Introduction

• Stress is defined as challenges in every day life, usually small occurrences, that disrupt the normal routine, (Almeida, 2005).
• Stress is an important aspect of life to look at because it can be a problem for anyone, but it is found to be a problem especially for college aged students, (Hintz, Frazier, & Meredith, 2015).
• Working memory is defined as “the ability to hold information actively in mind in a readily accessible state” (Brady, & Alvarez 2015, p 921).
• It has consistently been shown that stress is related to working memory, both positively and negatively, (Human et al., 2013).
• According to Belsky, Ruttle, Boyce, Armstrong, and Essex (2015) physiological responses come as a product of stress. Stress is indicated through physiological responses such as heart rate or blood pressure.
• Heart rate is an important physiological measure as it has been seen to have a relationship with the onset of many diseases (Vahle-Hinz, Bamberg, Dettmers, Friedrich, & Keller, 2014).
• It was predicted that when subjected to a cold presser task, heart rate would increase because stress was induced. It was further predicted that ability to use working memory, based off performance on a digit span task, would decrease when stress was induced.

Procedure

• Participants first filled out a demographics survey in a classroom setting.
• Participants were brought to the psychophysiological lab to complete a 3-minute baseline reading of their heart rate using an electronic blood pressure cuff.
• After completing the baseline, participants completed a digit span test in which they read numbers of increasing length (starting at 4 digits) and then required to repeat them back, forwards and backwards.
• The participant was finished once they got two numbers wrong in succession.
• At one random time during the test, their heart rate was again read using the same procedure as the baseline.
• Participants then completed another digit span test of the same format but with different numbers while having their right arm submerged in ice water (the Cold Presser task).
• Again their heart rate was read at a random time during the test.

Participants

• There were nine total participants, N=9.
• Broken down by sex, there were two males, n=2, and seven females, n=7.
• Broken down by class standing, there was one freshman, n=1, four sophomores, n=4, and four juniors, n=4.
• Broken down by ethnicity, there were seven white participants, n=7, and two Hispanic participants, n=2.
• Broken down by age, there were two 18 year olds, n=2, five 19 year olds, n=5, and two 20 year olds, n=2, with a mean age of M=19 and standard deviation of S.D.=.7071.

Apparatus

• A paper and pencil measure of demographics included four questions about sex, age, class standing, and ethnic heritage.
• An automatic electronic heart rate cuff was used on the participants wrist.
• A cooler filled with ice and water was used as a cold presser task.
• A random number generator was used to create a digit span test consisting of three numbers for each length (increasing from four digits up to twelve digits).

Results

• The mean digit length reached in the control test was M=6.67 with a standard deviation of S.D.=.87.
• The mean digit length reached in the stress test was M=5.78 with a standard deviation of S.D.=.83.
• The mean baseline heart rate was M=93.67 with a standard deviation of S.D.=24.86.
• The mean control test heart rate was M=93.11 with a standard deviation of S.D.=24.74.
• The mean stress test heart rate was M=97.11 with a standard deviation of S.D.=21.81.
• A Wilcoxon sign-ranked test was completed.
  • No significant differences between digit span test and digit span test while stressed (p=.07).
  • No significant differences between baseline heart rate and heart rate during the test (p=.83).
  • No significant differences between baseline heart rate and heart rate while stressed (p=.77).
  • No differences between heart rate during the test and heart rate while stressed (p=.59).

Conclusions

• There are no differences between working memory performance while under stress and while not under stress.
• There are no differences between heart rate when not under stress and when under stress.
• A limiting factor in this study was that it was completed in conjunction with another study and therefore other variables may be unaccounted for.
• Another limiting factor was that whether or not caffeine was consumed prior to the experiment was not recorded.
• Future research might take into account caffeine consumption prior to the experiment.
• Another further action to take would be to use different stressors and/or different physiological measures.

References


