**GENERAL INSTRUCTIONS**

* 1. **What general instructions should I follow when writing the drafts/final paper?**
     1. Follow the page length requirements for each draft section.
     2. Paper
        1. 12-point font, Times New Roman
        2. Double Space
        3. 1-inch margins (all around)
     3. Ensure that the draft adheres to APA-style.
     4. Ensure that the draft is free of plagiarism.
     5. Ensure that the draft is free of grammatical errors
  2. **What specific instructions should I follow when writing the drafts/final paper**?
     1. Title Page – APA style
     2. Abstract – 300 words (APA Style)
     3. Introduction
        1. 15-20 references from peer-reviewed journals
        2. Literature review of relevant sources
        3. “Current Study” section at the end of the introduction. In the “Current Study” section, connect the previous research that you reviewed in the introduction with your research questions/hypotheses.
     4. Method (Following sections need to be included)
        1. Participants
        2. Measures
        3. Apparatus (e.g., intervention, computer task [e.g., implicit association test])
        4. Procedure
        5. Data-Analytic Section
     5. Results (Following sections need to be included)
        1. Descriptive Statistics
        2. Inferential Statistics
     6. Discussion (Following sections need to be included)
        1. Discussion of your research findings
        2. Practical/Clinical Implications
        3. Limitations/Future Directions
     7. Figure/Tables
        1. 1 Figure (APA-style)
        2. 1 Table (APA-style)
     8. References - APA-style

**INTRODUCTION OUTLINE**

Our Study

**IV1 (All) - Stress**

**IV2 (Group ) - AGE**

**DV – Verbal Working Memory**

Outline

1. Negative effects of stress (Para 1)
   1. What is stress? (S2)

Stress is XYZ. Approximately 75% of college students experience stress

* 1. Do college students experience stress? (S1)

1. Negative effects of stress (Para 2)
   1. What are the negative effects of stress (general)? (S1)
   2. What are the negative effects of stress on verbal working memory (specific)?
   3. Purpose of the study (research question one sentence)?
2. Stress and verbal working memory (Para 3)
   1. Review the literature on the **negative** effects of stress on verbal working memory
3. Stress and verbal working memory (Para 4)
   1. Review the literature on the potential **positive** effects of stress on verbal working memory
   2. Does stress affect the encoding or retrieval (or both) of information into and from verbal working memory? How does this information relate to the current study?
   3. Overall, study will focus on **negative** effects of stress on verbal working memory
4. Mindfulness-based interventions to reduce stress (Para 5)
   1. What is mindfulness? (S1)
   2. What is state/trait mindfulness (see “our study” ppt and research)
5. Mindfulness-based interventions to reduce stress (Para 6-7)
   1. How do mindfulness-based interventions work to reduce stress (mechanisms of change)
   2. Describe 2-3 mindfulness-based interventions that were effective at reducing stress, particularly among college students.
6. How have researchers tried to increase stress (Para 8)?
   1. Hypothetical scenarios (imagine that you are in the class and forgot that you had a test)
   2. Pain (electric shock)
   3. Unsolvable anagrams
7. How might age/gender impact the relationship between stress and verbal working memory?

**Current Study**

1. Research Questions (Para 9)
2. Research Hypotheses (Para 10)

Questions to answers

1. What is stress?
2. Do college students experience stress?
3. What are the negative effects of stress?
4. What are the negative effects of deficits in verbal working memory?
5. What is the relationship between stress and verbal working memory **(Purpose of Study)?**
6. What is verbal working memory?
7. What is one way that researchers have measured verbal working memory (describe the test in detail)
8. What seminal study examined the limits of verbal working memory capacity?
   1. What other studies have examined verbal working memory?
9. What methods have researchers used to reduce individual’s level of stress (mindfulness)
   1. Describe the specific studies – focus on the findings that pertain to YOUR study
   2. Why would want to decrease college student’s stress level
10. What methods have researchers used to increase individual’s level of stress (unsolvable)
    1. Describe the specific studies – focus on the findings that pertain to YOUR study
11. Your group IV – How does gender/age impact the relationship between stress and verbal working memory
    1. Discuss findings from specific studies – make an argument why you believe your group IV will impact the specific levels of your stress IV and how this interaction will specifically impact your DV (digit span test performance).
12. Research Question (Purpose)
    1. To examine the effects of stress on working memory.
    2. Does stress affect verbal working memory?
13. Research Hypotheses
    1. Higher levels of stress will lead to lower levels of verbal working memory performance
    2. Lower level of stress will lead to higher levels of verbal working memory performance
    3. Your Group Level IV

**THIS IS MY DISCUSSION DRAFT (ONLY THING IVE WORKED ON)**

**Method**

**Participants**

There were 85 participants in the present study. The participants were current undergraduate college students with different majors at California State University, Dominguez Hills. Most participants were enrolled in Psychology 415 and Psychology 416. Psychology 101 students were also recruited and volunteered to participate to receive credit for their class. In terms of gender, it was 25% male and 75% female. Also, in terms of age the participants were required to be 18 and older and the majority were 20 years old (*M*=20.39, *SD*=3.64)*.* The racial makeup of the participants was 7.1% Black, 8.3% Asian, 1.2% Native Hawaiian/ Pacific Islander, 2.4% White, 76.2% Hispanic/Latino, and 4.8% Other/Mixed Race (percentages do not add up to 100% due to rounding) No compensation was received and IRB approval was not secured.

**Materials**

***Demographics***

The participants were asked to complete an online questionnaire that consisted of demographic information. The demographic questions consisted of 11 questions that had to do with an individual’s gender, sex, age, race, marital status, sexuality, current college, class standing, GPA, employment status, and hours of sleep per night. The main goal of these questions were to determine if the participant was eligible to complete the study and to get an overall better understanding of the individual’s background. For instance, a few questions include “What is your employment status?” with responses ranging from (*unemployed, part time, full time)* and “How many hours of sleep do you get at night?” with responses ranging from *(1-2 hours, 2-4 hours, 4-6 hours, 6-8 hours, over 8 hours)* to gain a better sense of their perceived notions of stress and how it can affect their verbal working memory.

***The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) – Trait Mindfulness***

The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) was created by Feldman et al. (2007) to assess an individual’s trait level of mindfulness. The scale consists of 12 items that allow participants to rate their thoughts and feelings from 1 (*Rarely/Not at All)* to 4 (*Almost Always).* A few example questions on the CAMS-R include: “It is easy for me to concentrate on what I am doing” and “I can usually describe how I feel at the moment in considerable detail.” Each individual score was calculated by first reverse scoring items 2, 6, and 7 before the total score for items 1-12 were added such that higher scores reflected greater trait mindfulness. α = .72 which entails good reliability.

***Five Facet Mindfulness Questionnaire (FFMQ) – Trait Mindfulness***

The second scale used to measure trait mindfulness was the Five Facet Mindfulness Questionnaire (FFMQ). This study was a factor analytic study of 5 separate mindfulness questionnaires created by Baer et al. (2006) to depict parts of mindfulness as it is currently conceived. The 5 features were observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. The scale consisted of 39 items that permitted participants to rate their own daily experiences from 1 (*Never or Very Rarely)* to 5 (*Always True)*. An example of an observing question is “When I’m walking, I deliberately notice the sensations of my body moving” while an example of acting with awareness is “When I do things, my mind wanders off and I’m easily distracted.” Although there were five subscales of the FFMQ, a total score was calculated and used in the current study. The FFMQ total score was calculated by being summed up by reverse-scored items and non-reversed scored items. α = .84 placing it at great reliability.

***Perceived Stress Scale (PSS) – Trait Stress***

The scale used to measure the participants’ trait stress was the Perceived Stress Scale (PSS). This scale was created by Cohen et al. (1983) to capture an individual's stress level in the past month. The scale consisted of 10 items that gave the participants’ a chance to rate their stress level in situations from 0 (*Never)* to 4 (*Very Often).* A few examples of the questions on the PSS were: “In the last month, how often have you been upset because of something that happened unexpectedly?” and “In the last month, how often have you found that you could not cope with all the things that you had to do?” The scores were calculated by reverse scoring items 4,5,7, and 8 then adding all the items together to get a total score. Scores ranging from 0-13 were considered low stress. Scores ranging from 14-26 were considered moderate stress. Scores ranging from 27-40 were considered high perceived stress. α = .80 placing at great reliability.

***Stress - State***

The participants’ state stress was measured by a brief questionnaire as both a pretest and post-test to show how stressed participants were before randomization and after being randomly assigned to a condition. The scale allowed participants to rate their stress from 1 (*No Stress)* to 5 (*Extreme Stress)*. Each participant was given 3 questions depending on which condition they were randomized into in the current study (i.e., mindfulness, unsolvable anagrams, or control). The questions were asked after the participant was randomly assigned to their condition and completed the post-test digit span test. Some questions for the mindfulness condition were “Before watching the mindfulness video, how did you feel?”, “While watching the mindfulness video, how did you feel?” and “After watching the mindfulness video, how did you feel?” A few examples of the questions for the unsolvable conditions were “Before solving anagrams, how did you feel?”, “While solving anagrams, how did you feel?” and “After solving anagrams, how did you feel?” If they were in the control group, they were asked questions such as “Before reading the information about bears, how did you feel?” “While reading the information about bears, how did you feel?” and “After reading the information about bears, how did you feel?” These questions aimed to see if an individual’s stress level increased or decreased with the randomized condition.

**Mindfulness Video**

Participants who were randomly assigned to the mindfulness condition watched this mindfulness video titled “5 Minute Meditation You Can Do Everywhere” (Goodful, 2019). The motive behind having participants watch this video was to induce relaxation and have the participants stay focused on the assigned task to decrease their stress level and assess how it mindfulness affects participants’ verbal working memory.

**Unsolvable Anagrams**

Participants who were randomly assigned to the unsolvable anagram condition were given solvable and unsolvable anagrams developed by Calef et al. (1992). Participants received unsolvable anagrams because the experimenters wanted to increase participants’ level of stress. An example of the solvable anagram was (*eurkty- turkey*). While an example of an unsolvable anagram was (*Yicdn).* The anagram “Yicdn” was an unsolvable anagram because the anagram cannot be solved. The motive behind having participants solve these anagrams was to increase their stress levels and see how it affects their verbal working memory.

**Control**

Participants who were randomly assigned to the control group were given the task of reading about bears from *Encyclopedia.* The information consisted of4 paragraphs that went in depth of the hibernation of bears. This condition did not have any type of influence on their levels of stress.

**Digit Span Test**

The pre-digit span test and post-digit span test developed by *Memory Health Check* required participants to recall a randomized set of digits for 10 seconds formed by a number generator. An example of a series includes (*0,9)*. The numbers in the DST gradually increased from series that consisted of two digits to series that consisted of 11 digits overall. The point behind having participants complete both tests was to evaluate verbal working memory prior to being assigned to a condition and how condition assignment may have an impact (i.e., decreased, increased, or had no impact) on participants’ stress and subsequent verbal working memory performance. For more detailed information about the contents in the survey, please see the Appendix below.

**Apparatus**

The software used to program the survey was Qualtrics. Qualtrics is an online survey tool to build surveys, distribute surveys, and analyze survey responses. Using the randomization option in Qualtrics, participants were assigned to either a mindfulness video, unsolvable anagrams, or control group.

**Research Design**

The study was an online experimental study with 3 x 2 x 2 mixed factorial design. Stress was the experimental factor and age was the quasi-experimental factor. The within- subjects component was the pre-digit span test and post-digit span test. The between-subjects component consisted of randomly assigning participants to 3 conditions: mindfulness (low stress), unsolvable anagrams (high stress), and control (no stress). The study had 2 independent variables: stress and age. The dependent variable was verbal working memory assessed via the DST.

**Procedure**

First, participants received a link to both the consent form and the survey in which it was administered online. Participants were asked to fill out a questionnaire about their demographic backgrounds and then they filled out a questionnaire describing their thoughts and feelings about their daily lives. Participants were asked to complete Participants were then asked to complete CAMS-R, FFMQ, and PSS before the pre-digit span test to assess their verbal working memory. After the pre-test, the participants were then randomly assigned to 3 different conditions. Placing these participants in these conditions tested to see how condition assignment affected participants’ stress levels. When participants were finished with either watching the mindfulness video, solving unsolvable anagrams, or reading about bears, they were asked questions about what their stress level was before, during, and after to see if there were any differences in stress. Lastly, participants took the digit span post-test to evaluate whether or not participants were able to recall more or less numbers compared to the pre-test DST. At the end of the survey, students who were in PSY 101 had their information sent to their faculty to receive credit for participation, while non PSY 101 students were done and completed the experiment. Participants were debriefed before the end of the survey.

**Data Analytic Plan**

The software used to analyze the data in the study was SPSS 25. It was used to input the participants' scores before and after taking the Digit Span test. It was also used to compare the scores between verbal working memory and stress levels the participants experienced in their randomly assigned condition. Mixed factorial ANOVA was administered (3 x 2 ANOVA, 3 x 2 x 2 ANOVA) There were 4 assumptions: normality, homogeneity of variance (between groups), homogeneity of variance-covariance matrices (between and within) and sphericity. Normality was not met because it was robust to violations of the normality assumptions. Homogeneity of variance (between groups) and homogeneity of variance-covariance was met. The 4 outliers in the pre-test and 3 outliers in the post-test. The missing data ranged from 0-3 in the trait tests, age, and demographics recorded. Sphericity was not applicable because we only have 2 levels of our within-subject variable (pre-test vs post- test DST). Overall, most of the ANOVA assumptions which was compatible with the mixed factorial ANOVA analyses.

References

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13(1),* 27-45. <https://doi.org/10.1177/1073191105283504>

Calef, R. S., Choban, M. C., Calef, R. A., Brand, R. L., Rogers, M. J., & Geller, E. S. (1992). Effects of unsolvable anagrams on retention. *Bulletin of the Psychonomic Society*, *30*(2), 164-166. https://doi.org/10.3758/bf03330428

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385-396. https://doi.org/10.2307/2136404

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. (2006). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29(3)*, 177-190. <https://doi.org/10.1007/s10862-006-9035-8>

Goodful. (2019). *5-Minute Meditation You Can Do Anywhere*. <https://www.youtube.com/watch?v=inpok4MKVLM>

**RESULTS OUTLINE**

**Descriptive and Inferential Statistics**

1. (**STEP 1 - ANALYSIS SPSS SYNTAX**) Did participants in the mindfulness and unsolvable anagram condition experience a statistically significant change in stress (see state stress measures)?
   * 1. Mindfulness (decrease stress) – **Y**/N
     2. Unsolvable Anagrams (increase stress) – **Y**/N
2. (**STEP 2, 3, & 4**) Were there any statistically significant differences in trait mindfulness or trait stress between groups before participants were assigned to a condition?
   * 1. Trait Mindfulness #1 (CAMS-R) Y/**N**
     2. Trait Mindfulness #1 (FFMQ) Y/**N**
     3. Trait Stress (PSS) Y/**N**
3. (**STEP 5 and STEP 6**) Did participants experience statistically significant changes in verbal working after being assigned into the mindfulness (H1) or unsolvable anagram condition (H2)?
   * 1. Was the 3 x 2 mixed ANOVA significant? **Y**/N
4. The interaction effect (condition x pre/post DST) was statistically significant, *F*(2, 82) = 3.31, *p* = .042
5. Did participants in the mindfulness condition experience a statistically significant improvement in verbal working memory (H1)? Y/**N**
6. In the mindfulness condition, participants’ scores on the DST decreased from pre-test (*M* = 6.89, *SD* = 1.20) to post-test (*M* = 6.57, *SD* = 1.50), however the decrease was not statistically significant, *F*(1,27) = 1.50, *p* = .231.
7. Did participants in the unsolvable anagram condition experience a statistically significant decline in verbal working memory (H2)? Y/**N**
8. **YOUR TURN (SEE 3B AS AN EXAMPLE)**
9. (**STEP 7 OR STEP 8**) Did age/gender change (moderate) the findings in the 3rd point above? 3 x 2 x 2
   1. Did age change the relationship between condition assignment and verbal working memory performance? Y/**N**
10. The three-way interaction effect (pre/post DST x  condition x age) was not statistically significant, *F*(2, 78) = .31, *p* = .733.
    1. Did gender change the relationship between condition assignment and verbal working memory performance? Y/**N**
11. The three-way interaction effect (pre/post DST x  condition x sex) was not statistically significant, *F*(2, 78) = .62, *p* = .542.

**Descriptive and Inferential Statistics**

The first question to be addressed was whether participants in the mindfulness and unsolvable anagram condition experienced a statistically significant change in stress? **ADD YOUR APA RESULTS HERE.**

The second question to be addressed was whether there was a statistically significant difference in trait mindfulness or trait stress between groups before participants were assigned to a condition? **ADD YOUR APA RESULTS HERE.**

The third question to be addressed was whether a participant experienced a statistically significant change in verbal working memory after being assigned into the mindfulness (H1) or unsolvable anagram condition (H2)? **ADD YOUR APA RESULTS HERE.**

The fourth question to be addressed was whether a participant’s age/gender changed (or moderated) the relationship between condition assignment and verbal working memory? **ADD YOUR APA RESULTS HERE.**

**DISCUSSION OUTLINE**

* + - 1. 1st paragraph – purpose what you found
      2. 2nd paragraph – what happened to verbal working memory in the mindfulness condition?
      3. 3rd paragraph – what happened to verbal working memory in the anagrams condition?
      4. 4th paragraph - Was AGE a moderator?
      5. 5th paragraph –
  1. miller study – do your findings support miller’s limit of verbal working memory?
  2. practice effects – control condition

1. practical implications
2. limitations/ future directions
3. conclusion