The Effects of Stress on Reflexive Processing

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Introduction

**Reflexive vs. Reflective Processing**
- When presented with repetitive, predictable outcomes, reflexive processing assists in generating automatic behaviors requiring minimal effort.
- When learning a new task or when presented with unexpected outcomes, reflective processing assists in creating and modifying rule-based frameworks for successful behavior. 1

**Stress and Framing Effects**
- Acute stress has deleterious effects on reflective processing and increases biased behavior. 2
- However, the effects of stress on reflexive processing in emotional contexts and contexts of varying feedback (punishing vs. rewarding) is unconfirmed

Hypotheses

1. Stress will enhance reflexive performance in both punishing and emotional contexts
2. Stress will result in exaggerated punishment learning biases when in emotional contexts

Design Overview

- Participants completed 4 tasks in counter-balanced order after either a stress manipulation or control manipulation

**Methods**

**Valence**

<table>
<thead>
<tr>
<th>Feedback Type</th>
<th>Emotional</th>
<th>Non-Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punishing – Minimize Losses</td>
<td>Emotional</td>
<td>Non-Emotional</td>
</tr>
<tr>
<td>Rewarding – Maximize Gains</td>
<td>Emotional</td>
<td>Non-Emotional</td>
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**Task Points Structure**

- 2 ‘B’ decks initially provide the better option
- Halfway through the task, the 2 ‘A’ decks become the better option
- Optimal performance in these tasks is attained by minimal switching between decks

**Results**

- Worse performance in Emotional conditions
- Worse performance in Punishing conditions
- Emotional performance deficit was not mediated by stress
- Stress reduced the negative effects of punishing feedback

**Summary**

- Overall, participants performed worse when the task was punishing in context
- This effect was attenuated by stress; stressed participants performed better when faced with punishing punishment relative to controls
- Overall, participants performed worse when the task was emotional in context
- This effect was not mediated by stress
- Emotional context did not exaggerate stress related biases on punishment processing, contrary to our hypothesis

**Conclusions**

- Stressed individuals show greater habitual/ reflexive behavior in punishing contexts. This may be one way addiction is perpetuated by stress
- Future research could take advantage of a socially-evaluated stressor, thus adding an emotional, naturalistic component to the stress induction
- Measurement of cortisol levels would also be useful in providing a measure of stress levels during the cognitive tasks

**References**


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