Decision Making and Anxiety Vulnerability in a Spatial Discrimination Task

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Introduction

- Many individuals with post-traumatic stress disorder (PTSD) report experiencing intrusive memories of the original traumatic event (e.g. flashbacks).
- These memories may reflect basic processes in learning and memory, such as generalization.
- Recent research examining generalization in PTSD found that Veterans with PTSD perform better and respond faster when spatial discrimination is difficult ("0"), some of the time ("1"), or yes/most of the time ("2").
- Here, we evaluate if enhanced spatial discrimination is present prior to the onset of clinical anxiety by examining individual differences in performance related to anxiety vulnerability.
- To assess anxiety vulnerability we used behavioral inhibition, a temperamental tendency to avoid or withdraw from social situations which is associated with increased risk for developing clinical anxiety³, and individual differences in learning and memory.⁴
- We hypothesized that participants at-risk for anxiety disorders would show enhancement of spatial discrimination performance.

Measures

Measuring risk for anxiety
- Participants completed self-report measures related to anxiety and anxiety vulnerability.

The Adult Measure of Behavioral Inhibition (AMBI)⁵
- A 16-item self-report measure that assesses the presence of inhibition or avoidance in response to new stimuli or social situations.
- Participants are asked to respond to questions on a three-point scale and indicate no/hardly ever ("0"), some of the time ("1"), or yes/most of the time ("2"). Total scores range from 0 to 32.

Recruitment
- 17 Lafayette College students (88.4% female, M = 19) volunteered for research credit.
- Participants first completed the AMBI.
- Based on previous research, a score of 15.5 was used to separate participants into high behavioral inhibition (High BI; > 15.5) and low behavioral inhibition (Low BI; ≤15.5) groups.⁶
- Two participants were removed from analysis due to poor performance, and only the remaining 15 participants (93.3% female, M = 18.8) were included in data analysis.

Methods

Delayed Match-to-Sample Task

- Participants were presented first with a dot (the target) and following a delay, provided with a forced choice between two dots, one at the target location and a second “foil” dot a short distance away on the screen.
- Testing consisted of 24 trials in blocks of six, with eight trials of each level of spatial difficulty. Participants indicated which dot was the target dot using left and right keys on a keyboard.

Results

- Our results did not support our hypothesis that participants at high risk for anxiety would show enhanced spatial discrimination.
- However, in line with recent research reporting faster responses of Veterans with PTSD in the same task,⁷ we observed a significant interaction between reaction time and anxiety vulnerability, with high-risk participants responding faster.
- Reaction times in this task indicate individual differences in decision making processes that may reflect mechanisms of encoding in selecting a behavioral response.
- Our results provide initial evidence that decision making processes may be different, not only in clinical anxiety as previously observed, but also in anxiety vulnerability.
- Continued research to understand individual differences in spatial discrimination performance and individual differences in decision making with larger sample sizes in this and other pattern separation tasks will shed light on the role of discrimination in risk for anxiety.

References


Figure 1. A 3 x 2 mixed measures ANOVA indicated a significant main effect of spatial difficulty, F(2,26) = 4.483, p = .021. Examination of means indicate poorest performance in the medium difficulty level (at 1.75 cm), None of the post-hoc t-tests was significant following Bonferroni correction.

Figure 2. A 3 x 2 mixed measures ANOVA indicated a significant interaction of difficulty and AMBI group, F(2,26) = 5.33, p = .001, with faster response times of the high AMBI group compared to the low AMBI group. There was also a main effect of spatial difficulty, F(2,26) = 20.85, p < .001. Bonferroni corrected post-hoc paired samples t-tests indicated significant differences between the hardest (.75 cm) and easiest (2.75 cm) trials, p = .004, and between the medium (1.75 cm) and easiest trials, p = .001

Figure 3. A 3 x 2 mixed measures ANOVA indicated a significant main effect of behavioral inhibition tendency, F(1,14) = 4.908, p = .043, with participants with low behavioral inhibition responding faster than those with high behavioral inhibition.