

The Effect of Test Anxiety on Performance Across Groups

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Introduction

Test anxiety varies by individual, and studies have shown that it is associated with a reduction in performance. Past findings suggest that individuals with ADHD and dyslexia overall report higher levels of test anxiety scores than peers. In this study we investigate how test anxiety varies across different groups (those with ADHD/Dyslexia compared to those who have no learning disability).

We hypothesized that when asked to complete a TAI (Test Anxiety Inventory), participants in the ADHD group and participants in the dyslexia group will overall have higher self-reported anxiety scores compared to our control group with no learning disability.

When it comes to actual performance on the test, these scores may not resemble the expected correlation that higher anxiety scores will be related to lower performance on the test. Lewandowski et al. (2012) suggest that individuals with ADHD only report higher anxiety, and their performance is not impacted by their disability. Carroll & Iles (2006) mention higher anxiety in students with dyslexia but do not mention anything about performance. Therefore, it was plausible that students with ADHD and dyslexia would score higher with self-reported test anxiety than the control group, but their performance may not follow the expected negative correlation between test anxiety and performance.

Another finding is that both ADHD and dyslexia have very high rates of comorbidity (Peterson & Pennington, 2012). In my study, this was considered and a questionnaire given to participants asked if they have multiple diagnoses. Individuals with comorbid disorders were tested, but they were asked what other diagnosis they have received so this could be accounted for. The only people who were not included in this study were individuals with both ADHD and dyslexia.

Methods

Participants were recruited primarily through an online college research participation system. This consisted only of currently enrolled college students. We intended to recruit a sample of approximately 90 students (30 students with dyslexia, 30 students with ADHD, 30 students with no learning disabilities). To determine if individuals had a diagnosis of ADHD or dyslexia, a survey was given to participants that asked if they have ever been given a diagnosis by a clinician. They then were asked what their diagnosis is and those with ADHD were to be grouped, those with dyslexia were to be grouped, and those with no learning disability were to be grouped. Due to the high comorbidity rates of dyslexia and ADHD, any person with both were not considered in the study.

The participants were recruited online from Ramapo College. The online participation system contained a link to a Qualtrics survey where they first were shown a consent form. This project was approved by IRB and participants received an informed consent and were debriefed after participation.

A subset of participants for the ADHD/dyslexia groups were recruited from office of specialized services at Ramapo College, with IRB approval. An email was sent to all students registered with the office of specialized services at Ramapo College.

Final sample consisted of 78 college aged adults (average age=19.385, range=18-28; 9 identified as male, 67 identified as female, 2 as non-binary).

18 participants identified as Hispanic/Latino, 12 participants identified as Asian, 7 identified as Black/African American, 53 identified as White, and 6 preferred not to say.

All had at least a high school diploma, 1 participant had an Associate's degree and 1 had a Bachelor's degree.

Methods

Measures

Test Anxiety

Each individual's test anxiety was recorded using a Test Anxiety Inventory (TAI) (*A Test Anxiety Inventory - University of Wisconsin-Eau Claire*). This scale is composed of 50 statements that the participant responded to with "True" or "False". Every "True" answer equates with higher anxiety in that area. The general categories being questioned are: concerns about how others will view you if you do poorly, concerns arising from threats to your own self image, concerns about your future security, concerns about not being prepared, bodily reactions, thought disruptions, and general test anxiety. The total number of "True" answers selected by participants was added up and a **percentage** was used for the anxiety score. The range is from 0 (not answering "True" on any statement) to 1 (answering "True" on all statements). The higher the score, the higher that person's self-reported test anxiety is.

Performance

This was measured by the **percentage of correct answers** (range 0-100) on a test consisting of questions taken from a brain teaser book. There were 60 questions in this portion of the survey, and all participants received the same questions in the same order. There were questions requiring mathematical reasoning, perceptual reasoning, and verbal comprehension. There were also some pattern driven questions.

Results

Descriptives for the Full Sample

The **mean TAI score** for all participants was .721 and the range was .240-.1 (std.= .156).

This suggests that the scores were fairly high for self-reported test anxiety, as a score of .721 is answering "True" on about 36 out of the 50 questions.

The average **performance test score** among all participants was 34.9% correct, the range was 5%-63.3% and the standard deviation was 12.3%. In order to assess the association between test anxiety score and performance on brain teaser tasks

Association between Test Anxiety and Test Performance

Pearson's product moment correlation was used with an alt hypothesis of a negative correlation (high test anxiety relates to lower performance). Results revealed no significant association between test anxiety and performance in the overall group ($r = -.102, p = .187$).

High vs. Low Test Anxiety Groups

Participants were then divided into two groups based on the **median test anxiety score** for the sample which was .74 (high TA vs. low TA). Participants who had .74 or higher on the TAI were placed into the high-test anxiety group, and those with lower scores were placed into the low test anxiety group.

We collapsed these samples because the original clinical group size was not big enough to answer our research question.

Group Differences between High and Low Test Anxiety Groups on Test Performance

An Independent Samples T-Test was used to assess how these two groups performed on the brain teaser task.

While no significant differences were found, the means were in the correct direction ($t(76) = .710, p = .240$). Mean for low TA: .359. Mean for high TA: .339.

Results

Group Differences between High and Low Test Anxiety in Control vs. Learning Disorder Groups.

We were also interested in investigating differences in performance in the typical (control) group as compared to the atypical or LD group.

The average TAI score for the control group was .728 (std.= .142) while the TAI score for the atypical group was .688 (std.= .208) for the average test score for the control group was .360 (std.= .121) as compared to .302 (std.= .127) for the atypical group. Although both groups performed worse than the researcher expected on the brain teaser tasks, the control group reported higher test anxiety and also they overall performed better on the brain teaser tasks.

Group Differences based on Timed versus Untimed condition.

The next analysis compared the brain teaser test condition for participants who received a timed test condition and participants who received an untimed test condition. Forty of the 78 participants randomly received the timed test condition, the remaining 38 received the untimed condition. The timed condition group had an average test score of .339 (std.= .128), while the untimed group had an average test score of .359 (std.= .12). The timed condition group also had an average TAI score of .727 (std.= .156), and the untimed condition group had an average score of .714 (std.= .157).

A 2x2 Analysis of Variance assessing performance based on LD group status and timed/untimed testing context

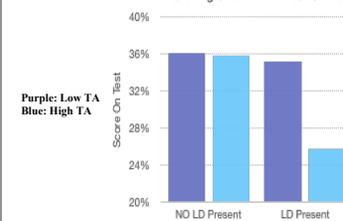
In the next set of analysis I used two 2x2 ANOVA's to look at group differences and timing on performance. The first ANOVA investigated performance based on the presence or absence of a learning disability (yes/no) and whether or not the participant received a timed or untimed test condition.

Neither of the main effects, or the interaction effect yielded a significant result however, the main effect for LD presence came close ($F(1,74) = 2.856, p = .095$). This suggests the presence of a learning disability may have had a larger effect on the test score than timed versus untimed conditions.

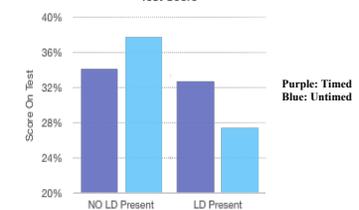
A 2x2 Analysis of Variance assessing performance based on LD group status and test anxiety group (high/low)

For the last analysis a 2x2 ANOVA was used to compare the role of test anxiety (high vs. low) for the full sample and learning disorder (absence vs. presence) on performance. None of these tests yielded significance, however, those with a learning disorder seemed to have lower scores on the brain teaser test ($F(1,74) = 2.387, p = 0.127$).

Interaction Between LD Presence and High/Low TA on Test Score



Interaction Between LD Presence and Timed/Untimed Condition on Test Score



Conclusion

Although no conclusive statements can be made, there were several observations that offer some scientific implications. The statistical test that was closest to being significant was the main effect analysis for whether or not participants reported having a learning disability and how that impacted their performance on the test. It is plausible the lack of participants, hence power, resulted in these findings failing to reach significance. Had we filled the groups as originally intended (and given my hypothesis was correct, I would have had a much better chance of reaching significance. The main effect of LD being so close to significance, along with the fact that neither the timed/untimed condition or the self-reported test anxiety score had as much of an effect, suggests that the presence of a LD may have been the most prominent predictor of success on the brain teaser tasks.

One limitation of this study was the lack of diversity in the participants. The participants were primarily female and white. There were very few participants outside of those parameters. This study also has very little external validity as all participants were college students recruited from Ramapo College of New Jersey. Another limitation is that, since the participants were college students and they had no incentive to perform well, there is the possibility that several individuals put minimal effort into their answers. Another limitation of this study is that the "atypical" group was a convenient sample, resulting from being unable to recruit enough participants for distinct dyslexia/ADHD groups. There is also quite a bit of diversity in this group as diagnoses were anywhere from visual processing disorders to oppositional defiant disorder to aspergers. It is possible that because of these differences, the tests assessed something different from what was originally intended. It is possible that test anxiety works very differently with each of the different diagnosed conditions, therefore these different anxiety profiles may make the results misleading.

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