Neural correlates of attention during frustration induction correspond to emotion dysregulation in autism spectrum disorder

Nicole R. Friedman, M.A.[1], Caitlin M. Hudac [2], Ph.D., Nathan Riek[3], B.S., Busra T. Susam[3], M.S., Philip Gable[4], Ph.D., Ricardo Wilhelm[1], Ph.D., Caitlin M. Conner[3], Ph.D., Carla Mazefsky[3], Ph.D., & Susan W. White[1], Ph.D.

BACKGROUND

- Difficulties regulating behavior in emotional contexts may be associated with competition between attention monitoring systems and emotion processing.
- Increased attention toward negative or ambiguous emotional information may deplete resources available for aspects of regulation.
- Attentional control is often linked to the N2 event-related potential[1] (ERP).

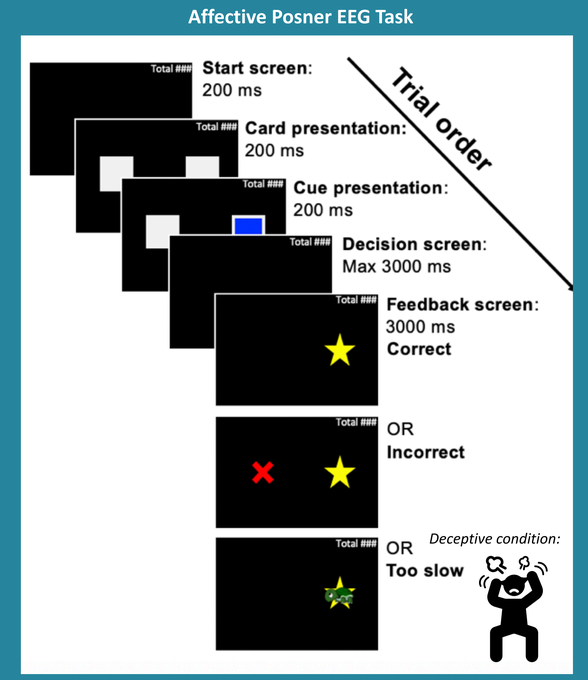
OBJECTIVE

To explore the potential downstream effects of competition among attention monitoring and emotional processing, we examine how neural correlates of attention (i.e., N2 amplitude) during a frustration induction task correspond to behavioral manifestations of emotion dysregulation.

Thank you to all our participants at the University of Alabama and the University of Pittsburgh!

Funding: DOD (Mazefsky; W81XWH-18-1-0284)
References: (1) Lewis et al., 2006; (2) Mazefsky et al., 2019
Affiliations: (1) University of Alabama, (2) University of South Carolina, (3) University of Pittsburgh, (4) University of Delaware
Contact Info: nrfriedman1@crimson.ua.edu

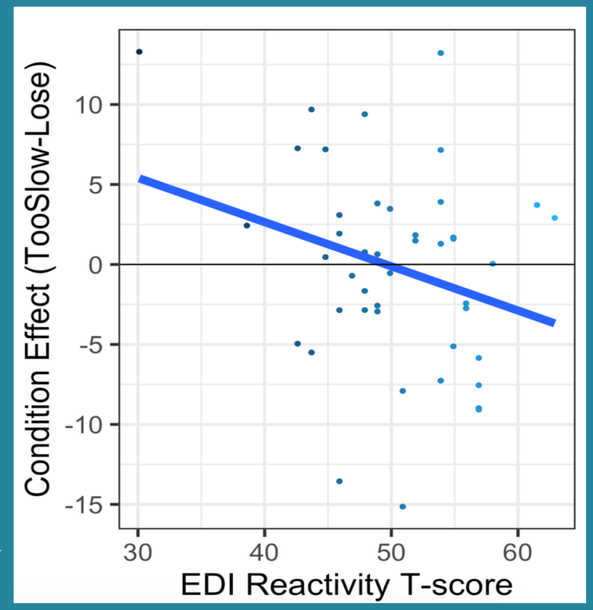
Increased engagement of attention monitoring systems in response to frustration induction is related to an elevated reactivity profile in autistic youth.



Engagement of **attention monitoring**

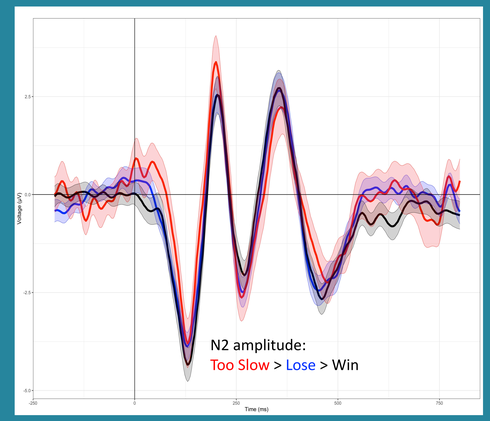
Smaller N2 to Too Slow

Larger N2 to Too Slow



Lower reactivity

Elevated reactivity



METHOD

- N=46 autistic individuals, 12-20 yrs old completed the affective Posner EEG Task.
- Feedback is deceptively altered to elicit a negative (frustration) affective response.
- Compared N2 ERP responses to condition feedback (i.e., Win, Lose, "Too Slow"), where feedback is deceptive ("Too Slow") on 60% of correct trials.
- Participants and parents also completed the Emotional Dysregulation Inventory[2] as a behavioral index of emotion regulation.

RESULTS

- Trial-level multilevel models indicated a fully-graded N2 effect between conditions, $F(2, 6626)= 15.5$, $p<.001$.
- Partial correlations investigating parent-reported emotional reactivity indicated larger N2 emotion dysregulation effects (i.e., N2 to "Too Slow" is more negative than Lose) for youth with elevated emotional reactivity, $r(44)=.32$, $p=0.047$.

IMPLICATIONS

- Difficulties in self-regulating may be associated with competition for cognitive resources among attention monitoring and emotion processing systems.
- Further exploration of neural correlates of emotion dysregulation paired with behavioral indices could help identify potential markers for detection and intervention efforts.