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A Little Goes a Long Way: Pressure for College Students to Succeed

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ABSTRACT

When college students begin college they experience pressure from multiple sources. For example, they experience pressure from their parents to succeed, from their professors, and pressure from themselves to do well in classes. This pressure could lead to high anxiety and possibly even poor performance in classes. Prior research that has examined the impact of anxiety on performance includes the Yerkes-Dodson law and the Processing Efficiency Theory. Both argue that anxiety increases the performance to a point, but then performance decreases again with too much pressure. The Processing Efficiency Theory also includes motivation. This motivation increases the drive to succeed and perform at a higher level. In the current study I manipulated the pressure participants felt as they completed a memory test to examine pressure as an influence on memory performance. Furthermore, I also analyzed how trait-anxiety interacts with pressure (as measured by the State Trait Anxiety Inventory). College students (n = 67) were separated into either a no pressure condition or a pressure condition and completed a memory test. Results showed a trend for participants with low trait-anxiety to have increased memory performance in the pressure condition. These results follow the Processing Efficiency Theory and the Yerkes-Dodson law. In other words, perhaps participants had better memory in the pressure condition because they were motivated to do well. Future research identifying the optimal amount of pressure for the best performance is suggested.

Keywords: anxiety, pressure, memory, processing-efficiency theory, performance.

INTRODUCTION

College students experience pressure in school every day by their parents, professors and even from themselves to succeed in their classes. That pressure may lead to anxiety. Anxiety is the most common mental illness in the United States, with the onset occurring most often between the ages of 18 and 22 years old (Andrews & Wilding, 2004). Anxiety is especially high amongst college freshman (Vye & Welch, 2007). For college students, pressure from peers to socialize, parents to succeed in school, and an internal drive to succeed, along with being in a new environment, could lead to high anxiety and poor performance in classes (Cassady and Johnson, 2002). Research that has examined the effects of anxiety on performance has used the State Trait Anxiety Inventory (Spielberger, 1983). This standardized assessment splits anxiety into state-anxiety and trait-anxiety. State-anxiety is feelings of nervousness that can be attributed to the present situation. Trait-anxiety is feelings of nervousness that can be attributed to a person's personality characteristics (Spielberger, 1983).

According to Eysenck (2013), performance is based on one's level of state-anxiety. The STAI contains a total of 40 items, 20 items to measure state-anxiety and 20 items to measure trait-anxiety. A typical item to measure state-anxiety is "I feel nervous and restless," and the participant answers on a four-point Likert scale ranging from 1 (almost never) to 4 (almost always). The STAI has a Cronbach alpha coefficient of .90 (Spielberger, 1983). State-anxiety could be brought on by experience of pressure such as the type of pressure college students experience to do well in classes. This type of anxiety could be associated with the autonomic nervous system response to stress, also known as the "fight or flight" response (Viljoen, Claassen & Mare, 2013).

Furthermore, Sarason (1984) states that participants who feel anxiety also experience cognitive interference in the form of preoccupying and concerning ideas, known as "task-irrelevant thoughts." For example, these intrusive thoughts take cognitive resources away from the task and the participant is left with fewer available cognitive resources to complete the task. Conversely, those who report lower anxiety levels have fewer "task-irrelevant thoughts" (Derakshan & Eysenck, 2009). A concept known as stereotype threat could explain why people have these thoughts. Stereotype threat is when someone has a

negative belief about themselves and they are worried that they will confirm this negative stereotype about themselves or their own group (Steele & Aronson, 1995). In other words, if participants begin an experiment thinking that they are going to fail, they are more likely to perform poorly (Chung, B. G., Ehrhart, M. G., Ehrhart, K. H., Hattrup, K. & Solamon, J., 2005). The negative stereotypes that participants have of themselves are the task-irrelevant thoughts.

The Yerkes-Dodson law (1908) has been used to examine the relationship between anxiety and performance. In concordance with the Yerkes-Dodson law, an individual's performance levels will follow a standard bell curve in relation to the amount of pressure applied. Therefore, performance on a difficult task is low with slight amount of pressure, high with an intermediate amount of pressure, and low with a high amount of pressure. The results of Yerkes' and Dodson's experiment showed that there was an optimal amount of pressure that increased performance in rats (Yerkes & Dodson, 1908). The results found by Yerkes and Dodson that lead to the development of the Yerkes-Dodson law have been examined and replicated many times over the past century (Diamond, 2005; Dodson, 1915; Salehi, Cordero & Sandi, 2010). However, the Yerkes-Dodson law does not include a motivational element, where the drive to succeed effects performance level. The processing efficiency theory (PET), which does include a motivational element, could help explain why participants perform better under medium pressure conditions. The processing efficiency theory states that the more pressure a participant experiences, the more effort the participant will exert to perform well up to an optimal amount of pressure (Eysenck and Calvo, 1992).

Since the Yerkes-Dodson law states that performance levels follow a bell curve pattern as the level of stress increases than an excessive amount of stress leads to performance detriments. The idea that performance decreases with pressure has been illustrated and replicated many times. For example, a study by Horikawa and Yagi (2012) identified 59 college soccer players that had high or low anxiety group based on their responses on the STAI. Next, they had them take penalty kicks while their coach pressured them to shoot better or did not give any instruction. The results indicated that both high and low anxiety groups' performance deteriorated under pressure.

In contrast, a study by Walkenhorst and Crowe (2009) showed that a little pressure can actually increase performance. They tested 60 participants that were either high or low anxiety groups based on their STAI responses. They then randomly assigned each participant to a high or low worry group. The high worry condition participants were instructed to sit for fifteen minutes and worry about any topic of their choice and then take a visual patterns test, whereas the low worry group just took the memory test. Results found that low trait-anxiety participants performed best when they were in the high worry condition. This pattern of results is noteworthy because it does not fit with the Yerkes-Dodson law that participants' performance on a task decreases with pressure. Furthermore, participants in the high worry condition would have had task-irrelevant thoughts, which then would have taken away cognitive resources from doing well on the task (Sarason, 1984; Derakshan & Eysenck, 2009). However, the Processing Efficiency Theory could explain this pattern of data because it argues that the participant's motivation to succeed would increase with some pressure resulting in improved performance (Eysenck & Calvo, 1992).

The purpose of this study is to examine whether manipulated pressure on college students will affect their memory performance on a cued-recall test. I hypothesized that overall, participants with high trait-anxiety will have worse memory performance compared to participants with low trait-anxiety. Furthermore, I hypothesized that pressure will negatively affect all participant memory performance, with pressure having the most deleterious effects for participants with high trait-anxiety.

METHOD

There was 67 participants selected from the South Dakota State University Psychology Department research participation pool (50 female, *M* age = 18.76). This experiment used a 2 Condition (no pressure and pressure) x 2 Anxiety (high trait-anxiety and low trait-anxiety) between subjects analysis of variance (ANOVA) design. Participants were randomly assigned to Condition and completed the trait portion of the State Trait Anxiety Inventory (Spielberger, 1983). Based on participants' responses, I created a low trait-anxiety group and a high trait-anxiety group using a median split. I selected the memory

test items from a norming study completed by Grimaldi, Pyc and Rawson (2010) based on the probability they were recalled during Trial 1 of the norming study. The average probability of recall on trial one was .23, but items from the entire range were selected (.04-.49 probability of recall).

PROCEDURE

Participants were first given an information sheet about the study and agreed to participate. Immediately after agreeing to participate, all participants completed the trait portion of the State Trait Anxiety (STAI). After completing the trait-anxiety portion of the STAI, participants in the no pressure condition heard, "You are about to study some easy word pairs, try to the best of your abilities." Participants in the pressure condition heard, "You are about to study some very difficult word pairs and your performance on the memory test will be indicative of your other abilities such as performance in classes, overall GPA, and expected earnings in the workplace." The participants were then shown 40 Lithuanian-English word pairs each for 10 seconds (e.g., durys-door) using Superlab (Cedrus, 2013). After participants viewed all 40 word pairs they began the memory test in which they were given a sheet of paper with all 40 Lithuanian words and were asked to provide the English equivalent (e.g., durys -). Participants attempted to recall the word pairs for 6 minutes. Finally participants were asked to complete a series of demographic questions. In the debriefing, participants were informed that the purpose of the study was to find out whether manipulated pressure on college students affected their memory performance.

RESULTS

I conducted a 2-way analysis of variance (ANOVA) with Condition (no pressure and pressure) and Anxiety (high trait-anxiety or low trait-anxiety) as the between subjects independent variables and memory performance as the dependent variable. The results revealed that there was no main effect of the Condition, $F(1,63) = 1.82$, $MSE = 0.01$, $p = 0.18$, $\eta^2_p = 0.03$. In other words, participant memory performance in the no pressure condition ($M = 0.16$, $SE = 0.02$) was no different than participant memory performance in the pressure condition ($M = 0.19$, $SE = 0.02$). Similarly, participant memory performance in

the low trait-anxiety group (M = 0.18, SE = 0.02) was no different than participant memory performance in the high trait-anxiety group (M = 0.17, SE = 0.01; $F(1,63)$ = 0.31, MSE = 0.01, p = 0.58, η^2_p = 0.01. Finally, there was no interaction between the pressure condition and trait-anxiety, $F(1, 63)$ = 1.44, MSE = 0.01, p = 0.23, η^2_p = 0.02. Students who have high trait-anxiety were no more likely to perform well on a memory test than students with low trait-anxiety, regardless of condition (see Figure 1).

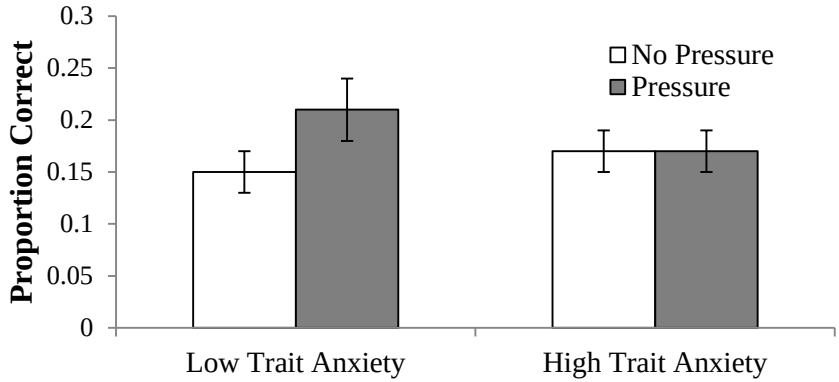

Figure 1. The percent correct on the memory test, comparing trait-anxiety and pressure condition. The error bars depict standard error

DISCUSSION

The goal of this research was to determine whether manipulating pressure on participants would affect their performance on a memory test. The high trait-anxiety participants had similar memory performance regardless of the pressure condition. The expectation was that the memory performance would be higher in the low pressure group; however there was a slight indication that pressure improved memory performance for people with low trait-anxiety. As such, it is possible that those with low trait-anxiety needed some pressure to be motivated to perform at a higher level, which follows the Processing Efficiency Theory and Yerkes-Dodson law in that the optimal amount of pressure results in increased performance. If this law was valid for pressure on students in college in real classroom settings, then one could infer that some pressure would be better than no pressure.

Some potential limitations of this experiment include external validity and the anxiety measurement. Putting pressure on an individual in a controlled environment is much

different than applying real life pressure, such as a parent or a professor in a natural situation, thus reducing external validity. Additionally, the state portion of the State Trait Anxiety Inventory was not used in this experiment. Future research in this area should use the state portion of the assessment to check if the pressure manipulations are effective at increasing state anxiety. It is possible that participants in the current experiment were not anxious for various reasons including that they were not listening to the instructions that were intended to cause the anxiety or that participants were not affected by the low severity of the pressure. Another check of state-anxiety could have been participant's subjective reports, but no reports were collected. For example, I could have asked participants how they perceived the pressure put on them.

Participant's trait-anxiety level in the current sample was low, which may have skewed the results. The State Trait Anxiety Inventory (Spielberger, 1983) ranges in scores from 20 to 80, so the mean should be 50, but in this sample both the mean and median were 37, which is much lower than the ideal mean. Increasing sample size to have a more representative sample would allow one to make better conclusions about how pressure and anxiety interact to influence memory performance.

Although some studies concerning anxiety focus on physiological responses to stress or pressure, this study focused on the cognitive effects of anxiety. Cognitive effects of anxiety, including task-irrelevant thoughts, affect college students and have deleterious effects on memory performance and performance on other tasks (Derakshan & Eysenck, 2009). In this study the task-irrelevant thoughts could have been focused on the fact that results of the memory test were "indicative of performance in classes, overall GPA, and expected earnings in the workplace." Although the results were not statistically significant there was a trend that high pressure led to increased performance on the memory test. This could be explained by the Processing Efficiency Theory (PET), stating that the more pressure a participant experiences, the more effort the participant has to exert to perform well.

Although people may be tempted to decrease anxiety, my results and results from previous research (Yerkes & Dodson, 1908; Eysenck and Calvo, 1992) suggest that there is an

optimal amount of anxiety, stress or pressure for performance on a given task, including memory. Future research should identify optimal amount of pressure to increase performance on a variety of tasks in more naturalist settings such as the college classroom.

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