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Can't Test This: Test Performance and Anxiety

Brian Judd
Lindenwood University

Danielle Merli
Lindenwood University

Jamie Zagar
Lindenwood University

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Brian Judd, Danielle Merli, & Jamie Zagar

We analyzed test anxiety with performance on a standardized test. We had four groups of participants. We looked at two variables: time warning and presence of a confederate. We hypothesized that the performance of participants in a more natural test environment (testing in the presence of another test taker, i.e., the confederate) would perform worse than those who were tested by themselves, and that those who received a time warning would perform worse than those who did not receive a time warning. Those with a higher GPA would have performed better overall on the test. There was not a significant difference in test scores with a time warning. There was not a significant difference in test scores with the presence of a confederate.

This study analyzed the effects taking a test with the presence of a test taker and with a time warning. A time warning was given to two groups of participants at a minute and thirty seconds. A confederate took the test with participants in two groups. We believed that these variables (time warning and confederate) created anxiety that would affect the performance on a test. There were three specific purposes in this experiment. The first purpose was to determine whether the performance of participants in a more natural test environment (testing in the presence of another test taker) would perform differently than those who were tested by themselves. We believed that those taking the test in the presence of another test taker would perform less accurately than those who took the test alone. Secondly, we wanted to find out whether participants, who received a time warning, would perform differently than those who did not receive a time warning.

We hypothesized that participants not receiving a time warning would performed more accurately than participants who received a time warning during the test. Lastly, we wanted to determine whether academic success would correspond with the participants' performance on the test. We decided to focus our attention on the variables that may increase or decrease anxiety during a test. We also looked at GPA. We believed that those who had a higher GPA would have performed better on the test.

To grasp the effects of test anxiety, we reviewed journal articles dealing with test anxiety. One study dealt with the influence of perfectionism and math anxiety on a mathematics test (Tsui, & Mazzocco, 2007). The study introduced the timed versus untimed math test to gifted sixth graders. As hypothesized, Tsui and Mazzocco found that the performance of the participants on the timed math performance was less accurate than on the untimed math test. They used standardized tests to find each participant's level of math anxiety and perfectionism before and after the math tests. They also used repeated measures in their experiment. We suspected that the first test may have influenced the performance on the second test because of test familiarity, as well as if the second trial test was untimed.

In another study, Brewer (2002) compared the performance of nursing and general college students on a standardized anxiety test, the AAT. He found that all students had increased levels of debilitative anxiety. He used parts of the AAT that used two scales for measuring anxiety on future academic performance (Brewer). One scale assessed motivation anxiety toward taking a test. The second scale assessed the interference of anxiety on test performance. Each scale was scored separately. Brewer's results were significantly higher than previous research (Alpert and Haber in 1960) (as

cited in Brewer, 2002). He concluded that nursing and general college students are experiencing more anxiety now compared with students in the 1960s.

Hembree (1988) explored 562 studies to illustrate effects and treatment for anxiety on standardized assessments. Effect- size groups and relationship were being examined for steadiness with statistics. The statistics were a form of inferential statistics (Hedgkins & Olkin, 1985) (as cited in Hembree). Poor performance on a test was caused by anxiety (Hembree). A student's self-esteem decreased due to anxiety which correlates the decline in performance on an academic test. The consistency of high test performance and high grade point average (GPA) lowers one's level of anxiety. One of our study's hypotheses was that participants, who have a higher GPA, will perform better at the standardized test than those, who do not have a higher GPA. The higher performance was due to lower stress on the academic test. Test anxiety can be reduced if one performs better on a test and with a higher GPA. Therefore, Hembree found statically significant between low GPA and high test anxiety.

In another article, the experiment wanted to explain academic accomplishment. Musch and Broder (2007) wanted to test if harmful task-irrelevant beliefs during taking a test would be stressful and determine test performance. They wanted to test the performance on a statistics exam with the variable of test anxiety, study habits, and math skills. Two classes of introductory level of statistic had 66 undergraduate students who were involved in this study. The participants were tested during the class before the final exam and immediately after the participants completed the final exam. The students were also asked their final math grade in high school and were given a test anxiety

questionnaire. The experiment found test anxiety and math skills had statistical significance in performance. Study habits did not show any statistical significance.

Whitaker, Lowe, and Lee (2007) experimented with elementary and secondary school students with and without learning disabilities. The experiment wanted to see if test anxiety showed a significant difference with learning disabilities. All the participants completed the Test Anxiety Inventory for Children and Adolescents (TAICA). The TAICA is made up of Cognitive Obstruction/Inattention, Performance Enhancement/Facilitation Anxiety, Physiological Hyperarousal, Social Humiliation, Worry, and Lie. Participants with learning disabilities showed a total test anxiety was above .90, which shows statistical significance. Students, who have learning disabilities showed Cognitive Obstruction/Inattention and Worry scores were high and Performance Enhancement/Facilitation Anxiety and Lie scores were low. Students, who show a high level of test anxiety, do not perform as well as they can and are accounted for lower scores on standardized tests (Whitaker et al.).

Zachary A. Pashea (2008), a Lindenwood University graduate, experimented placing a large clock in front of participants to see whether their performance would be affected on a timed task. Participants were asked to find as many words they could solve in a word find, and the experimental group were told how much time they were given; this allowed them to know how much time they had left due to the large clock in front of them. The control group had the knowledge of how much time was given; however, there was not a clock positioned in front of them. Pashea wanted to determine whether the participants with the large clock set in front of them would find fewer words than the participants, who do not receive a clock. He figured that this would be resulted in test

anxiety. His hypothesis was not statistically significant between the two groups. Participant's time was another independent variable, which determined whether the two groups and the amount of time used to accomplish the timed tasked. This was not statistically significant between the experimental and control group.

In another article, Hancock (2001) wanted to determine student achievement and motivation was affected by certain factors. He found "learner characteristic, test anxiety, and the classroom variable, threat of evaluation" would affect a participant's achievement and motivation during tests. There were two groups-- high or low evaluative threat conditions, and the participants were randomly assigned to these groups. He found that the results were statically significant because there were interactions between the factors, which engaged to poor performance and low motivation. When the participants thought or felt they were under pressure, they felt threatened. Therefore, their level of attentiveness started to decline because of worrying how much time was left to complete the task (Hancock).

Sud and Kumar (2006) did a study on whether dysfunctional thoughts about careers and/or low motivation on achievement showed a relationship with high text anxiety. The study conducted 80 girls and 80 boys from Himachal Pradesh University in India. Sud and Kumar hypothesized these participants, who wanted a particular job, would focus more on their careers. Each participant was given three questionnaires, which included career thoughts inventory, achievement motivation scale, and test anxiety inventory. It was given to the participants in the same order as well. The three variables in the study were related through rational similarities. However, not knowing the true

definition of dysfunctional career thoughts through the field of psychology in India, the relationship's findings were not very strong.

A study completed by Schmit and Ryan (1997) looked at applicant withdrawal rate, also known as attrition, with racial differences. They tested 3,290 police officers. Those that withdrew were interviewed to find out why they dropped out of the study. There were 618 police officers that withdrew from the experiment. The remaining participants (2,714 officers) were given a pretest to measure test taking attitudes (Schmit & Ryan). They were given a general idea of the test and a study guide to use to help them with the test. The second test that participants were tested on was the content-validated exam for police officers. There were 2,054 officers who took the second exam. Out of those who dropped out of the study, there was a 50 percent response rate to telephone interviews (Schmit & Ryan). All interviews were structured. Schmit and Ryan found minimal race differences on test attitude. They concluded that African Americans were more likely to withdraw from their study. The effects of literacy, motivation, and comparative anxiety scales were small. The researchers also found that those officers with more test anxiety were more likely to stay in the study. Motivated persons were less likely to quit the study. There was not a significant difference with motivation, but Caucasians had higher motivation for taking tests because they believed in the value of testing.

Method

Participants

Seventy-six university students volunteered to participate in our study. The volunteer students were recruited through the Human Subject Pool and were able to sign

up, by means of the research project, signup sheet on Human Subject Bulletin Board on the fourth floor in Young Hall. The participants that volunteered in this study were from one of the following three classes: Basic Concepts of Sociology, Cultural Anthropology, and Principles of Psychology. Extra Credit was rewarded to volunteers for their participation in the study; there was no monetary compensation granted. Two participants' data were discarded. The first participant figured out that the confederate taking the test with her was an experimenter. She still received the participant's receipt for extra credit. The second participant was under the age of 18 years, failed to have parental consent, so he was given a participant's receipt only. He did not participate in the study.

Materials

In this study four different groups were tested. The participants in every group were given a standardized test. The groups were tested if given a time warning or took the test with another test taker would distract or overwhelm the participant's success on the test. The standardized test consisted of three subjects: Math, Grammar, and Science (ACT test practice questions) (see Appendix A). On each subject five questions were asked. All participants in each of the groups received the same standardized test; participants were given three minutes to correctly answer all the questions. Additional materials also used in study included a stopwatch to keep track of time and also allow experimenters to give a time warning to two of the groups. Pens were used to record the information and were given to the participants to utilize on the timed test and on necessary paperwork. A desk and chairs were also provided for the participants and experimenters. Required paper work was also given to the participants to fill out. This

paperwork included a questionnaire (see Appendix B), two informed consent forms (see Appendix C), experimenter's list of participants, a feedback letter (see Appendix D), and a receipt showing proof of participant took part in the study.

Procedure

The recruitment description and sign-up sheets were posted on the HSP bulletin board on the fourth floor of Young Hall. When participants arrived at the designate lab room for the experiment, they were given two informed consents forms (see Appendix C) to read and sign. One copy was given to the experimenters and the other was given to the participants for their own records. Each participant also signed the experimental participant list when they arrived.

Each participant was given a multiple choice test over three subject areas (see Appendix A). The areas included Grammar, Mathematics, and Science on an ACT level that was to be completed within three minutes (ACT test practice questions). Each subject area contained five questions, a total of 15 questions.

The experimenters chose to have four different groups to study. Group one was not given a time warning and did not take the test with another test taker. Group two took the test with another test taker without a time warning. Group three took the test alone but was given a time warning. Finally, group four was given a time warning in the presence of another test taker. A confederate test taker took the test with groups three and four. All tests had the same format.

After completing the test, each participant was given a survey to fill out about his/her experience with the experiment, as well as over his or her demographic information. The participant was debriefed about having a confederate test taker in the

room, as well as the purpose of the study. The experimenters also gave the participant a feedback letter and answered all questions the participant had about the experiment and when the results of the study would be available to him or her.

The participant was given the participant's receipt that both the experimenter and participant signed to be turned in the HSP office. The participant then took the receipt to the HSP office to receive bonus points for one of the three general classes of Anthropology, Sociology, or Psychology. All tests were graded after all the participants in one day took the test. Results of individual tests were not given to any participant.

Results

Out of seventy-four participants, based on our survey questions, we found that the self-reported average GPA was 3.28, with a standard deviation of .49. The percentage of native English speakers was 86.5 percent (64 participants), with a standard deviation of .344. The mean score for the stress level on the standardized test was 2.899, with a standard deviation of 1.08. The average test score was 4.04, with a standard deviation of 1.96. The average question that participants ended their test on was 9.55, with a standard deviation of 3.2. For those participants that received a time warning, the average number that they completed at 1 minute 30 seconds was 4, with a standard deviation of 1.4.

Group one (20 participants), in which participants were not given a time warning and did not take the test with another test taker, scored a mean of 3.95 out of a possible 15 points, with a standard deviation of 1.88. Group two (17 participants), in which took the test with another test taker without a time warning, scored a mean of 4.00 on the test, with a standard deviation of 1.9. Group three, combined of 20 participants, took the test alone but was given a time warning, scored a mean of 3.70, with a standard deviation of

2.39. Finally, Group four (17 participants), in which participants were given a time warning in the presence of another test taker, had a standard deviation of 1.54. We conducted a 2 (time warning) x 2 (confederate) analysis of variance. It did not reveal the main effects of time warning, $F(1, 70) = .136$, $p > .05$. or confederate, $F(1, 4) = 1.044$, $p > .05$.

Next, we examined the relationship between participant GPA and test score. We conducted a Pearson Correlation. We found a very weak positive correlation between the two. The Pearson Correlation was .165

Our group also decided to look at Groups three and four because they received a time warning at one minute and 30seconds. We wanted to see if the participants would increase their speed on the test from what number they finished at the time warning to the finish time of three minutes. We conducted a paired t-test to determine the difference between how many questions were completed during the first half and second half o the three minute test session and to find out if there was significance in speed. We used the time warning and the difference (ending question minus time warning question) to determine the relationship. We found that that speed did increase after the time warning, $t(36) = -5.379$, $p < .05$, $p < .001$. We concluded that those that received a time warning, overall, increased their speed on the standardized test by a significant amount.

Discussion

We were interested in Schmit and Ryan's (1997) study because of racial differences. We used pieces from a standardized test for our own experiment. We wondered if the questions on our test were biased toward Caucasians. Because English was not the first language for some of our participants, we were curious about the

understanding of the participants. As in Schmit and Ryan's study, they were concerned with racial and cultural differences with attrition rate. We were also concerned with the results of our study, if they would be accurate in testing and performance with test anxiety. We found it was interesting that the results of the attrition study showed that those who had a higher test anxiety were more likely to stick with the test environment. We would have liked further information about the testing environment, whether the participants were tested in groups or individually. It would have been ideal for our own experiment to test participants in groups, individually, and with a confederate. However, we would not have been able to control for the group environment as well as we could have with one confederate and experimenters with a participant.

It would have been ideal for us to have used the AAT or some other anxiety test to use with our study (Brewer 2002). However, it may have increased the level of anxiety of each participant on our test. If we would have added the systematic variable, our results could have been altered by a confounding variable that would have affected the systematic variance in a negative way.

Two of our hypotheses were not supported. We did not find a significant difference in test scores between those receiving a time warning and those who did not. We were not able to find a significant difference in test scores between participants taking the test with a confederate or by themselves. We believe that the time warning may have increased the speed of the participants in the time warning groups that may have influenced how fast and poorly they performed on the test. However, other factors that may have influenced all participants' scores were the following: lack of motivation to perform well, not understanding the standardized test, and the test environment of a

small, confined room. Those taking a test with the confederate may not have felt pressure from taking the test with someone because they might have felt that the confederate was older and might have known more answers because of school experience.

While we found a slight significance in the relationship between GPA and test score, it was not enough to declare it a high positive correlation. A main reason for this was that participants self-reported their GPA on the survey. Not all participants knew their GPA; some were freshmen and did not have a cumulative GPA for college; and some may have lied about their GPA in order to please us with a higher GPA (even though it would not have mattered to us). We did not have them fill out an additional consent form to find out their GPA. We decided not to because it was not our main hypotheses and required much more effort.

We were very interested in how much quicker participants performed on the test after receiving the time warning. We were not surprised to find that there was a significant difference between the number that participants in groups three and four completed at the time warning and what number they completed when the total time was up. We believed that people generally sped up once they found out how much little time they had left on a test. In our own experience, we have quickened our pace on exams we have taken. We applied the same thought process to our Can't Test This test.

Other variables that we found in our study may have influenced the results. One extraneous variable was not using the same confederate throughout the experiment. A second variable was noise level outside of the lab B that could not be controlled. People in the main lab of Y105 were extremely loud when studying, talking, or waiting. One of

our participants commented on how gross it was to hear the bathroom stall being flushed above our lab room. That was obviously distracting to our participants because it had occurred a couple times during a few of our tests. The lighting in the room was not ideal for test taking. After a while of giving tests, our eyes were exhausted.

After giving the surveys after each test, we noticed that we should have asked a couple of more questions relating to the independent variables of time warning and the confederate. We were unable to change our survey, and still have enough participants if we would have done a pilot test, because of the time we had to perform our experiment due to our own scheduling conflicts as well as deadlines in the class.

Due to the small sample size and taking a test with only one person there was not enough information to conclude which test taking environment is best. Those interested in the topic would have been advised to also examine the actual classroom environment, as well as testing alone, or with one confederate as a test taker in a classroom setting rather than in a small lab setting. Other suggestions were to come up with a way to motivate participants to want to do well on the exam, give participants an actual anxiety test either before or after the standardized test.

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Author Note

The authors wished to thank their fellow classmates in helping them review their methodology and research paper. A special appreciation was noted to Dr. Nohara-LeClair for her helpful ideas, revision, and knowledge with SPSS and conducting research. These researchers were proud to work on such a cooperative project with such great participants. A couple of the researchers were considering furthering their understanding of research methods by taking a senior research project class. For readers who were interested in learning more about the research and results, the researchers were able to be reached via email at the following email addresses: jaz458@lionmail.lindenwood.edu, Jamie Zagar; bmj496@lionmail.lindenwood.edu, Brian Judd; and dcm152@lionmail.lindenwood.edu, Danielle Merli.

Appendix A

Can't Test This!

Grammar

1. Everyone in the bank-including the manager and the tellers, ran to the door when the fire alarm rang.

A. tellers, ran

B. tellers:ran

C. tellers, had run

D. tellers-ran

E. tellers' ran"

2. After the hurricane, uprooted trees were laying all over the ground.

A. were laying

B. lying

C. were lying

D. were laid

E. was laid

3. The fact that boxing is known to cause head injuries and brain damage should lead us to inform the public and push for a ban on boxing.

A. should lead us to inform

B. could lead us to inform

C. should of led us to inform

D. will lead us to inform

E. should have led us to inform,

4. *The Diary of Anne Frank* showed a young girl's courage during two years of hiding.

A. showed a young girl's courage

B. shows a young girl's courage

C. did show a young girls courage

D. has shown a young girl's courage

E. showed a young girl's courage

5. In August my parents will be married for twenty-five years.

A. will be married for twenty-five years.

B. shall have been married for twenty-five years.

C. will have been married for twenty-five years.

D. will be married for twenty five years.

E. will have married for twenty-five years.

Math

1. Sarah is twice as old as her youngest brother. If the difference between their ages is 15 years. How old is her youngest brother?

A. 10

B. 15

C. 20

D. 25

E. 30

2. Which of the following fractions is equal to 5/6?

A. 20/30

B. 15/24

C. 25/30

D. 40/54

E. 2/7

3. If 3x=6x-15 then x + 8=

A. 5

B. 10

C. 11

D. 12

E. 13

4. The number of milliliters in 1 liter is

A. 10,000

B. 1,000

C. 0.1

D. 0.01

E. 0.001

5. A hockey team won 6 games and lost 8. What is the ratio of wins to number of games?

A. 6/8

B. 8/6

C. 3/7

D. 8/14

E. 6/7

Science

1. When the chromosomes line up in mitosis this is known as which phase?

A. Telophase

B. Anaphase

C. Metaphase

D. Prophase

2. Which of the following is not considered a characteristic or property of a gas?

A. Volume

B. Mass

C. Pressure

D. Particles

3. Organs repair themselves through a process of?

A. Meiosis

B. Mitosis

C. Cellular differentiation

D. Transformation

4. Litmus paper that is blue will turn/stay _____ in the presence of a strong base.

A. Orange

B. Red

C. Blue

D. Green

5. The first American to win a Nobel Prize was _____ for measuring the speed of light.

A. Albert Einstein

B. Albert Michelson

C. Grimaldi

D. Thomas Young

Answers

English

1. D
2. C
3. A
4. B
5. C

Math

1. B
2. C
3. E
4. B
5. C

Science

1. C
2. D
3. B
4. C
5. B

Appendix B

Survey Says

SUBJECT ID NUMBER:_____(Assigned by Researcher)

1. What is your cumulative GPA? _____
2. Are you a native speaker of English?_____
3. What school subject do you prefer?
   - **a.** Grammar
   - **b.** Math
   - **c.** Science
4. How confident are you with your test score?
   - **a.** Very confident
   - **b.** Somewhat confident
   - c. Not Confident
5. On a scale from 1 to 5, how would you rate your stress level (1 is very low and 5 is very high)?: _____

Appendix C

Informed Consent Form

I, _____ (print name), understand that I will be taking part in a research project that requires me to complete a short questionnaire asking about my personal experience taking tests, and I will participate in a timed test. To the best of my knowledge, I do not have any anxieties or opposition with taking a timed test with another test taker. I understand that I should be able to complete this project within 10 minutes. I am aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete the study. I understand that the information obtained from my responses will be analyzed only as part of aggregate data and that all identifying information will be absent from the data in order to ensure anonymity. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher(s) involved to my satisfaction. Finally, I verify that I am at least 18 years of age and am legally able to give consent or that I am under the age of 18 but have on file with the HSP office, a completed parental consent form that allows me to give consent as a minor.

_____ Date:_____

(Signature of participant)

_____ Date:_____

(Signature of researcher obtaining consent)

Student Researchers' Names and Numbers
Brian Judd (714)402-8788
Danielle Merli (618)779-4098
Jamie Zagar (618)401-1063

Supervisor:
Dr. Michiko Nohara-LeClair
Course Instructor
(636)949-4371
mnohara-leclair@lindenwood.edu

Appendix D

Feedback Letter

Thank you for participating in our study. The questionnaire was used in order to determine if being under pressure with another test taker or to be given a warning time would affect your performance on your test. This experiment was conducted in order to determine people's ability to perform better on test. There were four different participant groups in the study. Group one was not given a time warning and will not be taking the test with another test taker. Group two was given a time warning at one minute and 30 seconds. Group three took the test with another test taker. Group four was given a time warning at one minute and 30 seconds and will be in the presence of another test taker. We predicted that participants that were given a time warning and having another test taker in the room would not have as many correct answers on the standardized test. Participants that were not given a time warning and did the test alone, without another test taker in the room, would perform the best on the standardized test. All participants who have a higher GPA would perform better on the timed test than those participants who have a lower GPA.

Please note that we are not interested in your individual result; rather, we are only interested in the results of a large group of test takers, of which you are now a part of. No identifying information about you will be associated with any of the finding.

If you have any questions or concerns regarding any portion of this study please do not hesitate to bring them up now or in the future. Our information is found at the bottom of this letter. If you are interested in obtaining a summary of the findings of this study at a later date, please contact us and we will make it available to you at the completion of this project.

Thank you again for your valuable contribution to this study.

Sincerely,

Principal Investigators:
Danielle Merli 618-779-4098 dcm152@lionmail.lindenwood.edu
Brian Judd 714-402-8788 bmj496@lionmail.lindenwood.edu
Jamie Zagar 618-401-1063 jaz458@lionmail.lindenwood.edu

Supervisor:
Dr. Michiko Nohara-LeClair 636-949-4371 mnohara-leclair@lindenwood.edu