Peer Achievement on Performance

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Abstract

There are many factors, both internal and external, that can affect one's academic performance. The purpose of this study is to see if a student's level of neuroticism and their level of anonymity of their peer's performance have any effect on their own academic performance, as tested with a memory task. The study was conducted with 57 participants, all of which were Georgia Tech undergraduate students enrolled in Psychology 2015 with ages in the range from 17 to 29. In this study, participants took part in one of three session types, with the difference between each session being the level of anonymity of their peers' scores they were exposed to. The sessions' level of anonymity was defined by the facilitator's divulgement of information regarding other's performance. Through the use of the N-back test and deception, we were able to measure the academic performance and stress levels of the participants. While this study shows main effects between the level of neuroticism on change in stress, level of anonymity of peers' score on stress, level of neuroticism on a change in performance, or level of anonymity of peers' score on a change in performance, our data do not provide evidence that these interactions were significant. Our data also do not show any significant interaction effect between the level of neuroticism or level of anonymity of peers' scores on either change in performance or stress.

In recent years, academic performance has become synonymous with the term academic achievement, with the latter typically being defined as the extent to which a student has accomplished their educational goals. Many people and cultures have different manners of measuring academic performance. In the American educational system, officials measure results and progress with classroom performance (test scores, GPA), graduation rates, standardized tests, and entrance exams.

Many cultures believe that having a manner of measuring academic performance is important. One of the benefits is that it reveals achievement gaps in public and private school based on race, gender, and financial background. It also allows parents, teachers, and students the opportunity to see growth (or lack of) in an intellectual capacity.

Many factors can affect one's academic performance. This includes communication, learning institution, teaching methods, proper guidance, and access to resources. All of these are direct factors, but other factors can also have an impact on one's academic performance. The people in the vicinity of the student, may also affect performance. The number of people, the personalities and attitudes of the people around them, the social context in which the students are present in could all play a role.

But what of peer's success playing a role? If there are peers present, could knowledge of how well others perform affect one's own performance? Few studies have linked peer performance to a discussion of peers' success and less have based that correlation on a foundation of the person's measured level of neuroticism.

Relationship between Self-Esteem and Obtained scores

Neuroticism is defined as a personality trait that refers to a person with higher levels of anxiety and a natural inclination to negative behaviors (Eysenck, 1986). It may also be associated with low self-esteem. Self-Esteem is an influential factor that can affect a student's academic achievement. Self-Esteem can be referred to as one's confidence, satisfaction, self-worth, and self-respect. In an educational setting, this behavior emerges when children compare and evaluate their performance with other students doing a similar task. According to the study, "The relationship between Self-Esteem and Performance When Information Regarding Other's Performance Is Available," people with low self-Esteem will expect lower scores on the test. The primary result of the study showed that self-esteem correlated positively with the obtained score in the failure information group ($r=.32$, $p < 0.5$) (Covin, Donovan & MacIntyre, 2003). Thus, it can be inferred that someone with a higher level of fear and anxiety will stress more, and this may negatively affect one's performance.

Effects of Social Comparisons Associated with Psychological Well-Being and Depression

Intentionally and unintentionally, we compare ourselves with one another. Sometimes we compare ourselves to others for self-verification and other times for self-improvement. We continuously evaluate ourselves based on various factors. Academically, we compare our performance, GPA, test scores, internships, and college acceptance with other students. These evaluations promote a biased and overly competitive attitude. Some research shows that people who always compare themselves to others often experience feelings of dissatisfaction and unhappiness. According to the study participants who browsed their Facebook News Feed

reported a higher level of depression than participants who browsed a non-social content Facebook page (Alfasi, 2019). There have been studies that show that depression and low self-esteem are correlated. Furthermore, in this study, multiple regression analyses were conducted. In one of the models, self-esteem was regressed onto social comparison, the experimental conditions, and their interaction terms. Results revealed the significant main effect for social comparison ($b = -0.38$, $p < .01$) (Alfasi, 2019). People that score higher in neuroticism may make unreasonable comparisons to others, causing them higher stress levels about their progress in life.

Effects on Cheating of Achievement Anxiety and Knowledge of Peer Performance

As children, we often compare our academic performance with others, and oftentimes when we do not perform as well as our comparison group, despair and anxiety results. Many people believe that this despair and anxiety can result in cheating, but why do people really cheat? Is it that people feel they need to maintain a consistent sense of self? If so, where does this need come from? Data shows that achievement anxiety and knowledge of peer performance has a positive correlation with cheating (Shelton and Hill, 1969). Therefore, cheating becomes a correctional tool that helps people avoid social consequences. However, the data shows that neither achievement anxiety nor knowledge of peer performance alone is enough to cause one to cheat. It is the combination of the two that yields cheating. Without the threat of social dissatisfaction, anxiety is not a strong enough force to create a causal relationship between cheating and anxiety. The study concluded that 61% of participants cheated and there was no distinction between guys and girls (Shelton and Hill, 1969).

Competition in Career Tournaments

Although self-esteem and anxiety have been shown to correlate with performance, what about competition? Tournament theory is a theory that describes situations where wage differences are based not on marginal productivity but instead on differences between the individuals. Person-environment fit theory describes the degree to which a person and their environment match. (Dawis, 1992; French, Caplan, & Harrison, 1982; Kristof-Brown, Zimmerman, & Johnson, 2005; Muchinsky & Monahan, 1987). A recent study concluded that because of these two theories, we can assume that the positive effects of trait competitiveness on objective and subjective career success is stronger when the competitive psychological climate is high (Spurk, Keller, & Hirschi 2018). This means that when the work environment is competitive, those who are more competitive thrive more in those kinds of spaces and vice versa and that internal will to compete and thrive can grow tremendously with the presence of knowledge of peer performance. Knowledge of peer performance alters the internal goals of a person with high trait competitiveness and this creates competition within that person as they see underperforming those around them as a form of social dissatisfaction.

How Competition Affects Performance and Learning

Competition is used in a variety of settings to enhance the motivation and determination of the participants within that setting, but does competition enhance the participants' performance? A study performed by Ching-Huei Chen and his fellow researchers tested the effect of competition on an individual's performance. To test this, they used a digital game-based learning environment and implemented 3 different levels of competition: no competition,

anonymous competition, and non-anonymous competition. Three groups were randomly assigned to each level of competition, and once gameplay was complete, the average score for each group was compiled, as well as the learning goals and perceived abilities of each student. The anonymous and non-anonymous competition groups scored significantly higher than the group that had no competition, and the same results were collected with respect to learning goals and perceived ability. These results support the theory that competition increases performance and learning (Chen, 2017). This study shows us that there is evidence to assume that competition or comparison between others will increase the performance of an individual.

Practical Instances of Competition

But what about competition in other, more common situations, like the office or a school? Would competition in those environments affect performance Well, Gächter & Thöni (2010) conducted a study that would shed some light on those questions. Gächter & Thöni conducted a study that wanted to see how knowledge of a coworker's paycheck influence the willingness and effort one would put into their own work. To do this, they set up three separate individual studies involving 544 college students who were either given the title of employer or worker. For this study the participants were grouped in threes and in all of the studies, participants assigned as workers were asked to detail the amount of effort they would put into their job, given information regarding the other worker's salary. In all three studies the results ran along with their hypothesis that given knowledge of co-workers' salary information and they were paid less, they would put in less effort into the task they were assigned.

How Individuals Assess Their Own Anxiety

Only an individual can assess the anxiety and stress arising within themselves, and because of that, how an individual can assess the type of anxiety within themselves will determine the outcome of their performance (Grossbard, 2009). Joel Grossbard and his associates designed an experiment to examine how individual athletes assess cognitive and somatic anxiety within themselves by giving them the SAS-2 assessment. The results showed that the expected results of anxiety assessment in these groups aligned with the actual results. With our understanding of how individuals can recognize the stress levels and anxiety within them, we can assess how that anxiety affects their performance.

Relationship Between Adversity and Performance

A study was conducted by Abry et al. (2018) that sought to establish a relationship between classroom-level adversity and academic performance (measured as academic skills), teaching practices, and executive functioning of first-grade students in the United States. Classroom-level adversity was defined as the factors that would impede the collective student's progress in the classroom. The psychologists took a look into the lives of 1,073 first grade students across the united states and asked their corresponding teachers about information regarding the amount of adversity there was present in the classroom. The psychologists then followed up with the students at the end of their first-grade year when they took their designated literacy and mathematics tests. The psychologists of the article found negative associations between the amount of adversity and students' performance as they progressed in school.

Relationship Between Working Memory and Academic Performance

In recent years, working memory has become increasingly linked with academic performance. Working memory is thought of as the ability to store and manipulate information over a period of time (Siquara, Lima & Abreu, 2018). In recent studies, working memory has been positively correlated with academic performance, and linked to a variety of academic-related achievements and performance capabilities. In the study conducted by Siquara, Lima & Abreu (2018) and Chalmers & Freeman (2018), working memory was shown to be a good predictor of learning, academic achievement and academic performance, even better than a person's Intelligence Quotient. Since academic performance often relies on memorizing information and relating that information, the relationship between the two variables is understandable. All of this implies that if the consolidation of information into one's working memory were disrupted in a competitive setting; it is reasonable to assume that academic performance would decline along with it.

The Present Study

Given information and studies regarding how competition between peers, adversity in a social setting, social pressures, and internal influences all impact a person's level of success and achievement, we have come up with an alternative influence that will impact performance. With the relationship between working memory and performance, we want to see if knowledge of a peer's success will influence a person's improvement on a memory-based assessment.

We believe that participants with higher levels of measured neuroticism will show less improvement in their working memory performance than those with lower levels of neuroticism.

Given the research into stress and anxiety, we also believe that participants who score high in neuroticism will report a higher level of stress compared to participants that score lower in neuroticism. We also aim to prove that when given knowledge of peers' success in working memory performance, the student will show less improvement in their scores than those who were not given access to that information. Given the research on competition and stress, we also believe that participants who are exposed to peer's scores will report a higher level of stress compared to those not exposed to peer's scores. Understanding that measured neuroticism may influence the dependent variables as a function of the anonymity of peers' scores, we predict that there will be a significant interaction effect between the anonymity of peers' scores and level or neuroticism relative to both working memory performance and stress.

Given all of the research is it reasonable to assume a relationship between academic performance, and in turn, working memory, and a peer's success academically, is it possible that someone's measured level of neuroticism also plays a part? Through our research, we intend to discover if this relationship does in fact exist. For our study, we will be looking at Georgia Tech students to provide some context. We will be measuring their scores in neuroticism with a modified NEO-PI-R and operationalizing academic performance, through working memory, with scores received from an N-back memory task.

Method

Participants

The study was conducted with 57 participants, all recruited via convenience sampling from the 2019 Fall semester of Psychology 2015 course. After removing data from four

participants who did not complete the required demographic survey and pretest, our effective sample size was reduced to 53 participants. Their ages ranged from 17 to 29 (M = 20.72, SD = 2.17). The participants in this study consisted of a mildly diverse group of people, with all participants being college undergraduate students, 18.9% of the participants identifying as White, 1.9% identifying as Hispanic/Latino, 7.5% identifying as Black or African American, 52.8% identifying as Asian, 11.3% identifying as White and Asian, 1.9% identifying as Hispanic and Black, 1.9% identifying as Hispanic and Other, 1.9% identifying as White, Black, and Asian, and 1.9% identifying as White, Asian, and Native Hawaiian.

Procedures

Prior to the day of the study, participants were sent a self-assessment pretest to measure their level of neuroticism. During the study, participants were first asked to complete a survey to measure their current stress level. After receiving permission from the facilitators the participants were prompted to complete an initial trial if the 2-back version of the N-Back task. Upon completion, participants were asked to take a three-minute break, during which they could not talk with each other or use any of their electronic devices. There were three different experimental sections for this study. In the first session, halfway through the break, the facilitators emphasized the good scores of two individuals by pointing them out by id and devalued the others. In the second session, similar to the first level, the facilitators emphasized the scores of a few individuals, however without indicating who. In the third and fourth sessions, the students were not given any indication of scores during the break. Due to the small number of participants in the third session, we believed it was necessary to conduct the third level again to

get a more accurate measurement. After the break, participants were then asked to complete the N-Back assessment again and were asked to complete a few post-study survey questions which included demographic information. The subjects were debriefed and given permission to leave.

Materials

Neuroticism. Before the experiment, participants were required to take a modified NEO-PI-R assessment to evaluate neuroticism. The NEO-PI-R measures the big five personality traits, one of which is neuroticism. We have shortened the test to 10 items, all of which correspond to neuroticism. Within the neuroticism measure, categories include components such as anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability to stress. Sample items from this subsection of the assessment are things like: "I am easily stressed out," "I worry about things," "I change my mood a lot," "I get upset easily," and "I often feel blue." There was evidence of acceptable internal consistency reliability for scores on the Neuroticism scale in our sample. When we conducted a reliability measure, there was evidence of acceptable internal consistency reliability for scores on the neuroticism scale, $\alpha = .828$. Once scores were compiled, neuroticism for participants were then separated into two categories, high and low, separating them to how they scored relative to the median. A full list of the statements and the scoring of these items can be found in Appendix B.

Stress. The stress assessment administered was created and conducted on the PsyToolkit survey website. The stress assessment consisted of three items to measure each individual's current stress level. All items were statements that each participant rated anywhere from 1 to 10.

The first item stated: “My mind is currently racing,” “I feel a higher than average level of cognitive stress,” and “I feel a higher than average level of physiological stress.” This stress assessment was administered at the beginning and end of the experiment. The individual scores of each evaluation do not matter much in this experiment. The analyzed data consisted of the change over time of the scores from the first iteration to the second iteration. There was evidence of high internal consistency reliability for the stress pretest. When we conducted a reliability measure, we got an alpha value of $\alpha = 0.792$. There was also evidence of high internal consistency reliability for the stress post-test, with a Cronbach’s alpha of $\alpha = 0.723$. A detailed view of the statements and their scoring can be found in Appendix C.

Results

Data Analysis

This study tested six hypotheses pertaining to exposure to peer performance and level of stress. Our first hypothesis was that participants with higher levels of measured neuroticism will show less improvement in their scores than those with lower levels of neuroticism.

Our second hypothesis was when given knowledge of peers’ success on working memory performance, the student will show less improvement in their scores than those who were not given access to that information. The third hypothesis proposed that participants that are exposed to peer’s scores will report a higher level of stress than the other groups, compared to those not exposed to peer’s scores. Our fourth hypothesis was that participants that score high in

neuroticism will report a higher level of stress compared to participants that score lower in neuroticism. We also predict that there will be a significant interaction effect between the anonymity of peers' scores and level or neuroticism relative to both working memory performance and stress.

In order to test our six hypotheses, we conducted two seperate 2 (Neuroticism: low, high) x 3 (Anonymity: Group 1, Group 2, Group 3) between-subjects factorial analyses of variance (ANOVA), one for each dependent measure. These tests allowed us to analyze the main effects of anonymity (i.e., exposure or lack of exposure to peer's scores) on level of stress, anonymity on N - Back test performance, neuroticism on level of stress, and neuroticism on N-Back performance. They also assisted us in determining if there were any significant interaction effects between neuroticism and anonymity on stress, along with the impact of neuroticism and anonymity on N-Back performance.

Hypothesis 1

Our first hypothesis was that participants that score high in neuroticism will show less improvement on the 2-back task compared to participants that score lower in neuroticism. Based on our findings, there was not a significant effect of neuroticism level on performance, $F(1, 44) = 0.67$, $p = .42$, $\eta_p^2 = .02$. Unlike we predicted, neuroticism levels did not significantly facilitate a change in scores.

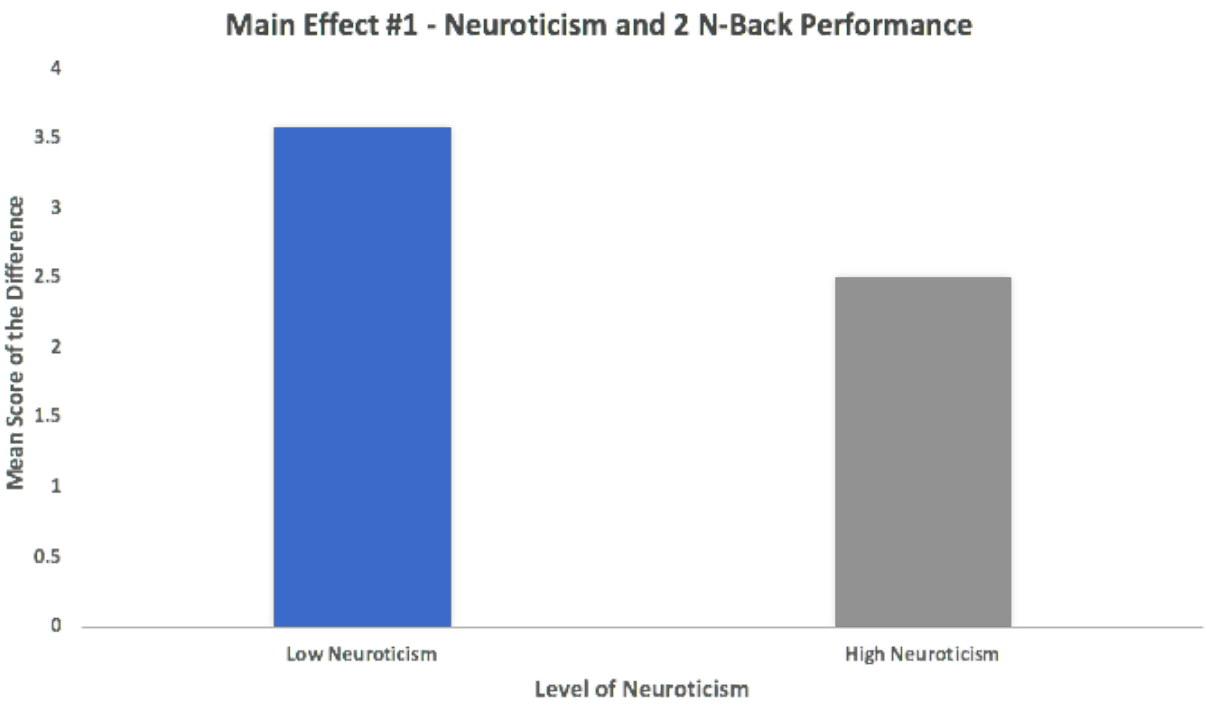

FIGURE 1. $F(1, 44) = 0.67$, $p = .42$, $\eta_p^2 = .02$. Mean Score for high and low neuroticism measures. This graph presents the mean average (out of 53) of participant's neuroticism measures.

Hypothesis 2

The second hypothesis proposed that participants that are exposed to peer's scores will have lower 2-back change scores compared to those not exposed to peer's scores. Based on our findings, there was not a significant effect of exposure of peer's scores on performance, $F(2, 44) = 2.20$, $p = .12$, $\eta_p^2 = .09$. Unlike we predicted, exposure to peers did not affect a student's change in performance.

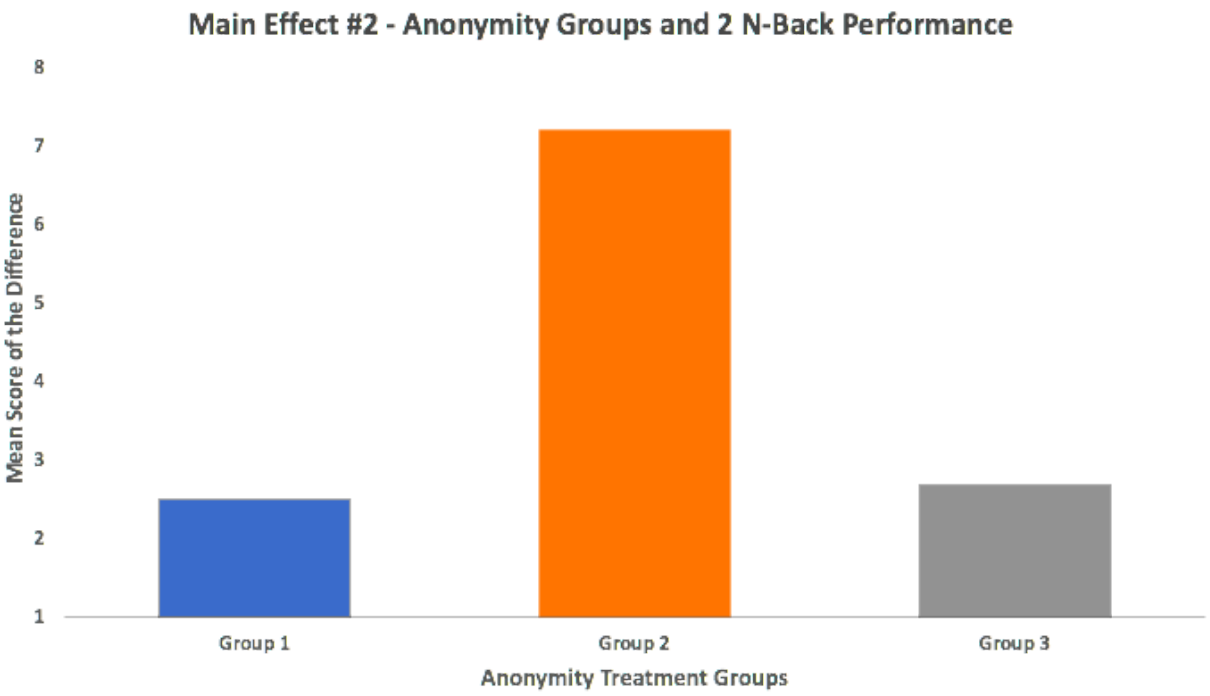

FIGURE 2. $F(2, 44) = 2.20$, $p = .12$, $\eta_p^2 = .09$. Mean Score of Difference for group 1 (feedback including confederates), group 2 (general feedback), and group 3 (no feedback received). This graph presents the mean score average (out of 53) of different treatments group measures.

Hypothesis 3

Our third hypothesis was that participants that score high in neuroticism will report a higher level of stress compared to participants that score lower in neuroticism. Based on our findings, there was not a significant effect of neuroticism level on stress level, $F(1, 45) = 0.24$, $p = .63$, $\eta_p^2 = .01$. Unlike we predicted, neuroticism levels did not significantly impact a person's level of stress perceived.

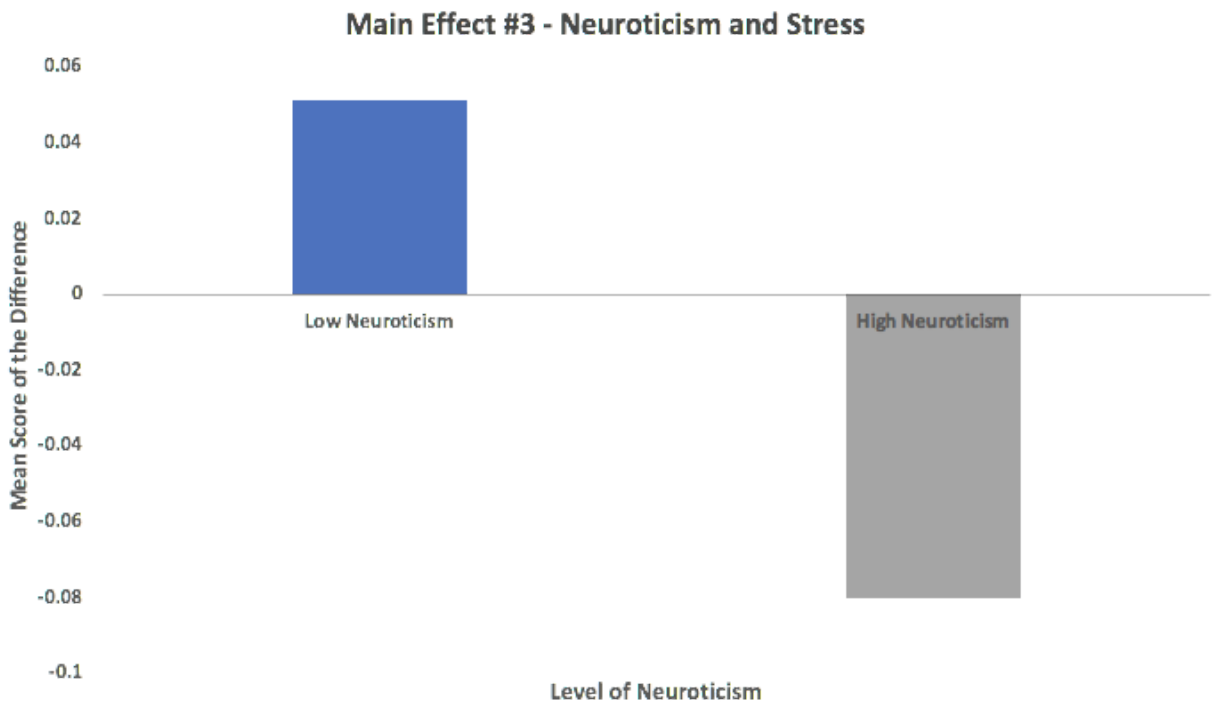

FIGURE 3. $F(1, 45) = 0.24$, $p = .63$, $\eta_p^2 = .01$. Mean Score of Difference for high and low neuroticism measures. This graph presents the mean average (out of 53) of participant's neuroticism measures.

Hypothesis 4

The fourth hypothesis proposed that participants that are exposed to peer's scores will report a higher level of stress than the other groups, compared to those not exposed to peer's scores. Based on our findings, there was not a significant effect of exposure of peer's scores on stress level, $F(2, 45) = 0.56$, $p = .57$, $\eta_p^2 = .02$. Unlike we predicted, exposure to peers did not affect the level of stress a student felt.

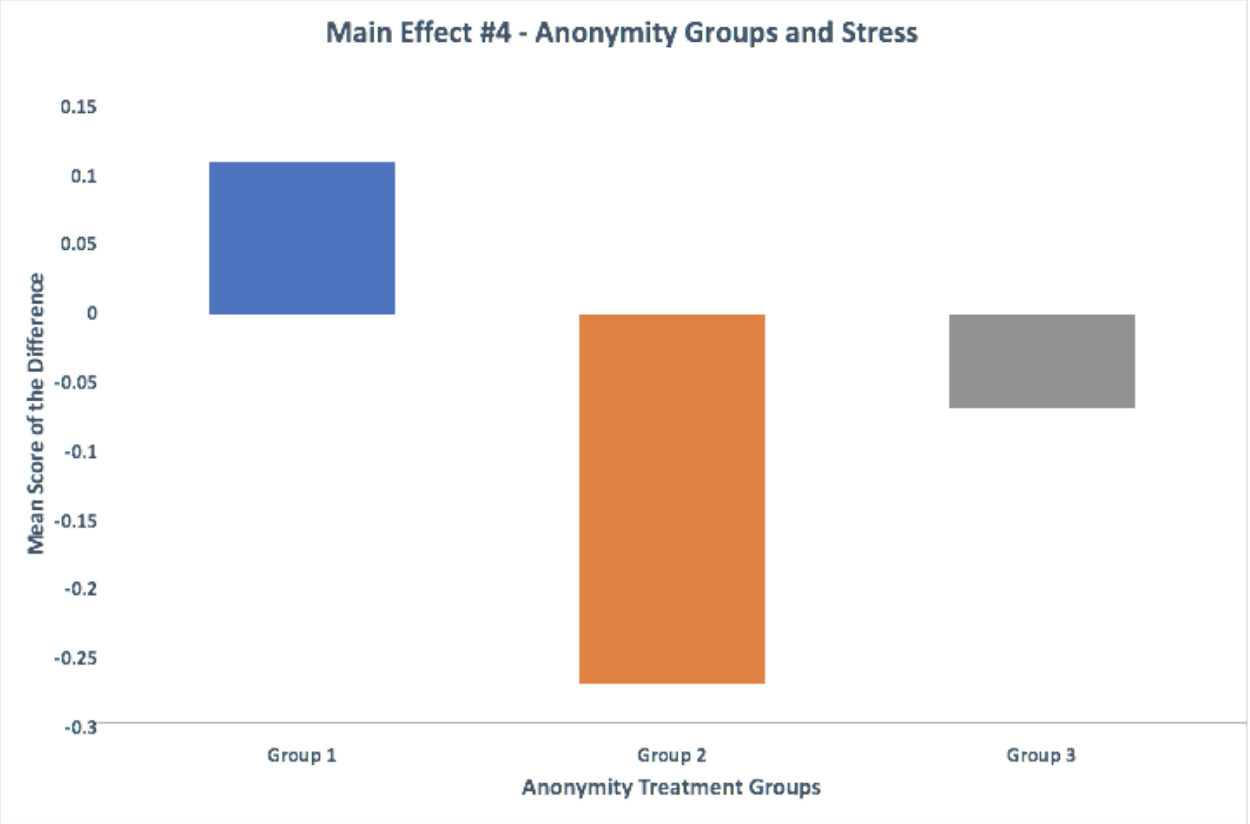

FIGURE 4. $F(2, 45) = 0.56$, $p = .57$, $\eta_p^2 = .02$. Mean Score of Difference for high and low neuroticism measures. This graph presents the mean average (out of 53) of participant's neuroticism measures.

Interaction Effect 1

The data suggest that there was no significant interaction between a participant's level of neuroticism and the level of anonymity in their condition on their working memory performance, $F(2, 44) = 0.46$, $p = .64$, $\eta_p^2 = .02$.

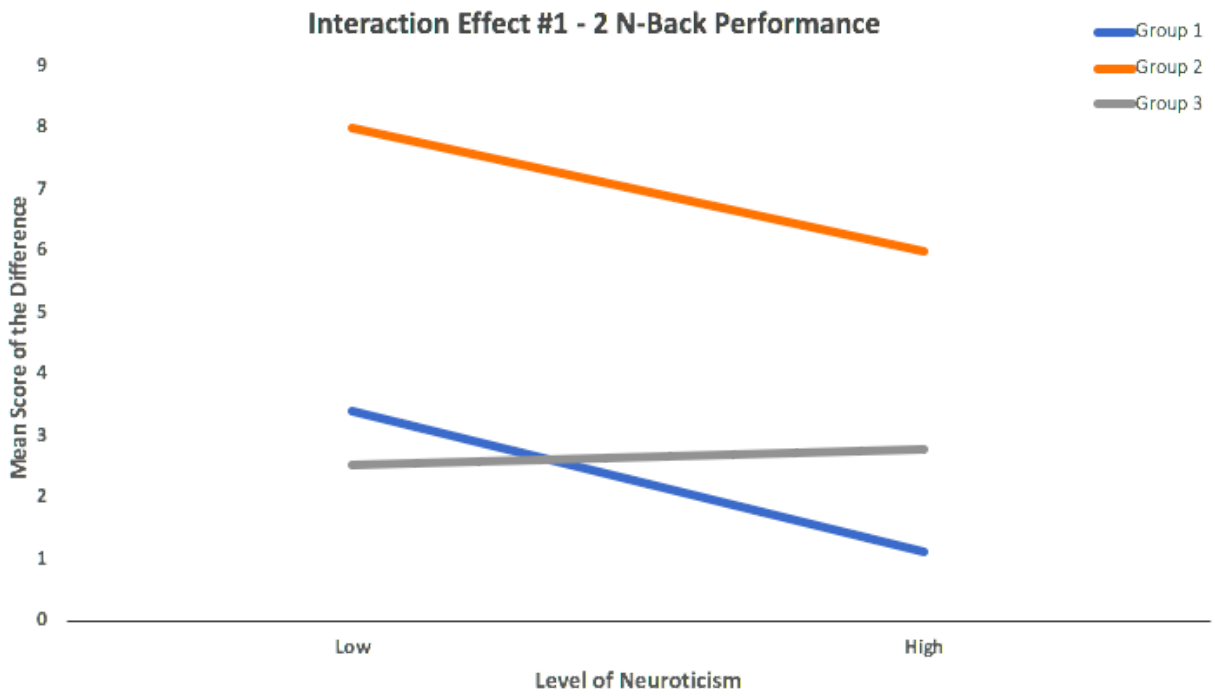

FIGURE 5. $F(2, 44) = 0.46$, $p = .64$, $\eta_p^2 = .02$. Mean Score consisting of average mean differences, for between groups' anonymity and neuroticism measures interaction effect on N-Back test performance.

Interaction Effect 2

There was no significant interaction between a participant's level of neuroticism and the level of anonymity on their stress level, $F(2, 45) = 2.29$, $p = .11$, $\eta_p^2 = .09$.

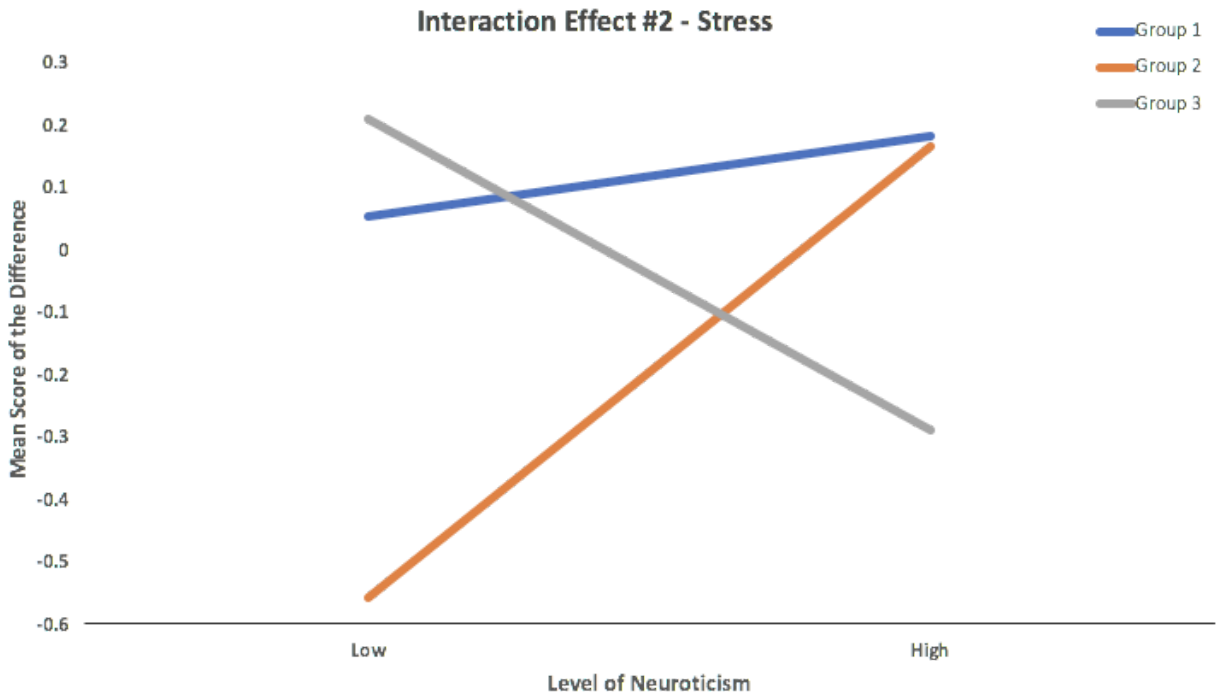

FIGURE 6. $F(2, 45) = 2.29$, $p = .11$, $\eta_p^2 = .09$. Mean Score consisting of average mean differences, for between groups' anonymity and neuroticism measures interaction effect on Stress.

Discussion

The goal of our study was to study how knowledge of other's scores and amount of neuroticism impact someone's performance. The present study shows no significant effect of the level of anonymity and student's level of neuroticism on the student's performance. Though results were not significant from our data, one can see students with high neuroticism have a lower mean score on the N-back test than students with low neuroticism level. There are studies done that support our hypothesis that a student with higher levels of measured neuroticism will show less improvement in their scores than those with lower levels of neuroticism. In Covin's study in 2003, the primary result showed that self-esteem correlated positively with the obtained score in the failure information group ($r=.32$, $p < 0.5$) (Covin, Donovan & MacIntyre, 2003).

Thus, it can be inferred that someone with a higher level of fear and anxiety will stress more, and this may negatively affect one's performance.

We also have hypothesized that when given knowledge of peer's success on a performance assessment, the student will show less improvement in their scores than those who were not given access to that information. The present study does not suggest if the level of anonymity of scores or knowing about other students' performance will affect a student's performance or not. But there are studies that have been conducted and that supports that social comparison may affect one's performance. According to the article "Effects of Generalized Self-Efficacy and Negative Social Comparison Feedback on Specific Self-Efficacy And Performance", it is well known that motivational variables are affected by feedback information about one's own performance. In real-life situations, performance feedback often contains not only information about one's own performance but also information about one's performance relative to peers (social comparison information). This shows that if one is less motivated then it may affect his/her performance negatively and one will perform poorly. In one study focusing on the manipulation check of feedback based on the analysis of variance and based on self-evaluation, data showed that only the main effect of feedback was significant ($F_{1,114}$=28.38, $p<.001$). That is, the participants in the Feedback group (M score = 3.9) gave a lower mean evaluation of their performance than the participants in the No feedback group (M score=6.3). The results suggest that the manipulation of feedback was valid. (Miyake, 2002). In short, there have been studies in supporting and not supporting our hypothesis like In another study by Chen, levels of competitive gameplay were manipulated to determine how social comparison and competition affect individual performance. The results of this study showed that there is

evidence to assume that competition or comparison between others will increase the performance of an individual.

Our study consist of 57 participants and the sample size wasn't too small but in future increasing the sample size may help us to get better results. Also, our study used the N-back test (2 back version) to measure participants' performance. We used N-back because it eliminates the risk of other confounds like for example if we have used a math test to measure the performance, it may not be that reliable. Also, it reliable as when we conducted a reliability measure, there was evidence of acceptable internal consistency reliability for scores on the neuroticism scale, α = .828. Also, it is easy to understand and complete the task and doesn't require any major skills to complete the test. Along with the strengths we have some limitations like we had limited time to conduct our study and our participants were only PSYC 1101 or PSYC 2015 students. In the future, this study can be extended to outside the GT. This may allow us to study the effect with different age groups and different professions which may be unknown confound variables. Also, after analyzing the data one reason for not getting the significant results could be because of weak manipulation of the independent variable that is the level of anonymity of peer's performance. Our findings also do not support our hypothesis that level of performance (mean score will be lower) if one knows the overall peer's performance. In our study, manipulation can be done strongly by sending the 2 confederates who did well in group 1 (session 1) out of the room or making the group of people who did well stand (session 2). This may have caused more stress and anxiety in participants especially in participants who have a higher level of neuroticism and we may get more significant data.

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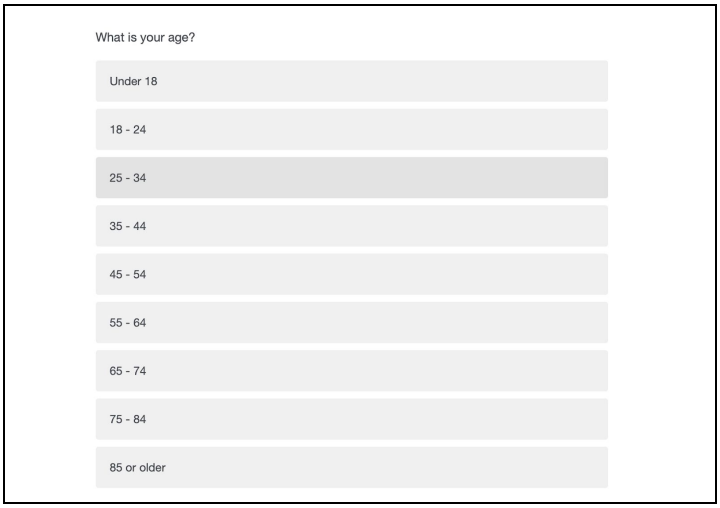
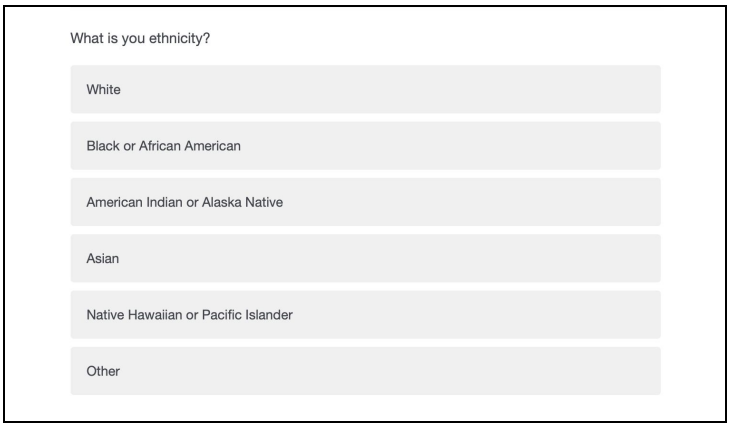
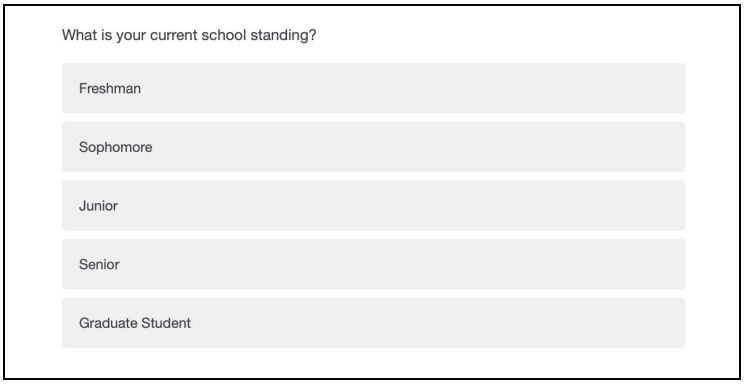
Appendix A

Demographic Response Questions







Appendix B

Neuroticism NEO-PI-R Vignettes

Please indicate the extent to which you agree with the following statements.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I get stressed out easily	○	○	○	○	○
I am relaxed most of the time.	○	○	○	○	○
I worry about things.	○	○	○	○	○
I seldom feel blue.	○	○	○	○	○
I am easily disturbed.	○	○	○	○	○
I get upset easily.	○	○	○	○	○
I change my mood a lot.	○	○	○	○	○
I have frequent mood swings.	○	○	○	○	○
I get irritated easily.	○	○	○	○	○
I often feel blue.	○	○	○	○	○

In order to gage the user's levels of neuroticism we used a modified version of the NEO-PI-R. This version consists of 10 items, all measured using a 5-point Likert scale. The participants were asked to respond to the vignettes with the extent to which they agreed with them. The second and fourth items will be reversed scored.

Appendix C

Stress Test Vignettes

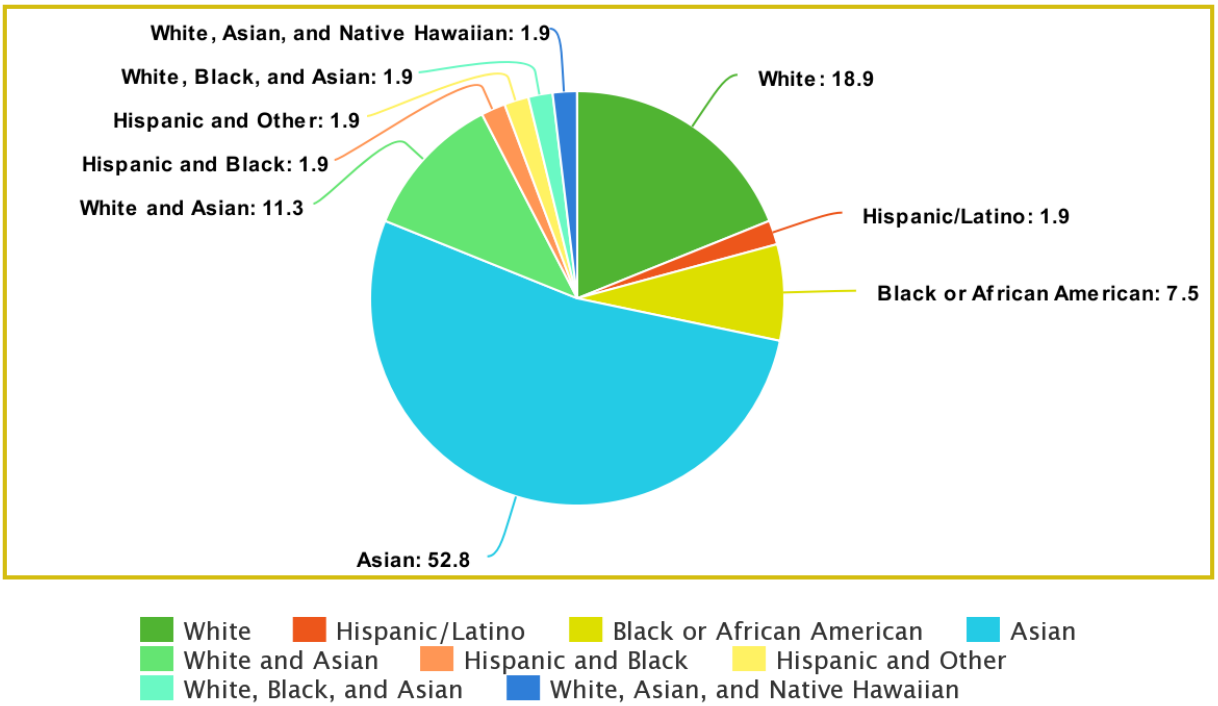
Please indicate the extent to which you agree with the following statements:

Item	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
My mind is currently racing.	◯	◯	◯	◯	◯
I feel a higher than average level of cognitive stress.	◯	◯	◯	◯	◯
I feel a higher than average level of physiological stress.	◯	◯	◯	◯	◯

In order to gage our participant's stress level, we will be using a 7-item Likert scale, asking them the extent to which they agree with the statements. None of the items will be reversed scored,

Appendix D

Demographics Pie Chart



Appendix E

Debriefing Document

Debriefing Document for Enrolling Adult Participants in a Research Study:
Georgia Institute of Technology

Peer Achievement on Performance

Thank you for your participation in the "Peer Achievement on Performance" research study at the Georgia Institute of Technology. The purpose of this study is to help us gain insight into how one's knowledge of their peers' performance on a specific task will change one's own performance on that task. We also hope to gain insight into how one's stress level changes while doing a task when given the knowledge of their peers' performance. In addition to the above, we also tested how an individual's neuroticism level affects stress level in a given situation. To obtain this data, we had all of the participants take a neuroticism assessment before the experiment. We also designed a qualtrics survey for participants to indicate their current stress level before the experiment and after. The N-Back test was used for the performance assessment to take out any differences in ability for specific subjects. Between the two iterations of the N-Back test, the instructor in each group made a statement regarding the scores of your group. These statements differed slightly to create multiple levels of knowledge of peer success, but the statements made were false statements to manipulate the desired effect. At this time, you may still withdraw your consent because we did not inform you of the deception. If you choose to withdraw your consent, we will not use your data.

If you have any questions about your rights as a research participant, you may contact Dr. Meghan Babcock at meghan.babcock@psych.gatech.edu. Note: this study was not approved by Georgia Tech's Institutional Review Board and is for classroom purposes only.

If you would like to receive a copy of the results, please let us know and we can email them to you at the conclusion of the study.

Please let us know at this time if you have any questions.

Thank you again for your participation!

Appendix F

Informed Consent Document Page 1

CONSENT DOCUMENT FOR ENROLLING ADULT PARTICIPANTS IN A RESEARCH STUDY
Georgia Institute of Technology

NOTE: THIS RESEARCH STUDY HAS NOT BEEN APPROVED BY THE GEORGIA TECH INSTITUTIONAL REVIEW BOARD AND IS FOR CLASSROOM PURPOSES ONLY (PSYC 2015).

Georgia Institute of Technology
Project Title: Peer Achievement on Performance

Investigators: *Meghan Babcock, Ph.D., Austin Neely, Anum Bhamani, Kelsey Silbert, Daisha White, Maria Ogunlusi*

Protocol and Consent Title: *Peer Achievement on Performance 11/01/19 v1*

You are being asked to be a volunteer in a research study.

Purpose:
The purpose of this study is to evaluate the effect of test scores and a student's neuroticism, on academic performance and stress levels. We expect to enroll 73- 75 people in this study.

Exclusion/Inclusion Criteria:
Participants must:
- Be 18 years or older and able to sit and participate
- Be a student enrolled at Georgia Tech
- Not be diagnosed with epilepsy.
- Be able to see a computer screen

Procedures:
- If you decide to be in this study, your part will involve one visit. The visit will take about 25 minutes. You will complete a revised NEO-PI-R neuroticism assessment and a questionnaire to identify demographic information. You will then be randomly assigned to one of three groups. Each group will be separated in different classrooms.
- Then you will be given a survey to measure your stress level, and once that is complete, you will be told to begin a memory assessment.
- The scores will be collected via a spot on your initial survey.
- After you complete the experiment we will give you a post assessment.
- The amount of time you will be in the classroom is no more than 30 minutes. Remember, you may stop at any time during this experiment.

Risks or Discomforts:
- The risks involved are no greater than those involved in daily activities such as using a computer.
- We do not anticipate any risks during this study. However, if you feel any discomfort at any time during this study, you may stop and will not lose any of the benefits of participating as a result of your withdrawal.

Appendix G

Informed Consent Document Page 2

Benefits:
You are not likely to benefit in any way from joining this study. We hope to evaluate the effect of test scores and a student's neuroticism on academic performance and stress level.

Compensation to You:
Instead of monetary compensation, Georgia Tech students will receive either course credit or class credit. If you have questions about course credit or extra credit, please contact psychology2015methods@gmail.com.

Confidentiality:
The following procedures will be followed to keep your personal information confidential in this study: Your privacy will be protected to the extent required by law. To protect your privacy, your records will be kept under a code number rather than by name. Your records will be kept in locked files and unless you give specific consent otherwise, only study staff will be allowed to look at them. Your name and any other fact that might point to you will not appear when the results of this study are presented or published. The Georgia Institute of Technology IRB, the Office of Human Research Protections, and/or the Food and Drug Administration may look over study records during required reviews.

Costs to You:
There are no costs to you, other than your time, for being in this study.

Questions about the Study:
If you have any questions about the study, you may contact Dr. M. Babcock by email at meghan.babcock@psych.gatech.edu.

In Case of Injury/Harm:
If you are injured as a result of being in this study, please contact Meghan Babcock, Ph.D., by email at meghan.babcock@psych.gatech.edu. Neither Meghan Babcock nor Georgia Institute of Technology has made provision for payment of costs associated with any injury resulting from participation in this study.

Questions about Your Rights as a Research Participant:

- Your participation in this study is voluntary. You do not have to be in this study if you don't want to be.
- You have the right to change your mind and leave the study at any time without giving any reason and without penalty.
- Any new information that may make you change your mind about being in this study will be given to you.
- You will be given a copy of this consent form to keep.
- You do not waive any of your legal rights by signing this consent form.

If you have any questions about your rights as a research participant, you may contact:
Ms. Melanie Clark, Georgia Institute of Technology
Office of Research Integrity Assurance, at (404) 894-6942.
[or]
Ms. Kelly Winn, Georgia Institute of Technology

Appendix H

Informed Consent Document Page 3

Office of Research Integrity Assurance, at (404) 385- 2175.

If you sign below, it means that you have read (or have had read to you) the information given in this consent form, and you would like to be a volunteer in this study.

_____
Participant Name (printed)

_____ _____
Participant Signature Date/Time

_____ _____
Signature of Person Obtaining Consent Date

Consent to Store and Share your Information:

I agree that my de-identified information/data may be stored and shared for future, unspecified research.

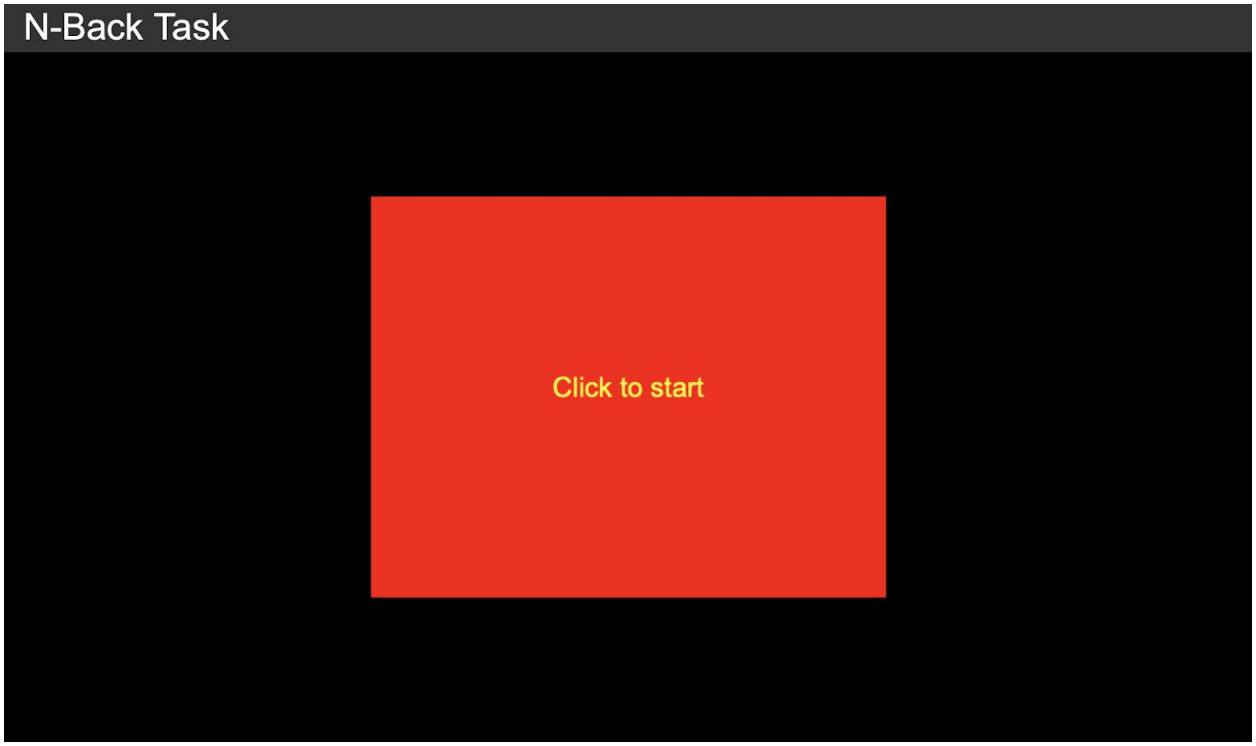
SIGNATURE _____

I do not allow my de-identified information/data to be stored and shared for future, unspecified research. These may only be used for this specific study.

SIGNATURE _____

Appendix I

N-Back Task Initial Screen



To see the full experiment in detail, please view the following website:

https://www.psytoolkit.org/cgi-bin/psy2.6.1/survey?s=9knN3 .