

Perceived Stress In AP Students: A Comparative Study Of STEM and Humanities

AP Research

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I. INTRODUCTION

Within two decades, Advanced Placement (AP) course offerings nearly tripled. This is beneficial because the program allows students to earn college credits if they score above a 3 on a scale of 1-5 (Judson & Hobson, 2015, pg.59). While AP is beneficial, there are drawbacks that come from such growth, such as the stress that it causes students. It is worth mentioning that the AP program is known for its rigorous content. As the offering of these courses nearly tripled, the amount of students enrolling in it also increased. This trend suggests an increase in students experiencing some types of stress, whether it be constant fatigue, burn out, irritability, physical pain, or depression symptoms, on a daily basis (Moore, 2016). While taking the AP exam is optional, there is an emphasis on taking the exam contributing to the increased stress that students experience (Rindels, 2021). This pattern suggests the correlation between students who are taking AP courses and those who experience an overall higher stress level than the average students.

Diving deeper into the AP program, there are two main categories of AP courses: AP Humanities (APH) and AP STEM (APS) courses. Based on my experience in both, there is a noticeable difference in the workload and experienced stress levels between the two. APS courses tend to demand a strong foundational knowledge in the subject that is being taught. For example, according to the College Board, AP Calculus AB requires a strong foundation in advanced math (College Board, 2020). While, APH does not explicitly state that it requires any formal foundational knowledge, they still require students to be literate, able to critically think and able to write coherently. These skills are built throughout general education and are accessible to most students entering the courses. Contrastingly, APS courses often require students to have specific prerequisite knowledge, which can add an additional layer of stress for

students due to the expectation. Furthermore, there is a correlation that “a heavier workload indicates a more demanding course” (Pivot Tutors, 2023), indicating that APS courses are likely to have heavier workload than APH due to its complexity. This distinction in academic demands ties directly to stress levels; the typical workload in APS course can lead to overwhelming stress as concluded from Grace Peryat’s study touches upon the unwritten expectations for high school students such as taking the AP exam after completing a corresponding class, and the pressure to take as many of the challenging courses in order to stand out to colleges. Additionally, most students are also involved in extracurriculars, community service, and part-time jobs. These combined responsibilities contribute to over 87% reported that they “feel overwhelmed at some point during the school year.” Furthermore, despite these overwhelming demands, there is a significant lack of sufficient support in place, which exacerbates their stress levels. Peryat’s study reinforces the conclusion that the heavy workload can lead to heightened stress among students (Peryat, 2021). Nonetheless, there is little research that examines if the difference in workload between APS and APH courses causes a similar difference in student stress level. This study examines the prevalence of stress among AP students and how the differences in workload and expectation contribute to the stress levels in APS and APH courses. Therefore, this study aims to prove or disprove that APS courses tend to cause higher stress levels than APH courses. The objective is to use a survey-based approach to evaluate whether APS students experienced higher stress levels, guided by various psychological theories relating to stress, which examine how individuals perceive and respond to stressors, along with an analysis of student responses.

II. LITERATURE REVIEW

According to the New York University’s College of Nursing, nearly half of all students reported experiencing stress caused by school on a daily basis (James, 2015). This study focused

on high-achieving students across multiple high schools in New York. Although based in New York, the large sample size makes the findings applicable to a broad population, suggesting that school-related stress is common amongst high-achieving students, especially those in the AP programs. While limited stress can be beneficial, excessive stress harms individuals' psychological state and reduces performance quality (Ganti, et al., 2023). In support of this point, a study by Feld & Shusterman found that over 20% of high-achieving students experienced high levels of stress daily (Feld & Shusterman, 2015). Such levels of stress can negatively impact their mental and physical health. Therefore, the following literature review will discuss the impact of stress through perfectionism, and the imposter syndrome, contextualizing their effects on AP students. Furthermore, it will explore the gap in the research regarding stress within the AP program.

Perfectionism

Perfectionism is a personality trait characterized by excessively high standards and a critical self-evaluation (Grugan, et al., 2021). Moore's (2016) study found that 60% of students who took three or more AP courses experienced maladaptive (unhealthy) perfectionism. These statistics suggest that most AP students experience maladaptive perfectionism causing them to set unrealistic expectations for themselves. While striving for perfection can be positive, many students equate imperfection with failure. That mindset is confirmed by a study from Ball State University with one student stating, "At school if I do not do as well as I think I should be doing, then I feel like I am failing" (Neumeister, et al., 2007). This all-or-none mentality is a strong predictor for stress and psychological problems (Rice, et al., 2006), and may lead to high stress levels and declining performance over time.

Exploring the social comparison theory is necessary to further analyze maladaptive perfectionism. This theory describes an individual's drive to evaluate others and compare themselves to others (Festinger, 1954). For perfectionists, the drive to outperform peers can heighten stress and cause dissatisfaction when they perceive themselves to be falling behind. Combining the discussion of maladaptive perfectionism and the social comparison theory reveals a destructive cycle of maladaptive perfectionism which drives students to compare themselves to their peers, and then set high expectations for themselves to meet. When failing to meet the standard, they equate their failure to total failure, which can cause stress in the long term. This cycle of perfectionism and comparison intensifies stress and reinforces the belief that imperfection equates to complete failure, exacerbating the negative impact on students' overall well-being.

Imposter Syndrome

Diving deeper into the psychological impact of stress, a psychological phenomenon that is crucial to the purpose of this study is the imposter syndrome (IS). IS is characterized when one does not believe in their abilities, despite being proven that they are capable. They tend to attribute their success to external factors, therefore, they are afraid of failing since they believe they will be exposed as a fraud and incompetent (Leonhardt, et al., 2017). It is associated that high-achieving students are more likely to experience IS (Rindels, 2021). AP students are most likely to experience IS because doing well academically in the AP course does not equal passing the AP exam. (Walker, 2017). The report supports the idea that AP students have a high likelihood of fostering a sense of distrust towards their capability due to imposter syndrome.

Students with IS are likely to have maladaptive perfectionism. The connection is based on individuals with both IS and maladaptive perfectionism that experienced intense fear of

failure, fear vulnerability, and being labelled as incompetent. Henceforth, students that experienced IS and are maladaptive perfectionists are most likely to overexert themselves to get the results that they want, regardless of how tired they are. Such behavior can lead to a variety of mental illnesses and burnout (Rindels, 2021). Ultimately, the combined effects of IS and maladaptive perfectionism demonstrates how the relentless pursuit of academic validation places these high-achieving students in a vulnerable position.

Instructional Strategies

According to CollegeVine, an educational platform that offers resources on AP courses and college preparation, they established the three main categories of AP classes: AP Capstone Diploma classes, APS classes, and APH classes (CollegeVine, 2022). For the purpose of this study, APS and APH classes will be the main focus, so, the differences need to be established. While both types of courses aim to equip students for college-level rigor and potentially offer college credit, they differ significantly in focus, structure, and application.

AP Humanities is a fancy way of categorizing courses that ‘study human society and culture.’ APH are divided into four subcategories: Arts, English, History & Social Science, and World Language & Culture (Ivester, 2020). On the College Board AP courses page, out of 40 AP subjects, there are 25 subjects that fall under APH categories which is about 62% of AP courses. After analyzing all of the APH courses, the top 3 skills that are learned are connecting information, argumentation, and analyzing information (College Board). These skills are not taught just in those specific classes, it is taught in humanities classes in all grade levels. This consistency makes APH courses manageable for students to take as they primarily build on familiar skills rather than introducing entirely new concepts. Additionally, these skills are

applicable to real world situations and to almost every, if not every, subject, even the STEM subjects.

AP STEM courses focus on the discipline of Science, Technology, Engineering, and Mathematics (STEM). Unlike APH, APS only has 13 courses which is about 32% of the offered course. All of APS courses required an explicit prerequisite knowledge such as being able to do advanced math and strongly understand biology concepts, etc. However, all of the courses teach humanities-based skills, their top 3 skills are problem-solving, analyzing information, and connecting concepts (College Board). The main distinction that APS has from APH is that there are new materials being taught and it is expected that students will be able to apply humanities skills to the new materials. Even though the skills being taught are humanities-based, the main focus is still the materials of the course. These materials are not widely applicable, hence, majority of the time only students who are planning to pursue a career in those subjects take the course. Supporting this, by Mike Robinson's (2003) study where the highest concentration of APS course enrollment and nonminority students' career choice is in science or mathematics track, and for minority students, the highest concentration results in the engineering path. The result shows a correlation that the majority of students who take the APS courses plan to pursue STEM-related careers.

While APH courses offer widely applicable skills, APS courses provide specific knowledge for STEM careers. Both categories contribute to students' academic and professional development, highlighting their respective importance in the AP program.

Gaps

There is a link between AP students experiencing maladaptive stress that causes psychological phenomena such as maladaptive perfectionism, and imposter syndrome that

ultimately harms their well-being. While previous research provides an in-depth understanding and statistical evidence supporting the broad statement that AP courses contribute to such stress, there is a lack of focused studies that explore how maladaptive stress varies across different AP course categories. A comparison of stress levels between APS and APH is necessary to further understand maladaptive stress in Advanced Placement courses. Additionally, previous studies that have researched student stress have rarely examined how perceived stress differs across defined levels, limiting the nuance in understanding how stress is experienced across academic domains. The overall purpose of this study is to inform educators for them to design targeted interventions that will address stress effectively for students in different AP course categories. Additionally, this study aimed to provide a spotlight on mental health issues in students so that it can be mitigated.

This objective ultimately led to the research question: How do the perceived stress levels differ between students in AP STEM and AP Humanities courses at X High School? The hypothesis is that students in APS courses exhibit higher perceived stress levels than in APH courses: $H_a: \text{mean}_{\text{STEM}} > \text{mean}_{\text{HUMANITY}}$; H_a .

III. METHODOLOGY

Researchers combine observational methods with scientifically validated questionnaires to assess participants' stress and anxiety in relation to school to measure their own respective goal of research. In other research, data from reputable sources such as the CDC or College Board itself was utilized to measure the stress rate in participants in relation to AP courses. My research topic is less widely researched and focuses on the perceived stress of AP students, so the use of the first mentioned method for my research was the most logical and useful.

Perceived Stress Scale (PSS)

The PSS is a self-report questionnaire used to measure overall stress of how uncontrollable, and unpredictable a person perceives their life is (Cohen & Williamson, 1988). The PSS consists of 10 to 14 items on a 5-point rating scale consisting of 0 = *Never*, 1 = *Almost Never*, 2 = *Sometimes*, 3 = *Fairly Often*, 4 = *Very Often*. A score ranging from 27-40 would be considered as high perceived stress, a score ranging from 14-26 would be considered moderate stress, whereas a score ranging from 0-13 would be considered low stress. The PSS measures the estimation of the stress, not the actual amount of stress a person experiences (New Hampshire Department of Administrative Services). The PSS has been found to have a good internal validity with an average Cronbach's alpha of 0.806. However, when it comes to the test-retest reliability, the PSS stability is estimated to last less than 6 weeks as the coefficient correlation is 0.55 for the interval of 6 weeks (Lee, 2012).

Research Design

In order to test my hypothesis, this study administered an adapted version of the perceived stress scale questionnaire to participants from grade 10 to grade 12 at X High School that are enrolled in APS, and APH. Additionally, I applied existing scientific research to interpret the result found between participants' perceived stress levels in different AP categories. Most importantly, I utilized naturalistic observation to track participants' behavior in the courses without manipulation of their feelings. Therefore, this study followed mixed, nonexperimental comparative research design and was approved by the Institutional Review Board as ethical.

Questionnaire's participants were identified with the help of my AP Research teacher reaching out to other AP teachers to distribute my survey and through my connection with students and teachers. While beginning the questionnaire, participants were given an informed consent form (See Appendix 1) notifying that their participation is completely voluntary, their

data will be confidential and secured, and they can stop answering at any time. If they responded “No, I do not consent,” then they are prompted to submit the survey.

I adapted the PSS to create a modified version specifically tailored for AP students. The questions in this version are more focused and relevant to the stressors for AP students, distinguishing it from the more general questions of the original version. The part of the research question I have addressed is, “How do the perceived stress levels differ between participants in APS and APH courses at X High School?” Because of the scope of my research question, it makes the most sense to use the modified version of the PSS, so I can have an accurate gauge of the perceived stress of AP students in different categories while retaining the 5-point Likert scale: 1 = *Never*, 2 = *Almost Never*, 3 = *Sometimes*, 4 = *Fairly Often*, 5 = *Very Often*. It is also important to mention that in the modified version, I split the entire questionnaire into three parts: APS, and APH. In those two sections, I used the same question but changed the categories in respect to the section. Participants who were enrolled in both APS and APH courses were initially recorded but ultimately excluded from the final analysis. This was done to maintain the focus of the research question, which focuses on the PSS level between students who were exclusively enrolled in APS or APH courses.

Each modified question corresponds to the same, one or more original PSS question mirroring the same intention of the questions. Appendix 2 presents a side-by-side comparison of the PSS questionnaire and the aligned questions of the modified questionnaire. For scoring, responses initially recorded on a 1 to 5 Likert scale were subtracted by 1 to match with the 0 to 4 Likert scale of the PSS. Additionally, items 4a, 6a, and 7a were reversed as noted by the PSS scoring sheet (i.e. 4 became 1, 3 became 2, 2 became 3, and 1 became 4) (New Hampshire Department of Administrative Service). An average score was also calculated from items 1a and

2a to convey the complete message of items 1b. Some of the items in the modified version combined items from the original set got their initial score multiplied by however many items it combined (i.e. item 3a and 4a score is multiplied by 2). After these adjustments, all item values were summed to compute a final PSS score for each participant and then, it was determined which level of perceived stress each participant has.

Naturalistic Observation is defined as observing people or other subjects in their natural setting (Vinney, 2019). In this case, the natural settings are the participants in their AP classes. Since I am enrolled in both AP categories, it is accessible for me to observe how participants behave at certain times of the school year. As this research sought to distinguish the stress level between AP students and the impact, observation allows an unfiltered understanding of how participants' responses to academic pressure. Observations occurred during December final season, January to middle March as the first quarter of the semester, and late March to early April as the months leading up to AP exam. The observations focused on five key variables: physical symptoms (e.g. leg bouncing, eye rubbing, and yawning) were categorized as observable signs of stress, fatigue indicators (e.g. drooping eyelids, slow responses, and zoning out) were noted as signs of tiredness, work habits (e.g. focused but slow, rushed work, not engaged), sociological cues (e.g. avoid interaction, minimal, talkative) were recorded to understand how participants interact with others in response to stress, and physiological cues (e.g. muscle tensions, eye strain) were noted as signs of anxiety. Observations were made at different times throughout the school day in different settings to account for the possible correlations between time and stress levels. (See Appendix 3 for observations notes). These data will be excluded from the final analysis due to insufficient patterns. While the observations

offered interesting insight into behavioral stress cues, the inconsistencies and subjectivity of the data limited its reliability and validity.

Methods of Analysis were conducted after the data was collected. Before analyzing the PSS' data, it is verified that there are no blank responses, no duplicate questions, and there is no outlier that skews the results. The PSS data is analyzed by using the 2-sample t-tests to compare the mean perceived stress levels between participants enrolled in STEM and Humanities' courses (i.e. $H_0: \mu_S = \mu_H$).

Scientific Knowledge is a structured body of observation and theories that explain phenomena or behaviors using the scientific method. Important to note that theories and observation are interconnected because theories provide meaning and significance to data, while data helps validate or refine existing theory or construct new theory (Bhattacharjee, 2012). Therefore, in order for my findings to be strong, I used scientific knowledge as a foundation to interpret my data.

The interpretation is informed by the scientific theory, specifically the Yerkes-Dodson law (Yerkes & Dodson, 1908), drive hypothesis (Zajonc, 1965), suggesting external pressures influence performance based on arousal levels, and the cognitive-motivational model (Paulus, 1983) - behavior is driven by the desire to avoid negative outcomes. Additionally, the comparison between participants' perceived stress and AP courses categories are drawn from survey data, with the Yerkes-Dodson law (Yerkes & Dodson, 1908), drive hypothesis (Zajonc, 1965), and the cognitive-motivational model (Paulus, 1983). These theories combine suggests that external pressures can influence performance depending on arousal levels. By incorporating scientific concepts of stress response, this study interprets how stress affects AP students by incorporating the Yerkes-Dodson law, drive hypothesis, and cognitive-motivational model

examine how varying levels of arousal impact participants' performance, thus providing insights into how different AP course categories might influence stress responses and academic outcomes.

IV. RESULTS

PSS quantitative results in STEM, Humanities and both for participants are compiled into the tables below:

Table 1

PSS quantitative results in STEM, Humanities, and both

Participants	STEM	Humanities
1	24	N/A
2	14	N/A
3	N/A	22.5
4	24	N/A
5	35	20.5
6	26	23
7	27	18
8	31	21.5
9	28.5	N/A
10	36	N/A
11	21.5	N/A
12	N/A	20
13	N/A	21
14	N/A	20.5
15	N/A	27
16	N/A	21

17	N/A	18
18	N/A	19.5
19	N/A	20
20	N/A	19
21	N/A	24
22	N/A	24
23	N/A	20
24	N/A	11
25	N/A	20
26	N/A	22
27	N/A	17
28	N/A	17.5
29	N/A	21
30	N/A	13
31	N/A	5
32	N/A	20
33	N/A	18.5
34	34	24
35	N/A	27
36	N/A	25
37	N/A	15
38	N/A	24.5
39	N/A	22.5
40	N/A	18
41	N/A	23

42	N/A	11.5
43	N/A	30
44	N/A	26
45	N/A	22.5
46	41	N/A
47	45	22
48	22.5	N/A
49	13	N/A
50	14.5	N/A
51	22	N/A
52	20	N/A
53	41	23
54	7	18.5
55	N/A	22
56	N/A	21
57	N/A	19.5
58	N/A	24
59	34	21
60	N/A	20

In order to compare the PSS between participants in STEM, and Humanity, one hypothesis test with a 2-sample t-test must be conducted with the participants' results, for STEM and Humanities as that was stated in my hypothesis. The process is conducted in Figure 1.

Figure 1

2-Sample T-Test comparing STEM's PSS levels and Humanities' PSS levels results

STATE

Parameter of Interest: The true difference in population mean PSS scores between participants enrolled in APS courses and those enrolled in APH courses

$$H_0: \mu_{STEM} = \mu_{HUMANITY}$$

$$H_A: \mu_{STEM} > \mu_{HUMANITY}$$

PLAN

Random: Participants were selected through a voluntary response survey, which limits full randomness but maintains group independence.

Independence: $n_{STEM} < 1/10(N_{STEM})$

$$21 < 1/10(\text{All students who are enrolled in APS at X High School})$$

$$210 < \text{All students who are enrolled in APS at X High School}$$

$$n_{HUMANITY} < 1/10(N_{HUMANITY})$$

$$48 < 1/10(\text{All students who are enrolled in AP Humanity at X High School})$$

$$480 < \text{All students who are enrolled in AP Humanity at X High School}$$

Normality: Outlier Method - STEM; Central Limit Theorem - Humanity

Outlier: $Q1 - IQR(1.5)$; $Q3 + IQR(1.5)$

STEM: $Q1 = 20.75$; $Q3 = 34.5$; $IQR = 13.75$

$$20.75 - 13.75(1.5) = 0.125$$

$$34.5 + 13.75(1.5) = 55.125$$

There is no outlier in the dataset, therefore, it is a normal distribution.

Humanity: Central Limit Theorem states if n (sample size) is over 30, then the sampling

distribution is normally distributed. Therefore, 48 is over 30 then the AP Humanity samples are normally distributed.

DO (TI-84 Plus CE output)

α (significance level): 0.05

$$\mu_{STEM} > \mu_{HUMANITY}$$

$$t = -2.66919$$

$$df = 23.79505855$$

$$\bar{x}_{STEM} = 26.23809524$$

$$s_{STEM} = 9.406937663$$

$$n_{STEM} = 21$$

$$\bar{x}_{HUMANITY} = 20.51041667$$

$$s_{HUMANITY} = 4.331342457$$

$$n_{HUMANITY} = 48$$

$$p\text{-value} = 0.0067379563$$

For Figure 1, the Null Hypothesis is that there is no significant difference between the population mean of PSS scores of participants in APS courses and participants in APH courses. The Alternative Hypothesis is that there is a significant difference between the population mean of PSS scores of participants in APS courses and participants in APH courses. The t-statistic is found to be -2.66919 and the p-value, the probability of getting the absolute value of a t-value of -2.66919, is found to be 0.0067379563.

V. ANALYSIS

The researcher will interpret and comment on the p-value for each hypothesis test and 2-sample t-test so that the results may be understood within the context of AP courses categories' relationship with the PSS scores.

PSS scores difference between APS and APH are represented in Figure 1, a 2-sample t-test was conducted comparing participants in APS and APH' PSS scores. Since the p-value = $0.0067379563 < \alpha = 0.05$, thus there is convincing evidence to reject the null hypothesis. Thus, the alternative hypothesis is supported, meaning that there is a significant difference between the PSS Score of APS courses and participants in APH courses. However, the sample size is relatively small ($n_{STEM} = 21$, $n_{HUMANITY} = 48$) and the results of each participant in STEM and Humanities are very unlikely to be related and is independent since it passed the 10% condition, a sample size should be smaller than 10% of population size when sampled without replacement.

VI. DISCUSSION

The result suggests that there is a significant difference between the PSS scores of participants in APS courses and participants in AP Humanity courses. The difference of the PSS scores is significant between participants in APS and APH courses. These results indicate that the perceived stress levels vary significantly depending on the categories, with STEM having a

higher perceived stress levels than Humanities. According to the cognitive-motivational model by Paulus (1983), the performance of an individual is dependent on the consequences they received, they will react a certain way to avoid the consequences. Tasks associated with higher perceived stakes or negative outcomes can increase arousal and motivation. Thus, APS courses often focus on learning new and unfamiliar information which increase the perceived risk of failure rather than focusing on building skills that were developed on previous courses, consequently, increasing arousals to avoid potential failure. Additionally, the Yerkes-Dodson law by Yerkes & Dodson (1908) states that performing at an optimal level of arousal benefits the performance, whereas performing at a low level or high level of arousal harms the performance. Therefore, rather than avoid potential failure, it will increase the chance of failure if increasing from an optimal level of arousal. With being in an academic setting, the contents that are taught will be tested which will be observed, compared and judged (e.g. timed tests, curve grading). This will feel like a social evaluation, thus, will trigger the dominant response which tends to be a false solution in an increased arousal solving complex tasks situation. This is inherently the drive hypothesis by Zajonc (1965) where it is stated that the presence of others will increase the probability of dominant reaction, correct response in simple tasks and tend to be false response in complex tasks. Therefore, APS courses having higher perceived stress levels than AP Humanities can be theoretically related to the nature of the course content and the pressure that the student feels.

It is worth noting, however, that there may be a variety of confounding factors affecting the research conducted. While observational data was collected but was overall excluded, this highlights the challenges of integrative qualitative data in a mixed-methods design, particularly when such data do not meaningfully triangulate with quantitative data. Additionally, data for

participants who took both courses categories were collected but were also scrapped. While these students may offer a more nuanced perspective on PSS across categories, including them could have introduced confounding variables that compromised the clarity of the research question. As such, their exclusion minimizes the study's generalizability to students with a more diverse schedule. This study only samples at X High School which reduces external validity of the result and the generalizability to other High Schools. The High School that is sampled is a Title 1 public high school, meaning a significant portion of students comes from a low-income family, which further limits the generalizability of the findings. Students at Title 1 schools received less resources than affluent schools, which add onto the stressor for students to seek external support to succeed in AP courses and exams. This highlights the importance of implementing stronger academic and mental health systems for AP students at X High School, particularly for those in APS classes, as it correlates with a higher PSS than APH. The methods employed in this study, self-reported survey, are subjected to social desirability bias, where the participants can underreport or overreport their stress levels causing the result to be either underestimated or overestimated. Moreover, the adapted version of the PSS was not formally revalidated, which may affect its reliability. Finally, since this study is a nonexperimental comparative design, causal inferences cannot be made therefore, anything that is concluded in this study is saying that the hypothesis for this study has convincing evidence in supporting it. These limitations may affect the result and the interpretation of the result, thus, it must be considered when applying them more broadly.

Should these results be reflective of the APS and APH population at X High School, the implication for the fields could be significant, as research on PSS levels among AP students is relatively limited. Firstly, this would address the gap in research on the stress level between APH

vs. APS students, where further research into the broader population of AP students and their PSS levels can allow the generalization of the difference of APS' PSS levels and APH's PSS levels. Thus, this established that the course categories that an individual is enrolled in correlate with the stress levels of students. As well as addressing a gap in research about stress differences based on courses categories in the AP program, this also most likely impacts the stress differences based on course categories outside of this field, for example in the professional fields where different paths will present stressors that is distinct from each other, thus, is important to understand stress differences. Further research investigating the broader population, within and outside the United States of America, of AP students, then dividing them up into APS and APH categories to measure their PSS levels is necessary for the generalizability of this topic. Considering the increasing number of AP courses, especially internationally, these conclusions may become even more relevant in understanding the stress dynamics in diverse academic environments.

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Appendices

Appendix 1: Informed Consent Form

I am asking you to participate in a research study titled “AP STEM vs. Humanities: Stress Comparison”. Please read this consent form carefully.

What the study is about

The purpose of this research is to investigate the correlation between enrollment in Advanced Placement (AP) STEM courses and AP Humanities courses. By analyzing participants' experiences in these different academic environments, the study aims to identify specific factors contributing to stress, such as workload, perceived difficulty, and time management demands.

Risks and discomforts

In this study, you may experience some emotional stress while answering survey questions about their stress levels, study habits, and academic workload. Reflecting on these topics might bring up feelings related to school pressure or personal challenges. However, it's important to know that you are able to take breaks if needed and are free to skip any questions you are uncomfortable answering. I aim to create a supportive environment, and participants can reach out for help or talk to someone they trust if they feel overwhelmed during the process. Overall, while some emotional discomfort may occur, I am committed to minimizing any negative feelings and ensuring a safe experience for all participants.

Taking part is voluntary

Your participation in this study is entirely voluntary. You have the right to refuse to participate before the study begins, and you can choose to discontinue your involvement at any time, for any reason. If you feel uncomfortable with any questions or procedures, you are welcome to skip those specific questions without penalty. Your decision to withdraw will not affect any compensation you have earned before withdrawing or have any impact on your relationship with me.

If you have questions

If you have questions, you may contact the researcher at [REDACTED]. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) for Human Participants at [REDACTED] or at [REDACTED].

This consent form will be kept by the researcher for five years beyond the end of the study.

- Yes, I consent
- No, I do not consent

Appendix 2: Modified PSS-10 Questionnaire to Original PSS-10 Questions

Modified Version	PSS-10
1a. In the last month, have you ever been upset because of unexpected academic challenges in the courses?	1b. In the last month, how often have you been upset because of something that happened unexpectedly?
2a. In the last month, have you ever been not happy because of unexpected academic challenges in the courses?	1b. In the last month, how often have you been upset because of something that happened unexpectedly?
3a. In the last month, have you ever felt overwhelmed by assignments, exams, or projects in the coursework?	2b. In the last month, how often have you felt that you were unable to control the important things in your life? 3b. In the last month, how often have you felt nervous and stressed?
4a. In the last month, have you ever felt confident about your ability to handle the workload in the course?	4b. In the last month, how often have you felt confident about your ability to handle your personal problems? 5b. In the last month, how often have you felt that things were going your way?
5a. In the last month, have you ever felt that you cannot cope with all the things you had to do, specifically related to the coursework?	6b. In the last month, how often have you found that you could not cope with all the things that you had to do?
6a. In the last month, have you ever been able to control irritations or frustrations caused by challenges in the course?	7b. In the last month, how often have you been able to control irritations in your life?
7a. In the last month, have you ever felt that you were on top of things, especially when it comes to staying on track with the coursework?	8b. In the last month, how often have you felt that you were on top of things?
8a. In the last month, have you ever been angered or frustrated because of things that happened in the courses that were outside of your control (e.g., deadlines, grading issues, technical difficulties)?	9b. In the last month, how often have you been angered because of things that happened that were outside of your control?
10a. In the last month, have you ever felt that the challenges in the coursework were piling up so high that you could not overcome them?	10b. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix 3: Observation Notes

DECEMBER								
ID	Humanities/ STEM/Both	Time	PSS	Physical Symptoms	Fatigue Indicators	Work Habits	Social Interact	Physiologi cal Cues
A1	Humanities	9:21A M	19.5	Leg Bouncing	Slouching	Slow	Minimal	Muscle Tension
B2	Humanities	10:23 AM	20	Leg Bouncing	None	Rushed	Fast	Jitteriness
C3	STEM	12:34 PM	27	On Phone	Lack of Engagement	Rushed	Irritated	Eye Strain
D4	STEM	1:50 PM	14.5	Looking Around	Slow Responses	None	Avoid	Drooping Eyelids
E5	Both	11:45 AM	22.5	Zoning Out	Yawning	None	Normal	Low Energy
F6	Both	8:23 AM	24	Zoning Out	Slow Responses	None	Avoid	Dry Eyes
G7	Both	7:25 AM	24	Crying	Rubbing Eyes	Rushed	Quiet	Rapid Breathing
H8	Both	7:20 AM	22	On Phone	Head Drooping	None	None	Heavy Eyelids

JANUARY								
ID	Humanities/ STEM/Both	Time	PSS	Physical Symptoms	Fatigue Indicators	Work Habits	Social	Physiological
A1	Humanities	7:40 AM	19.5	Leg Bouncing	Slouching	Slow	Minimal	Restless
B2	Humanities	1:22 PM	20	On Phone	Lack of Engagement	Rushed	Irritated	Eye Strain
C3	STEM	9:32 AM	27	Leg Bouncing	Slight Fidgeting	Slow	Minimal	Muscle Tension
D4	STEM	11:30 AM	14.5	Zoning Out	Yawning	Slow	Avoid	Low Energy
E5	Both	8:45 AM	22.5	Talking	Mild Restlessness	Normal	Talkative	Elevated Energy

F6	Both	12:00 PM	24	On Phone	Lack of Engagement	Slow	Avoid	Posture Slump
G7	Both	2:02 PM	24	Talking	Restlessness	Rushed	Minimal	Tense Posture
H8	Both	10:45 AM	22	Talking	Restlessness	Slow	Normal	Steady Breathing

FEBRUARY								
ID	Humanities/STEM/Both	Time	PSS	Physical Symptoms	Fatigue Indicators	Work Habits	Social	Physiological
A1	Humanities	2:03 PM	19.5	Leg Bouncing	Not Calm	Rushed	Minimal	Rapid Blinking
B2	Humanities	10:23 AM	20	Leg Bouncing	Fidgeting	Slow	Some	Slight Tense
C3	STEM	12:23 PM	27	Zoning Out	Yawning	None	Avoid	Slouched Posture
D4	STEM	10:30 AM	14.5	Leg Bouncing	Mild Calm	Rushed	Quiet	Tapping Fingers
E5	Both	8:34 AM	22.5	On Phone	Distracted	Slow	Minimal	Slouched Posture
F6	Both	11:10 AM	24	On Phone	Lack of Engage	Slow	Irritated	Eye Rubbing
G7	Both	1:24 PM	24	On Phone	Low Focus	Rushed	Avoid	Drooping Eyelids
H8	Both	7:34 AM	22	Zoning Out	Slow Responses	None	Avoid	Heavy Blinking

MARCH								
ID	Humanities/STEM/Both	Time	PSS	Physical Symptoms	Fatigue Indicators	Work Habits	Social	Physiological
A1	Humanities	9:31 AM	19.5	Zoning Out	Slow	None	Avoid	Slouched Posture
B2	Humanities	10:34 AM	20	Leg Bouncing	Not Calm	Rush	Minimal	Tense Posture

C3	STEM	11:42 AM	27	Crying	Overwhelmed	None	Minimal	Rapid Breathing
D4	STEM	1:42 PM	14.5	On Phone	Distracted	Absent-minded	Ignoring	Glazed Eyes
E5	Both	9:34 AM	22.5	Zoning Out	Exhaustion	None	None	Head Drooping
F6	Both	10:23 AM	24	On Phone	Fidgeting	None	Minimal	Shallow Sighs
G7	Both	8:43 AM	24	Zoning Out	Yawning	Absent-minded	Avoid	Heavy Eyelids
H8	Both	1:34 PM	22	On Phone	Overwhelmed	Minimal	Minimal	Blank Stare

APRIL								
ID	Humanities/STEM/Both	Time	PSS	Physical Symptoms	Fatigue Indicators	Work Habits	Social	Physiological
A1	Humanities	12:24 PM	19.5	Rubbing eyes	Heavy Yawning	Blank Stare	No	Slow Blinking
B2	Humanities	10:10 AM	20	Leg Bouncing	Anxious Fidgeting	Rushed	Minimal	Shallow Breathing
C3	STEM	11:22 AM	27	Head in Hands	Deep Sighing	Rushed	Minimal	Tense Shoulders
D4	STEM	1:42 PM	14.5	Nail Biting	Squinting at Screen	Rushed	Avoid	Fast Breathing
E5	Both	9:19 PM	22.5	Slouching	Long Pauses	Slow	Minimal	Drooping Eyes
F6	Both	10:40 AM	24	Knuckles Cracking	Mild Yawning	Rushed	No	Tapping Fingers
G7	Both	8:53 AM	24	Chew on Pen	Deep Sighing	Overwhelmed	No	Tight Jaw
H8	Both	12:34 PM	22	Sleeping	Silent Yawning	No	Minimal	Eye Closed