

Shyness Mindset Beliefs and Attentional Bias: An Experimental Study

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Authors Note

This paper describes a study for the purposes of PSYC 499, spring and fall 2016, at Northern Illinois University. The faculty supervisor on this study is David Valentiner.

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Abstract

Social behavior depends one's perceived level of shyness and the degree to which one believes that level of shyness is fixed versus malleable. Shy entity theorists maintain a fixed mindset and believe that shyness is a trait about themselves that cannot be altered. Shy incremental theorists hold a growth mindset and believe that behavior can change with experience (Beer, 2002). Past studies have shown that interventions can alter mindset beliefs and doing so affects behavior and performance (Aronson, Fried, & Good, 2002). Persons with a fixed shyness mindset have a tendency to view situations that provoke anxiety as threatening (Pergamin-Hight, Naim, Bakermans-Kranenburg, Ijzendoorn, & Bar-Haim, 2014). Reappraising the negative arousal that accompanies anxiety as something positive should then reduce threat vigilance, and decrease the likelihood that anxious individuals will perceive future situations as threatening (Brooks, 2014). Shyness related anxiety frequently results in increased attention toward threatening stimuli. This phenomenon is known as attentional bias. The dot probe paradigm has demonstrated attentional bias in anxious individuals (Asmundson & Stein, 1994). If an intervention is successful in altering shyness mindset beliefs, attentional bias should also be lessened. The current study seeks to use latency scores from an emotional pictures dot probe paradigm to assess for a reduction in attentional bias after administration of a shyness mindset intervention in socially anxious college students. No significant differences were found in latency scores between the control and experimental conditions.

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Implicit Self Theories

Many individuals may believe that a person's behavior is a result of stable personality traits such as intelligence or shyness, however, behavior may have more to do with the individual's mindset. Dweck (2006) found evidence to suggest that implicit self-theories (i.e. mindsets) are a strong indicator of behavior in performance related situations. Personality traits may be viewed as fixed or malleable. Entity theorists, those who hold a fixed mindset, believe that their character traits are fixed and cannot be changed in any way. Incremental theorists, those who hold a growth mindset, believe their character traits can be altered and change with time and experiences (Yeager & Dweck, 2012). Each mindset leads to a distinct approach towards performance outcomes and achievement. Entity theorists will focus on academic performance because they believe their performance is an accurate indicator of their intelligence, and incremental theorists attend to learning and aim to achieve self-improvement.

Beer (2002) transferred the concept of implicit self-theories to the domain of shyness. Shyness can be defined as "an affective-behavioral syndrome characterized by social anxiety and interpersonal inhibition that results from the prospect or presence of interpersonal evaluation" (Leary, 1986, p. 30). Shy entity theorists believe that their shyness is a trait that they cannot change, and shy incremental theorists believe that their shyness is malleable (Beer, 2002). Shy individuals that report the same perceived levels of shyness will respond differently to an identical social situation depending on their mindset. Those with a fixed shyness mindset display more avoidant behaviors, and those with a growth shyness mindset tend to view a challenging social situation as a learning opportunity despite experiencing negative emotions (Beer, 2002).

Beer (2002) hypothesized that the two contrasting shyness mindsets would be predictors of shy people's social goals. She expected incremental theorists to view situations related to their shyness as an opportunity to overcome shyness, rather than avoid these situations to avoid failure. Participants completed an avoidant social strategies scale in which they rated eight items on a five point scale ranging from "disagree strongly" to "agree strongly" based on strategies used in social interactions (i.e "Smile so I look interested by don't have to talk much"). The findings implicated that shy entity theorists utilized more avoidant social strategies, while shy incremental theorists used social interactions as a chance to decrease their shyness. Accordingly, mindsets are a better determinate of behavior, rather than personality traits.

Valentiner, Mounts, Duirk, and Gier-Lonsway (2011) found evidence that shyness mindset theory can be applied to better understand shy individuals during their transitions into college. Their study found evidence to suggest that college freshmen who arrived at college with a fixed shyness mindset maintained their levels of performance anxiety, and those who arrived with an incremental shyness mindset saw a decrease in performance anxiety during the first year of college. These findings suggest that using social interactions as an opportunity for growth eventually leads to decreased anxiety.

Cognitive Reframing

The vast majority of individuals believe that trying to calm down while experiencing anxiety is the most effective way to eliminate the negative outcomes associated with the heightened arousal (Brooks, 2014). However, it takes more emotional resources to down regulate arousal rather than to reappraise anxiety as a similar emotion, such as excitement, with similar physiological responses. Brooks (2014) provided evidence to suggest that redirecting anxiety as excitement lead to increased performance outcomes. The same physiological symptoms

associated with anxiety could be utilized to increase positive outcomes, if anxiety was reappraised as excitement.

The biopsychosocial model of challenge and threat states that when people believe that they do not possess enough resources to complete a task, they feel threat. In contrast, if people do feel they have the capacity to complete the task at hand, they view it as a challenge that they are capable of accomplishing (Blascovich & Mendes, 2010). Thus, if the individual believes that their personal resources exceed the demand of the task, then he or she will no longer view the situation as threatening (Jamieson, 2013). Persons with a fixed shyness mindset have a tendency to view social situations that provoke anxiety as threatening. Reappraising the arousal that accompanies anxiety as something positive should then debilitate threat vigilance, and decrease the likelihood that anxious individuals will experience future situations as threatening.

An Intervention

Aronson, Fried, and Good (2002) and various other studies have found that interventions can alter intelligence mindsets, and that changes in mindset affect subsequent academic behavior. Researchers have used educational approaches to promote a growth intelligence mindset. The intervention used by Aronson et al. (2002) provided information about the brain's functioning and malleability by explaining how new neural connections develop in the brain. The intervention designed by Good et al. (2003) included weekly mentor e-mails on incremental theory throughout the school year. These two interventions led participants with initial fixed mindsets to improve their academic achievements when compared to participants that did not receive the same intervention. However, limited intervention work has been applied to the domain of shyness mindset theories.

Attentional Bias

Individuals experiencing anxiety will overly attend to threatening stimuli associated specifically with the cause of their different types of anxiety (Pergamin-Hight, Naim, Bakermans-Kranenburg, Ijzendoorn, & Bar-Haim, 2014). Research using an attentional bias dot probe paradigm demonstrates that threat-related attentional bias and threat detection is a major factor in maintaining anxiety. (Beck & Clark, 1997). Beck and Clark (1997) found evidence that amygdala hypersensitivity was present in anxious individuals, and that amygdala activation was related to attentional bias towards threat relevant stimuli. Additionally, other researchers have found evidence to that stimuli are classified by anxious individuals as threatening or safe before understanding specific content (Mathews & Macleod, 1994). Thus, attentional bias will occur before the individual is cognizant of what they are viewing.

Various different kinds of dot-probe paradigms have exhibited attentional bias in individuals with anxiety or anxiety related disorders. The modified stroop color naming paradigm involves asking participants to say the color name that various threatening and neutral words are presented in (McNally, 1990). Research using this paradigm has suggested that persons with anxiety disorders spend more time processing threatening words than did individuals without a history of anxiety. Additionally, there were no differences in neutral word timings between the two groups. A dichotic listening paradigm yielded similar results with social phobia patients (Burgess et al., 1981).

The Dot-Probe Paradigm. The dot-probe paradigm is a computer based attentional assessment program (Asmundson & Stein, 1994). Attentional allocation is measured in the paradigm with response times related to a dot stimulus that appears on the screen with threatening and neutral stimuli. Asmundson and Stein (1994) created a variation of the program

using threat and neutral word pairs. During each trial, the researcher directs the participant's attention towards the top of the screen to help reduce unrelated effects, such as response bias. Participants are asked to identify the stimulus as soon as it appears on screen by pressing the space bar. Asmundson and Stein (1994) found no overall difference in response time between participants with social phobia and the control group. However, when compared to the control group, they found that the participants with social phobia responded more quickly to a stimulus in the top half of the screen if a threatening word was present. This finding suggests that the patients were remarkably fixated on the threatening word; they were able to identify the stimulus faster because it was already in their immediate view (Hight et al., 2014).

The version of the paradigm used in the current study was used previously in three samples, two sets of individuals with social anxiety, and one set of healthy youth (Price, Kuckertz, Siegle, Ladouceur, Silk, Ryan, Dahl, & Amir, 2015). Individuals in the first two groups displayed selective attention to threatening images more significantly than the third group. The researchers found evidence to suggest that the dot probe paradigm is reliable at accessing all groups, once proper analysis is utilized. Insuring proper analysis includes: calculation of bias scores based on dot-bottom trials based on incongruent and congruent trails; adjusting data outliers rather than excluding them; and issuing the paradigm multiple times (Price et al., 2015).

The Current Study

The preceding results suggest that the dot-probe paradigm may be a valid and reliable assessment for attentional bias in anxiety and social phobia related disorders. If an intervention is effective in promoting a growth mindset in individuals with a fixed mindset, then those individuals should experience less performance anxiety and be more likely to view social

situations as an opportunity for learning. Furthermore, if an intervention can implement a growth mindset in individuals with fixed mindsets, then there should be a reduction in attentional bias following the change in mindset. A reduction in attentional bias would be revealed if no difference is found between latency scores involving threatening stimuli and latency scores involving neutral stimuli on a dot-probe paradigm on the trails administered after the intervention has occurred.

Method

Participants

Participants were recruited from introductory psychology classes at a large Midwestern university in the United States. The students participated in a mass survey. Those that scored in the top quartile on indices of social anxiety and shyness mindset were selected as potential participants. The sample includes 40 participants between the ages of 18 and 25 ($M=19.54$, $SD=1.24$). Of these participants, 59.26% are female and 40.74% are male. Subjects' race is comprised of 56% Caucasian Americans, 16% African Americans, 10% Asian Americans, and 6% preferred not to respond. Ethnicity included 8.3% Mexican 4.2% Puerto Rican, 4.2% Cuban, and 2.1% preferred not to respond. In exchange for participation, students receive course credit.

Measures

Shyness mindset intervention. The Shyness Mindset Intervention contains a series of slides adapted from Dr. David Yeager of the University of Texas at Austin (Yeager & Dweck, 2012). The slides inform the readers of the malleability of neurons in the brain, how behavior is shaped by experiences, and how individuals change over time. The intervention includes a mix of videos, quotations from high school aged individuals, and a mutable voice over related to the topic. After reading about other student's experiences with overcoming shyness, the participant

is asked to describe their own story and what could help them understand or change his or her experience. The control condition consists of a series of slides informing the reader of how different lobes of the brain function.

Dot probe paradigm. The current study uses an emotional pictures dot probe paradigm developed by Amir (2015). The dot probe paradigm is a measure of selective attention. The paradigm initially displays a crosshair. The crosshair is then replaced by two pictures of faces, either neutral or threatening, on the top and bottom of the screen. The paradigm includes both congruent (i.e. threating picture replaces threatening picture) and incongruent (neural picture replaces threatening picture) trials. The participant is instructed to focus on the top face, then, once the pictures disappear, he or she must identify whether a “F” or an “E” is displayed on the screen as quickly and accurately as possible by clicking either the right or left mouse button. This process repeats until the participant has reached the end of the trials. In general, dot probe paradigms produce mixed reliabilities and validities, but show stronger results when used to assess between-group differences (Taylor, Cross, & Amir, 2009).

Shyness mindset scale. The shyness mindset scale (SMS) is a 9-item, 5 point likert type scale ranging from “strongly disagree” to “strongly agree.” The scale assessed for fixed shyness mindset ($\alpha = .928$) and included statements such as “I can’t change my true level of shyness” and “My shyness is fixed and does not change over time.”

Procedure

Participants were ushered individually into a private room before beginning the study. The research assistant (RA) then completes the informed consent process and allows the participant to read and sign the consent form. After consenting, participants completed the SMS. Following completion of the questionnaire, the RA read aloud the instructions to the dot probe

paradigm and administered the task. Subsequently, the participant was randomly assigned to complete either the intervention or the control task. Randomization was constrained so that participants are equally distributed across the two conditions and conditions were blind to the RA. Then, the participant received the dot probe paradigm a second time, and completed the SMS once more. Ultimately, the participant completed questionnaire about demographics, was fully debriefed, and then dismissed.

Analysis

Randomization checks were run using an independent groups t-test. A repeated measures ANOVA with scores from the SMS was used as a manipulation check with shyness mindset as the dependent variable. Changes in attentional bias were assessed using a repeated measures ANOVA. The between-subjects factor includes the intervention and control group. The within-subjects factor consists of pre-test and post-test scores for both neutral and threatening pictures. The dependent variable is latency scores determining attentional bias on the dot-probe task.

Results

Randomization between groups was successful as no significant difference was found across scores between the experimental and control conditions for the control group's pre-test neutral face scores ($M = 1714.88$, $SD = 701.06$) and for the experimental group's pre-test neutral face scores ($M = 1534.97$, $SD = 533.21$); $t(37) = .911$, $p = 0.368$. Additionally, no significant difference was found across scores between the experimental and control conditions for the control group's pre-test disgust face scores ($M = 1635.39$, $SD = 504.34$) and for the experimental group's pre-test disgust face scores ($M = 1572.05$, $SD = 751.63$); $t(37) = .299$, $p = 0.767$

A significant interaction effect was found between conditions with pre and post test scores on the SMS, $F(1, 46) = 9.285, p = 0.004$. Participants in the experimental group had reduced scores on fixed shyness mindset.

There was no significant interaction effect found of latency scores by condition. No interaction was found within pre and post neutral face test scores by condition, $F(1, 37) = 0.262, p = 0.612$. No interaction was found within pre and post disgust face test scores by condition, $F(1, 37) = 0.112, p = 0.739$. See figure 1.

Discussion

The current study evaluated the effectiveness of an intervention in altering shyness mindset beliefs. The hypothesis indicated that if an intervention is successful at enhancing growth shyness mindset, then there would be a reduction in an individual's attentional bias. This would be shown if latency scores involving threatening stimuli were the same as latency scores involving neutral stimuli on the post-test dot probe paradigm.

The results of the current study showed no significant difference in the pre-test scores and post-test scores in the dot-probe paradigm in either neutral or disgust face trials between both groups. Individuals that received the intervention performed similarly to individuals that received the control in terms of pre-test and post-test latency scores on the paradigm. Latency scores remained stable in both administrations of the task. These findings suggest that the intervention did not cause a reduction in attentional bias.

However, scores on the SMS did differ between groups after administration of the intervention. Individuals that received the intervention reported a reduction in fixed shyness mindset. This could signify two different options: the intervention did not work and self-report

scores are not an accurate indicator of mindset, or the more probable option, the dot-probe paradigm is not an appropriate test for signifying changes in mindset.

Limitations

A potential limitation of the current study is the lack of an eye tracking device on the dot probe paradigm. Although the participants are instructed to focus on the top face, there is no possible way to conclude that the individual maintained focus on one particular stimulus. By implementing an eye tracking device, there would be more certainty on where attention is allocated. Additionally, the sample used in the current study is limited to young college students at a Midwestern university. As a result, the findings may not apply to a large body of the population across the United States. Ultimately, in the current study, the intervention is only administered one time as opposed to repeated exposure to the information. Therefore, it may not be a strong enough measure to create a lasting change in attentional bias.

Additionally, the dot-probe paradigm has most commonly been used with individuals that have social and anxiety disorders. Therefore, it is possible that the dot-probe paradigm does not detect lesser instances of attentional bias, as with those who maintain a fixed shyness mindset, but may not be at clinical levels of disruption.

Future Directions

The current study looked at pretest and posttest latency scores in general as a measure of determining attentional bias. However, examining the positions of disgust and neutral faces in relation to the stimulus may be a more appropriate means of analyzing the data. Future studies should consider looking at each piece of the paradigm individually, rather than as a whole.

Previous research indicates that interventions can create lasting effects by altering individual's mindsets. Once an individual faces repeated exposed to material, it is more likely

they will adapt that material into his or her belief system (Good et al., 2003). By increasing exposure to the intervention from a one-time event, to a sequence of events, there may be more lasting effects in altering attentional bias. Furthermore, by adding eye tracking to the dot probe paradigm, there can be more certainty in the participant's focus. By implementing these improvements to the current study, the results may yield significant findings.

Conclusion

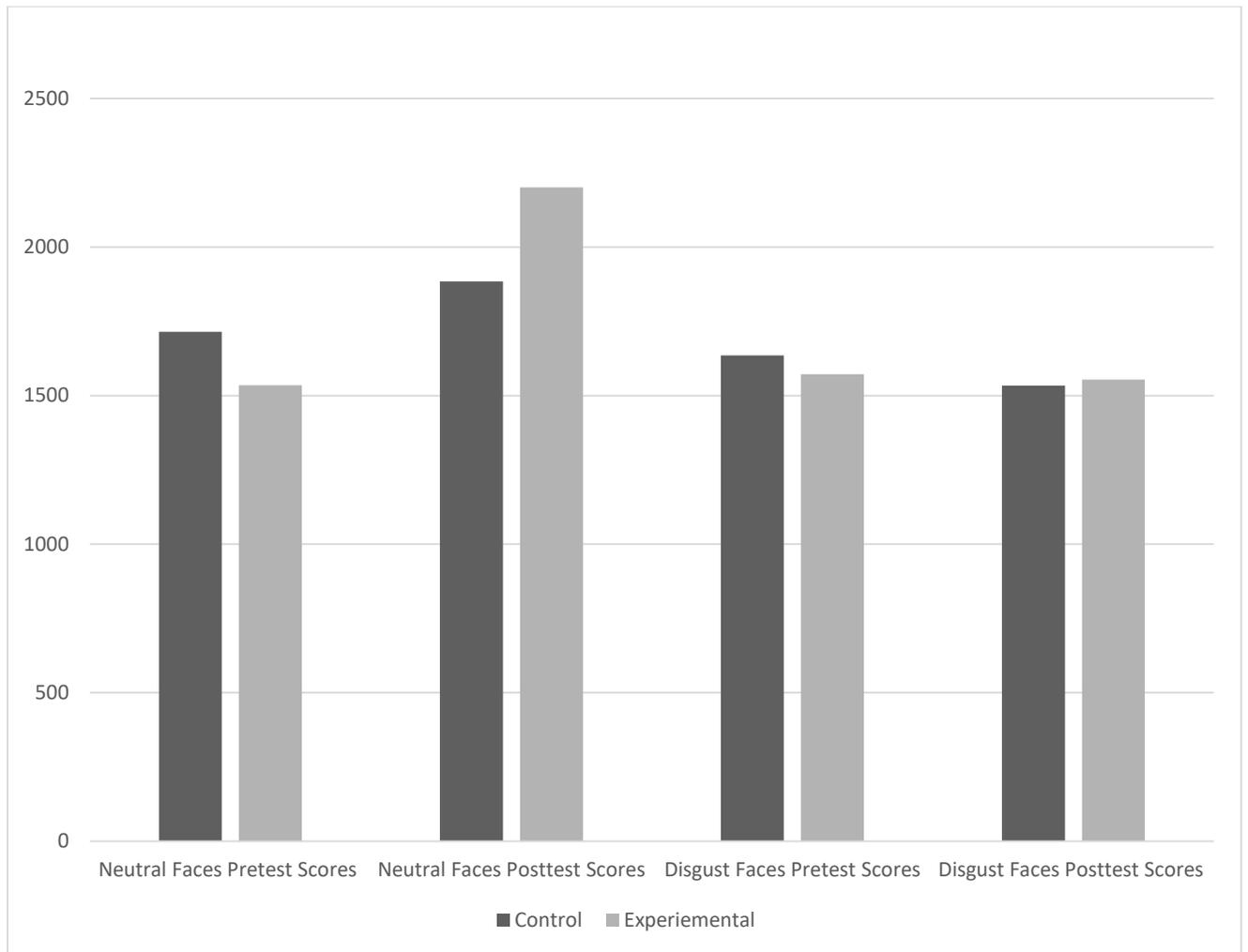
Although the current study did not find evidence of a reduction in attentional bias following an intervention, it did find a significant difference in self-report scores, suggesting that interventions can be powerful tools in manipulating mindsets. Further research with different cognitive tests should be done to insure the reliability of interventions. Incorporating interventions into clinical practices could create lasting change in individuals facing life disrupting challenges.

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Figure 1. Marginal Means of Latency Scores



Note. $F(1, 37) = 0.262, p > .05$