More attention, Greater Control: Acute and Chronic stress correlate with differences in alpha and theta levels

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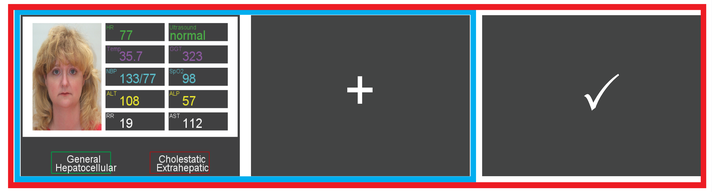
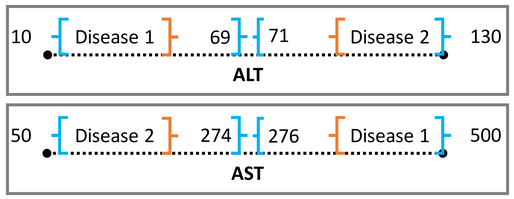
INTRODUCTION

- In the brain, oscillatory alpha activity is associated with attention[1] while oscillatory theta activity is associated with cognitive control[2]
  - These are two related aspects of decision making
- Both chronic (long-term) and acute (immediate) stress have been found to modulate aspects of brain function (including decision making)
- To date, there is little research on how acute and chronic stress might affect these two brain responses
- Thus, our goal was to determine how chronic and acute stress might affect theta and alpha levels, in a decision making task that elicits both

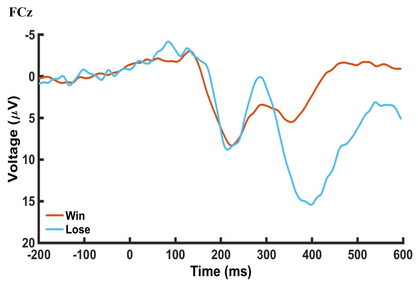
METHODS

- **Task:** Participants diagnosed "diseases"
- In **part 1 (training),** they had to learn which symptoms were pertinent and received feedback from choices
- In **part 2 (testing),** they no longer received feedback, and the difficulty was varied by changing the range of symptoms (see right)
  - **Easy difficulty** had little overlap, **Hard difficulty** had a lot of overlap
- **Measures:** Posterior alpha and frontal theta (before decision) were averaged across easy or hard trials
- **Measures:** Chronic Stress was assessed by scores on the TICS (total and social sub-scales) and Acute Stress by scores on the STAI



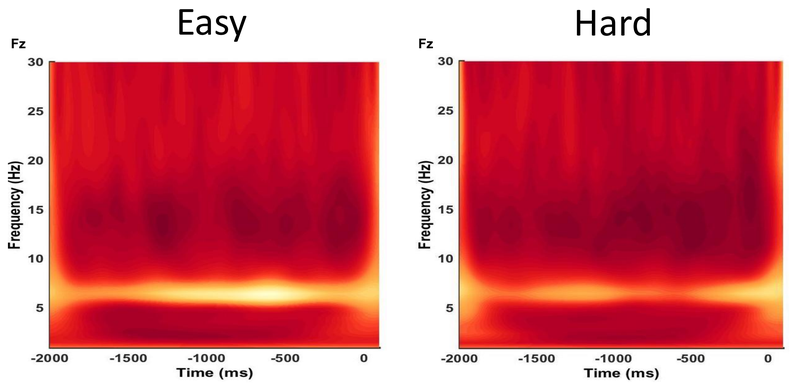


Response to Feedback

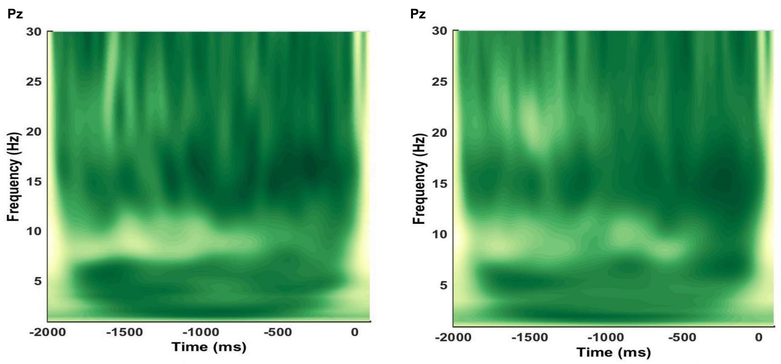


Participants did show an enhanced response to positive feedback (win) during training

Wavelets

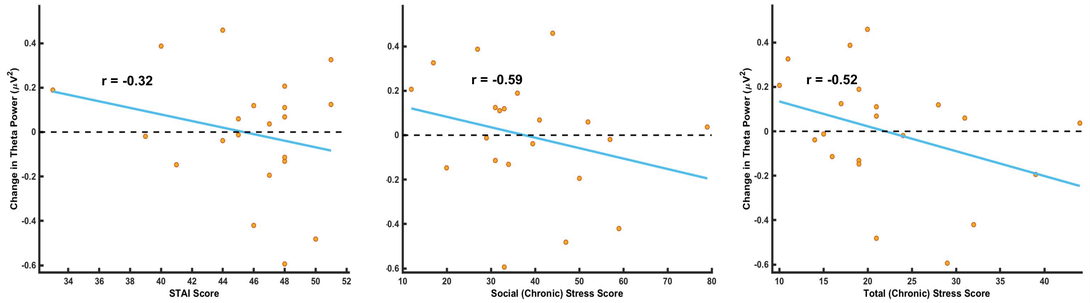


Increased Theta (more control) in the easy condition

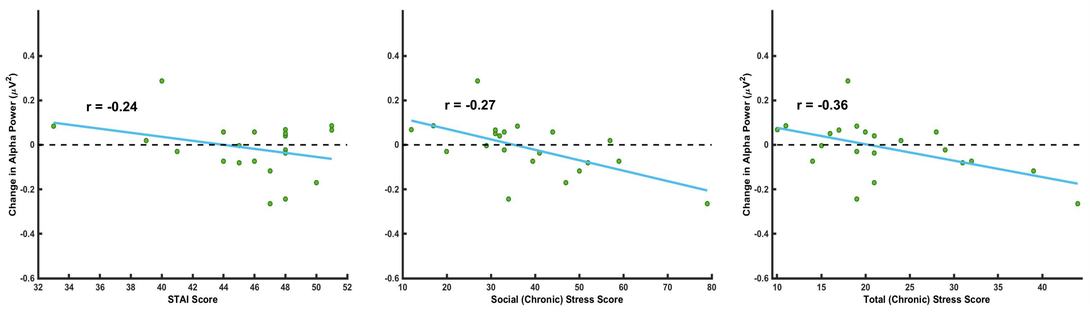


Increased alpha (less attention) in the easy condition

Correlations



Acute stress and chronic stress were both correlated with theta activity
Higher acute and chronic stress (both social and total) correlated with smaller changes in theta activity



Acute stress and chronic stress were both correlated with alpha activity
Higher acute and chronic stress (both social and total) correlated with smaller changes in alpha activity

1 – Klimesch, W., Sauseng, P. & Hansmayrs, S. (2007). *Brain Research Reviews.* **2 –** Cavanagh, J. F. & Frank, M. J. (2014). *Trends in Cognitive Sciences*

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