about student mental health and emphasis on the student's mental state during finals week.

**Survey Design and Analysis Plan:**

Finals are a time in the quarter that is typically associated with high workloads and stress levels. For our survey, we sampled students in our chosen elective classes to find their stress levels with the finals approaching and investigate what impact factors such as academic year, affiliated UCR college, and course load have on student stress levels. Our sample targets all UCR students enrolled in three or more courses as you require 12 units to be considered a full-time

student in UCR. Our method of conducting this survey was by sending a link to a Google Form questionnaire to UCR students in chosen elective classes through class discord chats to be filled out anonymously. We chose this method of sampling due to the dual aspects of convenience and respondent diversity. Sending Google forms through discord chats was the most convenient way to contact students from these classes and choosing to survey classes with more diverse student populations better represents our target population when compared to specialized classes such as stats classes which have many more students with similar educational circumstances. Our sampling method was a simple random sample to begin with, after which we post-stratified for course load. Our sampling frame is a list of UCR Students registered in our chosen general education classes while our variable of interest was preliminarily college affiliation but was later changed to student course load. While sampling, biases we considered included response bias as the respondents may choose to underreport or overreport their stress levels due to a need to conform to certain social standards, sampling bias as we needed to ensure that our sampled population was diverse enough to represent our target population, and non-response bias as our method of sampling made it difficult to ensure numerous responses from students. To minimize the impact of these biases on our sample, we first made the sample results anonymous and explicitly stated this when sending out the survey links to ensure that respondents don't feel the need to respond incorrectly due to the pressure of having their responses seen by others. We also neutrally worded our questions to eliminate the possibility of our question's wording impacting respondents' answers. To ensure that our sampled population was diverse enough to fully represent our target population, we sent out our surveys to chosen general education classes that were diverse enough to give responses from students of different academic years and colleges. We had also sent our survey into discord chats with a total student number of a couple hundred

thus ensuring that we reached out to enough students to obtain our desired sample size of above 20. Lastly, while sending out our form links, we mentioned that the form was designed to be a short process to increase the number of responses from those who didn't want to spend much time on a survey.

#### Sampling Plan:

- Our target population was all currently registered full-time UCR Students and we chose to sample students from three chosen general education classes to closely represent our target population.
- We chose to first conduct a simple random sample with the intention to post stratify by course load.
- We created a google form with a total of 4 multiple choice questions which were relevant to our topic and sent them out through discord group chats for the three chosen general education classes asking students to fill out our forms through the link.
- After obtaining 24 responses during week 10 of the quarter, we cleaned our data to remove one observation which filled out a course load of below 3 courses.
- We created distributions on stress level count, affiliated college count and course load count to understand the distribution of students who filled out our survey. We also created a relationship plot on course load and stress level to determine whether there was any significant relation between these two variables.
- Next we completed analysis by finding the mean, standard error, and confidence interval on stress level for both the srs and after post stratifying for course load.

- Lastly we estimated that the mean student stress level among currently registered UCR full-time students was 3.87 and we found the value to be a highly precise estimate given our small standard error value. We are 95 percent confident that the true value lies between 3.86 and 3.88.

#### List of Questions:

- On a scale of 1 to 5, how stressed are you with finals approaching? (1 to 5)

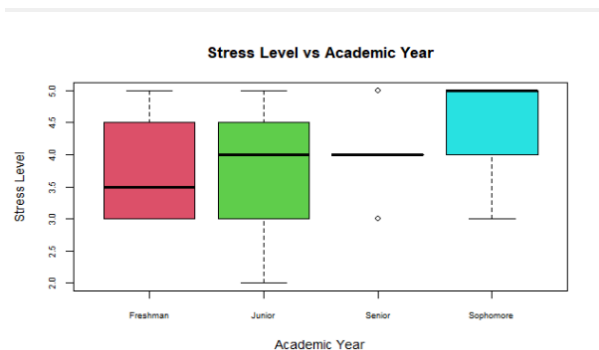
On a scale of 1 to 5, how stressed are you with finals approaching? \*

12345

☐☐☐☐☐

- Which UCR College are you currently enrolled in? (BCOE, CHASS, CNAS, Other)
- What academic year are you in? (Freshman, Sophomore, Junior, Senior, Other)
- How many courses are you enrolled in this quarter? (3, 4, 5, Other)

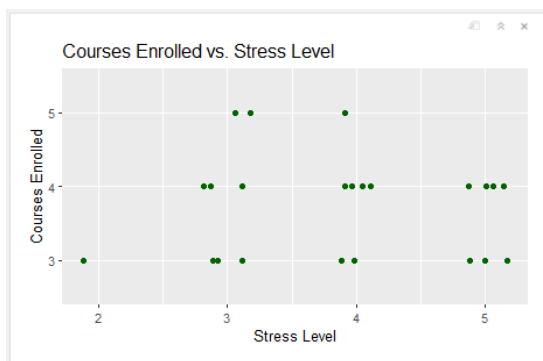
#### EDA:



Students who are currently sophomores showed the highest median levels of stress among all academic years with their median being a stress level of 5 which is significantly higher than that of the other academic years. This checks out as this value could be attributed to being unadjusted with an increasing course load. Freshmen are shown to have the lowest median stress levels

which once again also seems to check out as they may be taking more general education courses and have lower class workloads. Some surprising observations would include how all academic years have a highest stress level value of 5 with the majority of the observations all being above a stress level of 3.0 which we can see because at least 75 percent of the observations for every academic year have stress levels above 3.0.

Relationship Plot:



Students enrolled in 5 courses were less stressed overall compared to those with 3 or 4. The result is unexpected, as the assumption would be that many students would be more stressed with more courses enrolled. It was expected that a higher response rate would further improve representation within the relationship between the courses enrolled. The high non-response bias, as stated in the sampling plan, affects the precision of the result. The sampling plan continues to bring reasonable expectations regarding the non-response bias and sampling bias that would be portrayed in the relationship plot.

**Analysis:**

Equations:

$$(1): \bar{y}_S = \frac{1}{n} \sum_{i \in S} y_i$$

$$(2): V(\bar{y}) = \frac{S^2}{n} \left(1 - \frac{n}{N}\right)$$

$$(3): SSB = \sum_{h=1}^H N_h (\bar{y}_{h\mathcal{U}} - \bar{y}_{\mathcal{U}})^2$$

$$(4): \text{var}_{between} = \frac{SSB}{n}$$

$$(5): \hat{y}_{str} = \sum_{h=1}^H \frac{N_h}{N} \bar{y}_h$$

$$(6): \hat{V}(\bar{y}_{post}) = \left(1 - \frac{n}{N}\right) \sum_{h=1}^H \frac{N_h}{N} \frac{s_h^2}{n}$$

$$(7): [\bar{y} - t_{\alpha/2, n-1} SE(\bar{y}), \bar{y} + t_{\alpha/2, n-1} SE(\bar{y})]$$

$$(8): \left[ \bar{y}_{post} - t_{\frac{\alpha}{2}, (n-h)} SE(\bar{y}_{post}), \bar{y}_{post} + t_{\frac{\alpha}{2}, (n-h)} SE(\bar{y}_{post}) \right]$$

$$(9): SE(\theta) = \sqrt{V(\theta)}$$

Table(s):

Courses_Enrolled <chr>	mean_stress_level <dbl>	s2_stress_level <dbl>	n_h <int>
3	3.777778	1.1944444	9
4	4.090909	0.6909091	11
5	3.333333	0.3333333	3

(Table 1):

College <chr>	mean_stress_level <dbl>	s2_stress_level <dbl>	n_h <int>
BCOE	4.000000	0.6666667	4
CHASS	4.142857	0.8095238	7
CNAS	3.666667	0.9696970	12

(Table 2):

During finals season, the average stress level using simple random sampling was found to be 3.83 (1), with the standard error being 0.187 (2; 9). The 95% confidence interval was found to be between 3.45 and 4.22 (6). The variance between strata grouped by college affiliation, and the

variance between strata grouped by course load were compared. The variance between strata based on college affiliation was found to be 0.0485 (3; 4); and the variance between strata with respect to course load was found to be 0.0655 (3; 4). The course load was selected as the stratification of choice based on its higher SSB. The within strata variances are also more clearly defined for course load (Table 1). The average stress level using post-stratification was found to be 3.87 (4), with a standard error of 0.00564 (6; 9). The 95% confidence interval was found to be between 3.86 and 3.88 (7).

Estimates:

1.  $\bar{y}_s = 3.83$
2.  $SE(\bar{y}_s) = 0.187$
3.  $CI_{95}(\bar{y}_s) = (3.45, 4.22)$
4.  $\text{var}_{\text{between}}(\text{college}) = .0485$
5.  $\text{var}_{\text{between}}(\text{course load}) = .0655$
6.  $\bar{y}_{\text{post}} = 3.87$
7.  $SE(\bar{y}_{\text{post}}) = .00564$
8.  $CI_{95}(\bar{y}_{\text{post}}) = (3.86, 3.88)$

The average stress level during finals season that UCR students feel, assuming that course load does not affect stress level, is 3.83. The 95% confidence interval for the stress that students feel is between 3.45 to 4.22. This means that students can feel anywhere between moderately stressed, or overwhelmed during finals season. Table 2 indicates that the course load factor should be accounted for, as the within stratum variance is very low for those with five courses compared to those with three or four. When considering the course load factor, the average

stress level felt by UCR students during finals season is 3.87, which is slightly higher. The 95% confidence interval for students' stress levels is between 3.86 and 3.88. This means that overall, students feel moderately stressed during finals season. Post-stratification was very effective in narrowing down the range of stress that students felt.

### **Conclusion:**

This project set out to explore the stress levels among UCR students through simple random sampling with post-stratification, examining differences across various colleges, academic years, and units taken. The results indicate that stress is a prevalent issue across all student groups, with no significant differences among the colleges. This suggests that stress is a common experience for students irrespective of their specific academic affiliations. This finding underscores the importance of implementing broad-based mental health initiatives that cater to the entire student population and clarifies the stereotype that specific majors receive more or less stress levels during Finals week.

The sampling process has been a simple procedure, as it was simple to collect data through different social media outlets. Using Google Forms allows a convenient way to collect many responses in a short amount of time. Due to the advantages that it gave to the sampling procedure, the logistics of distributing the survey have been straightforward, and the Excel spreadsheet that the survey responses are recorded to make it convenient for further analysis.

Stratified sampling is a method that captures a more representative picture of the student body. However, the process highlighted some areas for improvement. One challenge was ensuring adequate representation from each stratum, particularly for smaller colleges. Surveys could benefit from increased outreach to encourage participation from underrepresented colleges.



Additionally, sampling from a bigger diversity of classes could reduce the sampling bias, as having observations from different breadth classes brings more representation.

#### Work Cited

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