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Examining the Interaction of State and Trait Anxiety on Working Memory Performance

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Authors Note

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ABSTRACT

Anxiety affects a large number of adults everyday; with so many people affected it is important to know the exact challenges these individuals face. Anxiety is thought to affect cognitive function, which can disturb daily life, such as academic endeavors. It has been hypothesized that anxiety specifically influences working memory. A number of studies have looked at how state anxiety affects working memory and how trait anxiety affects working memory, but only a relatively small amount of studies have looked at the interaction of trait and state anxiety on working memory performance. In this study 44 participants completed a PROMIS anxiety questionnaire to measure trait anxiety and completed either a pressured counting activity or normal counting activity as a state anxiety manipulation. Shortened working memory tasks were administered before and after the state anxiety manipulation. It was hypothesized that individuals with higher anxiety scores on the PROMIS anxiety questionnaire would be more affected by the pressured counting task and in turn score lower on their second working memory task. However, no effect of trait or state anxiety, or their interaction, on working memory scores was found.

Examining the Interaction of State and Trait Anxiety on Working Memory Performance

One in five adults is estimated to have a mental illness, with anxiety disorders being the most common (i.e. 31.1%) (“Any Anxiety Disorder,” 2017). With such a large portion of our population suffering from anxiety, it is important for us to understand how it affects everyday life such as school, work, and relationships. It turns out anxiety can have a very serious effect on academic performance and educational achievements. In fact, people who have an anxiety disorder are 1.4 times more likely to drop out of high school or college (Kessler, Foster, Saunders, & Stang, 1995). Van Ameringen, Mancini, and Farvolden (2003) found that the failure to graduate was directly related to the anxiety as described by the participants. With anxiety disorders having such a serious effect on academic performance, it begs the question of why. What exactly about anxiety causes such a struggle in academic endeavors?

One possible contributor is that there is a link between anxiety and cognitive functioning, including working memory. This is not a new idea; in 1946 Rashkis and Welsh (1946) tested how anxiety affected scores on the Wechsler scale. Most notably, participants with anxiety performed worse on digit span task and had temporary inefficiency with information; the participants seemed to know the answers but were unable to recall them (Rashkis and Welsh, 1946). Moldawsky and Moldawsky (1952) also found that anxious individuals did poorer on a digit span task. These studies show that the idea of anxiety negatively affecting cognitive function is not a new notion.

More recent studies have delved deeper into this issue, but have a mixture of results. One study found that after requiring subjects to participate in the Trier Social Stress Task (i.e., a state anxiety manipulation) they were less accurate in phonological 2

and 3-back tasks (Schoofs, Preuss, & Wolf 2008). A study by Olver, Pinney, Maruff, and Norman (2013) had similar findings; the stress from the Trier Social Stress Task impaired spatial working memory as well as non-working memory measures (i.e. delayed verbal recall and attention). But all of the literature is not in agreement. Hoffman and Mustafa (2003) also implemented the Trier Social Stress Task and while they found that this task did, in fact, increase participant anxiety, this anxiety did not affect performance on any of the measures including working memory measures such as digit span or visual memory span. Like Hoffman and Mustafa (2003), Banks, Tartar, and Tamayo (2015) found that a writing stressor task, while it did elicit stress, did not affect the participants' scores on an automated operation span.

With such different findings within the literature, one begins to wonder what is causing the discrepancy. Bohnen, Houx, Nicolson, and Jolles (1990) tested cognitive performance after subjecting participants to mental fatigue. They found that the mental fatigue did induce stress, as shown in higher cortisol levels, and this did lead to poorer performance on cognitive testing (i.e., verbal memory, concept shifting and divided attention). Although an increase of cortisol levels was seen in the experimental group, certain participants had much higher increases in cortisol levels as compared to other participants within the experimental group. These participants with the highest increases showed the lowest performance when retested on working memory. From this an interesting conclusion was made; they believed that "stress response is not caused by the aversive or noxious nature of the stressor per se, but by the ability of the subject to cope with the stressor." One could argue that the differences in findings have to do with whether a participant has trait anxiety or not. Having an anxiety disorder may lower one's

ability to cope with a stressor. This idea has been proven true by a handful of experiments. Hood, Pulvers, Spady, Kliebenstein, and Bachand (2015) followed the same general experiment outline as the others. They tested participants on working memory with a letter-number sequencing task and digit span task. They placed some participants in a stressful environment and then retested working memory. But by also testing for trait anxiety using the Beck Anxiety Inventory, Hood and colleagues (2015) added a new element to the research. They used a cold-water compress placed on the forehead to induce stress in subjects, but this did not affect performance on the working memory tests unless the participant had a higher score on the Beck Anxiety Inventory. This reinforces the idea that individuals with trait anxiety will be more negatively affected by the stressful situations than a healthy individual. Edwards, Moore, Champion, and Moore (2014) also looked at the effect trait anxiety had on working memory. Edwards and colleagues had participants self-rate their trait anxiety, placed stress on participants through a pressured counting task, and then gave an automated operation span task. Much like Bohnen and colleagues' (1990) conclusion, Edwards, Moore, Champion, and Moore (2014) found that higher trait anxiety was associated with poorer efficiency but only for those who reported higher situational stress. These findings seem to imply that for stress to affect working memory, you must have an individual with trait anxiety who has been put in a situation they deem anxiety or stress inducing.

Actually, these findings begin to make sense when considering Yerkes-Dodson Law. Yerkes and Dodson (1908) found that when they lightly shocked mice they were more motivated to complete a maze. But, if the shock was increased too high it had the exact opposite effect as the mice ran about aimlessly looking for an escape. Yerkes and

Dodson created a bell curve to show their findings now named the Yerkes-Dodson curve. The curve shows the relationship between performance and arousal (see figure one). It shows that a small amount of stress will cause an individual to perform better, but too much stress will lower performance. This same curve has been experimentally proven to be true in humans as well (Wu, Pan, & Chen, 2017). When applying this to the current study, it's possible that individuals with trait anxiety are further along the curve and putting them under stress pushes them past optimal performance.

The present study was designed to look at how trait anxiety affects working memory after inducing stress. It was hypothesized that individuals with trait anxiety would be more affected by the stress-inducing task and because of this perform more poorly on working memory tasks. There are few studies that have looked at both state and trait anxiety and their interactions. This study had a similar setup to Hood and colleagues (2015) and Edwards and colleagues (2015).

Methods

Participants

For the experiment, 48 participants were recruited. They were all LSU students who received course credit for participation in the study. Students with high and low levels of trait anxiety were included. All participants filled out a consent form and were informed that they may be put under stress during the study. Participants were free to stop the study at any time.

4 participants' data was not used in the study due to improperly saved data leaving 44 participants. The racial/ethnic composition of the sample was as follows; 34 were Caucasian, 5 were African American, 4 Asian American/Pacific Islander, and 1 was

Hispanic. 26 participants were female and 18 were male. All participants were between the ages of 18-22 years old. There were 22 students in the control condition and 22 students in the experimental condition. Based on the PROMIS scores, 19 participants fell in the ‘none to slight’ category, 12 in the ‘mild’ category, 12 in the ‘moderate category’, and 1 in the ‘severe’ category. Originally the moderate and severe groups were labeled high trait anxiety and the none to slight and mild groups were labeled low trait anxiety. However, due to our low number of ‘high’ trait anxiety participants per clinical cutoffs, the parameters were changed to better balance our sample. The median of the PROMIS scores from the participant pool was found, which was 16, and the groups were split based on this median. A PROMIS score of 17 or greater was labeled as high trait anxiety and a PROMIS score of 16 or lower was labeled as low trait anxiety. Based on the median split 20 participants were categorized as high trait anxiety and 24 were categorized as low trait anxiety. This change moved 6 of the formally “low anxiety” to the “high anxiety” group.

Measures

PROMIS Emotional Distress— Anxiety—Short Form

The PROMIS emotional distress short form for anxiety is a 7 question, self-rated questionnaire that has been proven to gauge levels of anxiety (Betterham, Sunderland, Carragher, & Callear). The questions include statements such as “I felt fearful” and “I felt anxious” which they rank on a Likert scale of 1-5 on how often they have felt that way in the past seven days (see Appendix A). The PROMIS is an easy, quick, and affordable way to test for general trait anxiety. The PROMIS scores fit into one of four categories, “none to slight”, “mild”, “moderate”, or “severe” based on national normative data.

Participants were labeled high or low trait anxiety by comparison to the median of the pool of participants' scores on the PROMIS short form.

Shortened Domain-General Measure of Working Memory

There is a plethora of different working memory tasks and tests; unfortunately many of these tests are extremely time-consuming. Oswald, McAbee, Redick, and Hambrick (2014) successfully created a shortened computerized domain-general measure of working memory. They were able to do so by representatively sampling items from three existing complex working memory span tasks: operation span, reading span, and symmetry span. Operation and reading span are shortened by presenting 6 trials instead of the traditional 15 trials. These shortened measures save 15 to 25 minutes and are still accurate. The shortened version takes approximately 10-15 minutes depending on the participant. The operation and reading span shortened measure of working memory were implemented in the current study.

Pressured Counting Task

Edwards and colleagues (2014) utilized a pressured counting task as a stress-inducing measure. The task requires the participant to count backward aloud from 1002 by increments of 13 as quickly as possible. It was emphasized that this task is extremely important to the study so the participant should do their very best. The participant was also told that most people get about 10 answers correct when in reality most people only answer 3 or 4 correctly. The experimenter added pressure by telling the participant to correct any mistakes made, tell them they are counting too slow, and to count faster. At the end of the task, the participant was told the task would be repeated at the end of the experiment, although it was only to be administered once. This task has a lot of benefits,

it is quick and easy to give and it also seems similar to a working memory test, so the participant may not be aware of the true purpose of the task. The downside of this pressured counting task is it has not been utilized in many studies. At the completion of the study the participants will self-rate their anxiety during the counting task to ensure that it had the desired effect.

The control group was asked to count forwards starting at 1 at any pace they feel comfortable for 60 seconds.

Procedure

To begin participants were given the PROMIS anxiety questionnaire. After completing the PROMIS participants completed the shortened working memory test to obtain a baseline working memory score. Following this, subjects either participated in a pressured counting task or simple counting task, based on random assignment of groups. Following the stress-inducing or non-stressful exercise, participants again completed the working memory tasks. To finish, the participants were given a demographics sheet with a manipulation check worked in. The post questionnaire asked the participant how they felt after completing each task, both working memory test and also the stressor or normal counting task to ensure the pressured counting task increased levels of anxiety (see Appendix B).

Results

The experiment was a 2x2 factorial design with two independent variables, state anxiety and trait anxiety. Both independent variables were between subjects. The four groups were high state anxiety control, high state anxiety experimental, low state anxiety control, and low state anxiety experimental (see Table 1).

Prior to running the main analyses, anxiety ratings made by the control group and experimental group were compared as a manipulation check. Results confirmed that the state anxiety manipulation was associated with increased self-rating of anxiety, ($F(1,42)=6.645, p=.014$). The control group had an average stress rating of 1.64 during the counting task, while the experimental group had an average stress rating of 2.46 during the counting task. The experimental average was near the mid-point between “a little bit” and “moderately”.

Two mixed ANOVAs were run using two between-subjects variables (i.e., group and trait anxiety) and one within-subject variable (i.e., first or second assessment, or time) with operation or reading span score as the dependent variable.

For operation span, neither the effect of time ($F(1,40) = 1.23, p > .05$) nor the interaction of group and time ($F(1,40) = 3.01, p > .05$) or trait anxiety and time ($F(1,40) = 0.05, p > .05$) or the interaction of time, group, and trait anxiety ($F(1,40) = 0.60, p > .05$) was significant. When collapsing across time, group ($F(1,40) = 1.44, p > 0.05$) and the interaction of group and trait anxiety ($F(40,1) = 0.25, p > .05$) were not significant. However, trait anxiety was significant ($F(40,1) = 6.63, p < .05$); those with higher trait anxiety did better on average on operation span (Figure 2).

For reading span, neither the effect of time ($F(1,40) = 0.91, p > .05$) nor the interaction of group and time ($F(1,40) = 0.54, p > .05$) or trait anxiety and time ($F(1,40) = 0.41, p > .05$) or the interaction of time, group, and trait anxiety ($F(1,40) = 0.18, p > .05$) was significant. When collapsing across time, group ($F(1,40) = 0.18, p > 0.05$) and the interaction of group and trait anxiety ($F(40,1) = 0.13, p > .05$) were not significant.

However, anxiety was significant ($F(40,1) = 6.63, p < .05$); those with higher trait anxiety did better on average on reading span (Figure 3).

A univariate ANOVA was run to compare anxiety scores of the groups after the second computer task. There was no significance in anxiety scores at the end of the second computerized working memory task ($F(1,40)=2.783, p > .05$)

Discussion

This study intended to look at how the interaction of state and trait anxiety would affect working memory, specifically on operation and reading tasks. Multiple studies of similar designs have been run to investigate if and how anxiety affects working memory. However, these studies have yielded mixed findings. Nonetheless, it was hypothesized, based off of Yerkes-Dodson curve (1908), that individuals with high trait anxiety would be more affected by state anxiety and in turn lead to negative effects on working memory tasks. However, this hypothesis was not supported. Of note, this does not appear to be due to a failure of the state manipulation as those in the high state anxiety condition (i.e., pressured counting task) reported more anxiety than those in the low anxiety condition.

Although not predicted, a positive effect of trait anxiety on working memory performance was found. These findings directly contradict Processing Efficiency Theory, which states that individuals with high levels of trait anxiety will have impairments in processing and cognitive function, including working memory (Eysenck, Derakshan, Santos, & Calvo, 2007). This theory has been supported in multiple studies (e.g., Lukasik, Waris, Soveri, Lehtonen, & Laine, 2019). However, of note, the high anxiety group in this study did not all have high anxiety per normative values; therefore, it is not clear how the findings of this study will generalize to those with clinical levels of anxiety.

It may be that the group in this study had greater levels of arousal on the task which benefitted performance and even under stress that arousal did not reach the level to cause problems with performance.

The literature on anxiety and working memory has been mixed. The null findings here for both state and trait anxiety are consistent with prior work (Hoffman and Mustafa, 2003; Banks, Tartar, and Tamayo, 2015; Olver, Pinney, Maruff, and Norman, 2013). If more studies continue to find similar results it may suggest that anxiety, at least at the levels studied in these studies, does not have a consistent large effect on working memory.

This study was different than other studies in how stress was created in participants. This study used a quick counting task to induce stress and anxiety. Although quickly administered, it did cause significant amounts of anxiety in the experimental group as compared to the control. A probable reason for mixed findings within the literature could be due to the different stress manipulations utilized in each study. There could possibly be a threshold or level of stress that must be met in order to cause a decline in working memory scores. While the manipulation in this study was stressful, it's possible it may not have been stressful *enough*. The mean rating in the experimental group was near the mid-point of a 5-point scale. This may be the case for other studies, as well. Future studies could look into a potential threshold of stress by comparing low, medium, and high levels of stress manipulation to see if there is a difference in working memory results.

The pressured counting task only lasted for one minute, while the working memory task takes 15-30 minutes to complete. The participants began the task stressed,

but how long that stress lasted is unknown. By the end of the working memory task there was no difference in self reported stress between the groups. This may be a reason for the null findings, the stress response in participants may not have been long lasting enough to cause impairment in working memory. In future studies the duration of stress should be accounted for to ensure the chance of impairment.

Additionally, a stress-inducing task will create different levels of stress in each participant. The pressured counting task is notably subjective in stress caused to each participant due to its emphasis on mathematical abilities. Data was not taken on the number of responses given in the 60 seconds, however there were participants unable to give a single response, while others were able to give several responses. Math ability and confidence would have an effect on the level of anxiety that the task caused.

The literature on anxiety and working memory has been mixed (Hoffman and Mustafa, 2003; Banks, Tartar, and Tamayo, 2015; Olver, Pinney, Maruff, and Norman, 2013). One factor that may contribute to variable findings in the literature is that across studies different cognitive and working memory tasks were used. With such different tasks focusing on different cognitive functions they are difficult to compare. While state and trait anxiety may show an interaction on digit span scores, for example, this may not hold true for reading span, etc. Replicating studies using the same measures of working memory would allow for answers on what areas, if any, of cognitive functioning and working memory are affected by state or trait anxiety. Working memory is important for reasoning and the guidance of decision-making and behavior and school and day-to-day activities. Future studies should continue to explore how anxiety may be related to

working memory in order to determine whether there are certain circumstances in which it may affect working memory and everyday abilities that involved working memory.

One major limitation of this study that needs to be addressed is the small sample size; with only 44 participants it is difficult to find a main effect. This small sample size led to an additional limitation, a newly defined ‘high’ trait anxiety group. Originally, high trait anxiety was to be a raw score of 20 or higher on the PROMIS inventory, which is in the moderate to severe range. But due to the low number of ‘high’ trait anxiety participants the parameters were changed to better balance our sample. This caused 6 individuals not previously marked as “high anxiety” to be included in the high anxiety group. Other experiments have also used a median split to define high and low trait anxiety (Bohnen et al., 1990). Other studies used percentile ranks (Hood et al., 2015). However, Edwards, Moore, Champion, and Moore (2015) defined high trait anxiety based on the definitions laid out by their anxiety form and produced positive results. If anxiety can in fact impair working memory abilities, it is possible the individuals that were moved to high trait anxiety may not have had high enough levels of anxiety to cause this impairment. Their working memory scores may not have shown much, if any change, and with such a small sample it is possible this alteration could have caused a difference in findings.

It would be beneficial to repeat this study with a larger sample size to better establish if working memory is affected by anxiety. Additionally, studies focusing on the stress-inducing task and the levels of anxiety they produce may give answers to the discrepancy within the literature. However, these findings do not support that anxiety affects working memory abilities.

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Table 1

Experimental Design

	Trait Anxiety	No Trait Anxiety
Pressured Counting Task	Trait anxiety + Pressured counting task	No trait anxiety + Pressured counting task
Normal Counting Task	Trait anxiety + Normal counting task	No trait anxiety + Normal counting task

Note. 2x2 factorial design, all groups are between subjects

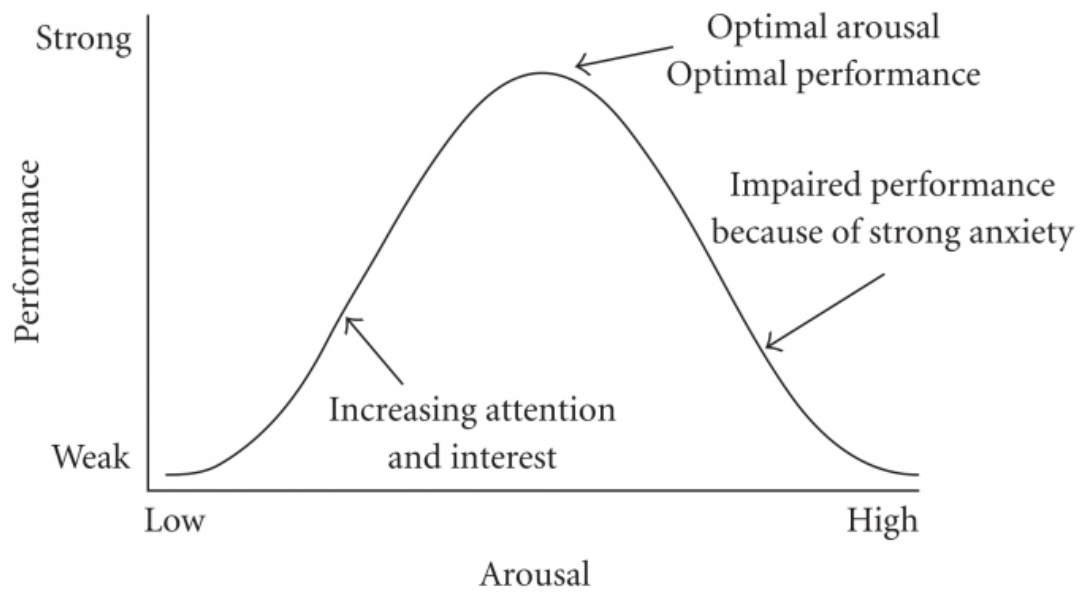


Figure 1: This figure shows the bell-curve of performance vs. arousal.

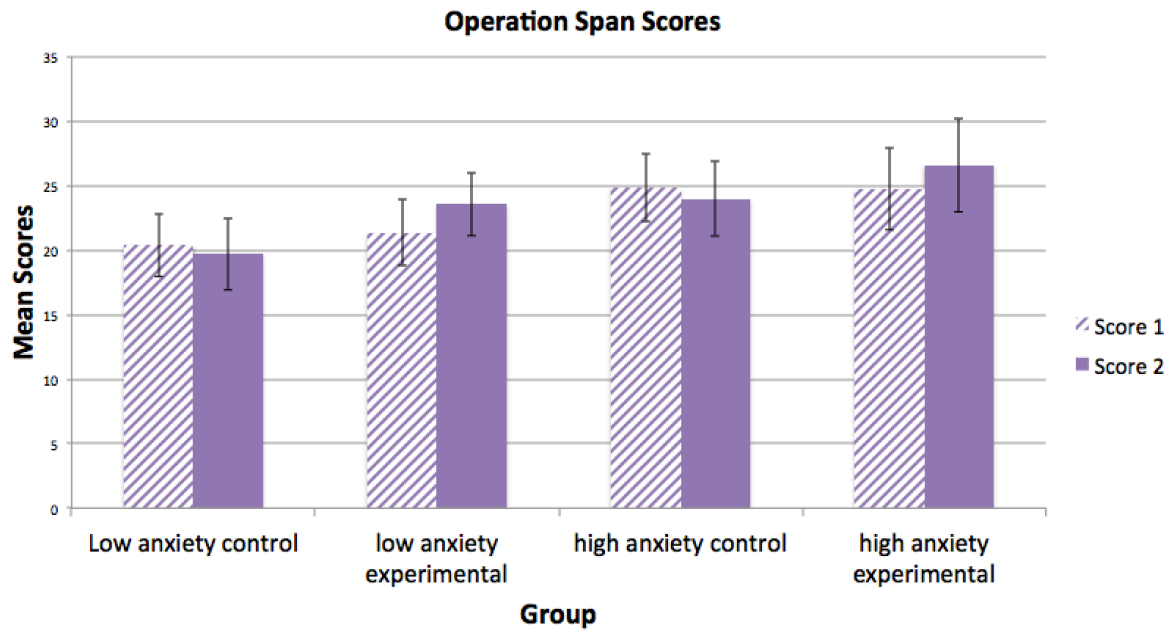


Figure 2: Mean Operation Span Scores compared within groups with standard error.

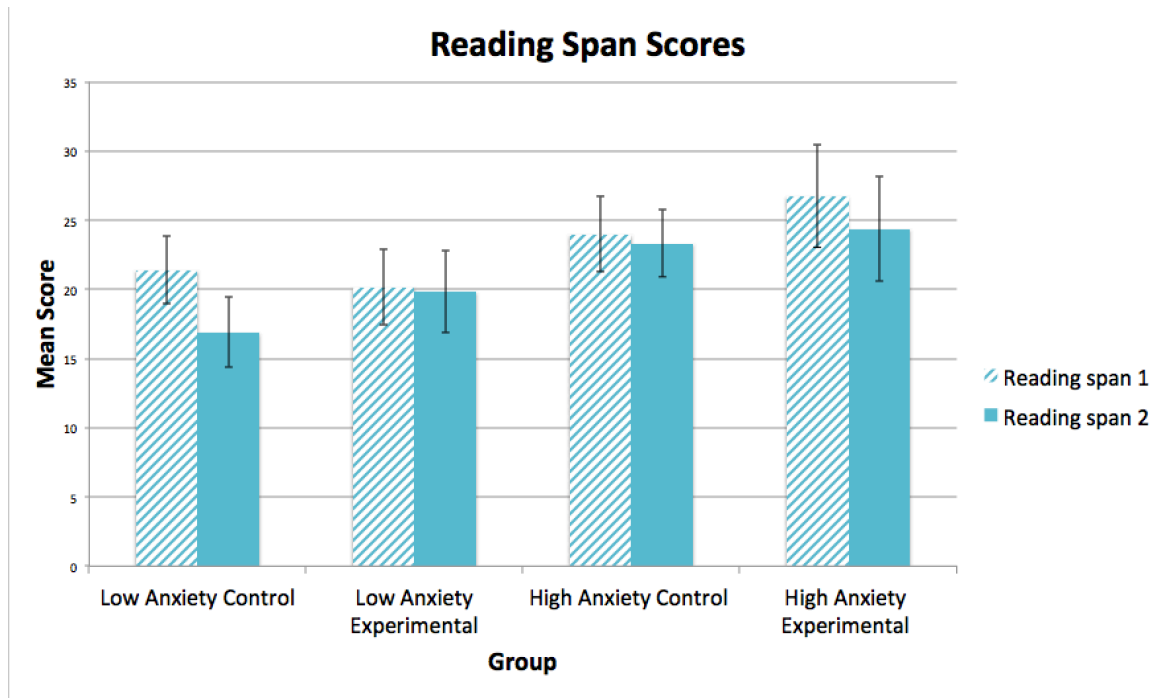


Figure 3: Mean Reading Scores compared within groups with standard error.

Appendix A

Methods. PROMIS Emotional Distress— Anxiety—Short Form

LEVEL 2—Anxiety—Adult*

*PROMIS Emotional Distress—Anxiety—Short Form

Name: _____ Age: _____ Sex: Male Female Date: _____

If the measure is being completed by an informant, what is your relationship with the individual? _____

In a typical week, approximately how much time do you spend with the individual? _____ hours/week

Instructions to patient: On the DSM-5 Level 1 cross-cutting questionnaire that you just completed, you indicated that *during the past 2 weeks* you (individual receiving care) have been bothered by “feeling nervous, anxious, frightened, worried, or on edge”, “feeling panic or being frightened”, and/or “avoiding situations that make you anxious” at a mild or greater level of severity. The questions below ask about these feelings in more detail and especially how often you (individual receiving care) have been bothered by a list of symptoms **during the past 7 days**. Please respond to each item by marking (✓ or x) one box per row.

In the past SEVEN (7) DAYS....						Clinician Use
	Never	Rarely	Sometimes	Often	Always	Item Score
1. I felt fearful.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
2. I felt anxious.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
3. I felt worried.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
4. I found it hard to focus on anything other than my anxiety.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
5. I felt nervous.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
6. I felt uneasy.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
7. I felt tense.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
Total/Partial Raw Score:						
Prorated Total Raw Score:						
T-Score:						

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Instructions to Clinicians

The DSM-5 Level 2—Anxiety—Adult measure is the 7-item PROMIS Anxiety Short Form that assesses the pure domain of anxiety in individuals age 18 and older. The measure is completed by the individual prior to a visit with the clinician. If the individual receiving care is of impaired capacity and unable to complete the form (e.g., an individual with dementia), a knowledgeable informant may complete the measure as done in the DSM-5 Field Trials. However, the PROMIS Anxiety Short Form has not been validated as an informant report scale by the PROMIS group. Each item asks the individual receiving care (or informant) to rate the severity of the individual’s anxiety **during the past 7 days**.

Scoring and Interpretation

Each item on the measure is rated on a 5-point scale (1=never; 2=rarely; 3=sometimes; 4=often; and 5=always) with a range in score from 7 to 35 with higher scores indicating greater severity of anxiety. The clinician is asked to review the score on each item on the measure during the clinical interview and indicate the raw score for each item in the section provided for “Clinician Use.” The raw scores on the 7 items should be summed to obtain a total raw score. Next, the T-score table should be used to identify the T-score associated with the total raw score and the information entered in the T-score row on the measure.

Note: This look-up table works only if all items on the form are answered. If 75% or more of the questions have been answered; you are asked to prorate the raw score and then look up the conversion to T-Score. The formula to prorate the partial raw score to Total Raw Score is:

(Raw sum x number of items on the short form)

Number of items that were actually answered

If the result is a fraction, round to the nearest whole number. For example, if 6 of 7 items were answered and the sum of those 6 responses was 20, the prorated raw score would be $20 \times 7 / 6 = 23.33$. The T-score in this example would be that T-score associated with the rounded whole number raw score (in this case 23, for a T-score of 63.8).

The T-scores are interpreted as follows:

- Less than 55 = None to slight
- 55.0—59.9 = Mild
- 60.0—69.9 = Moderate
- 70 and over = Severe

Note: If more than 25% of the total items on the measure are missing the scores should not be used. Therefore, the individual receiving care (or informant) should be encouraged to complete all of the items on the measure.

Frequency of Use

To track change in the severity of the individual’s anxiety over time, the measure may be completed at regular intervals as clinically indicated, depending on the stability of the individual’s symptoms and treatment status. For individuals with impaired capacity, it is preferred that completion of the measures at follow-up appointments is by the same knowledgeable informant. Consistently high scores on a particular domain may indicate significant and problematic areas for the individual that might warrant further assessment, treatment, and follow-up. Your clinical judgment should guide your decision.

Anxiety 7a Short Form Conversion Table		
Raw Score	T-score	SE*
7	36.3	5.4
8	42.1	3.4
9	44.7	2.9
10	46.7	2.6
11	48.4	2.4
12	49.9	2.3
13	51.3	2.3
14	52.6	2.2
15	53.8	2.2
16	55.1	2.2
17	56.3	2.2
18	57.6	2.2
19	58.8	2.2
20	60.0	2.2
21	61.3	2.2
22	62.6	2.2
23	63.8	2.2
24	65.1	2.2
25	66.4	2.2
26	67.7	2.2
27	68.9	2.2
28	70.2	2.2
29	71.5	2.2
30	72.9	2.2
31	74.3	2.2
32	75.8	2.3
33	77.4	2.4
34	79.5	2.7
35	82.7	3.5

*SE = Standard Error on T-score metric
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Appendix B

ID # _____

General Participant Information Survey

Please indicate by writing in, circling, or checking the correct demographic information

How did you feel after completing the first computerized task? Use the following scale:

1	2	3	4	5
not at all	a little bit	moderately	quite a bit	extremely

Bored: _____

Nervous: _____

Upset: _____

Alert: _____

Irritable: _____

How did you feel after completing the second counting task, given aloud? Use the following scale:

1	2	3	4	5
not at all	a little bit	moderately	quite a bit	extremely

Bored: _____

Nervous: _____

Upset: _____

Alert: _____

Irritable: _____

How did you feel after completing the second computerized task? Use the following scale:

1	2	3	4	5
not at all	a little bit	moderately	quite a bit	extremely

Bored: _____

Nervous: _____

Upset: _____

Alert: _____

Irritable: _____

Age: _____

Gender (circle one): M F prefers not to answer

Race/Ethnicity (check one):

African American _____

Caucasian _____

Asian American/Pacific Islander _____

American Indian _____

Hispanic/Latino _____

Middle Eastern _____

Other _____

Major: _____

Are you a native English speaker? Yes No

Have you been diagnosed with anxiety? Yes No