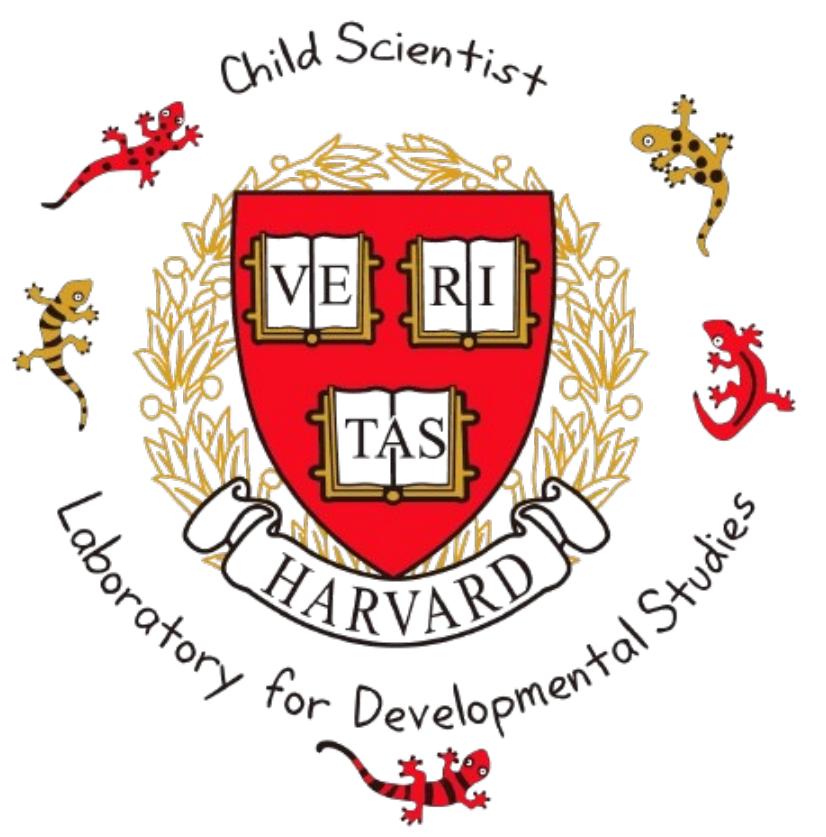




# Examining Neural Adaptation in Typically Developing Children and Children with Autism

Isabel Sichlau, Hanna Shine, Jesse Snedeker



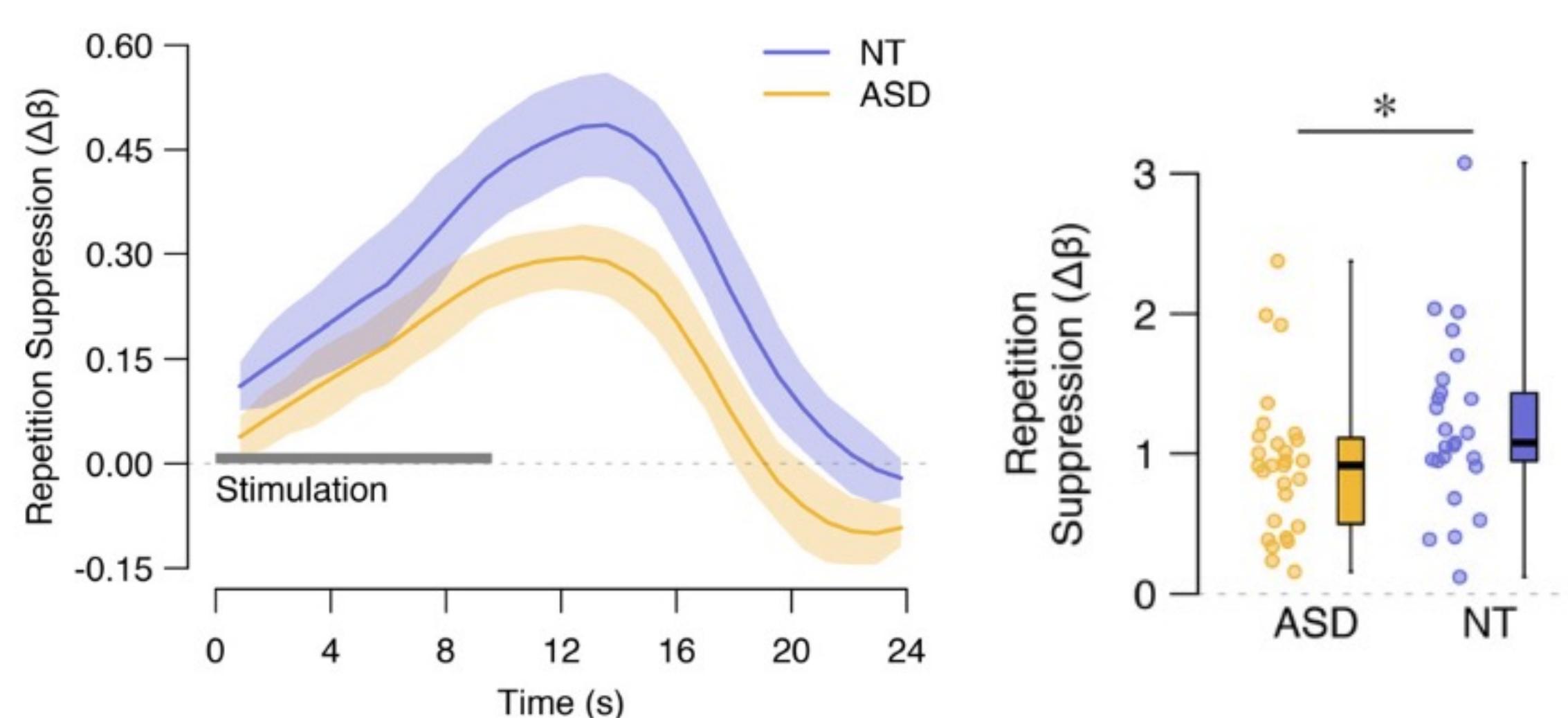
## BACKGROUND

- Neural Adaptation: reduction in neural activity in response to repeated stimuli <sup>2</sup>
- Diagnostic criteria for autism spectrum disorder (ASD) includes deficits in social-emotional reciprocity <sup>1</sup>
- Higher symptom severity in ASD is correlated with lower rates of adaptation<sup>4,5</sup>
- Children with ASD took longer to habituate to visual stimuli in looking-time experiments compared to typically developing (TD) children <sup>8,9</sup>
- ASD adaptation to faces took longer overall <sup>9</sup>

Is there a neurological difference?

## PRIOR fMRI RESULTS

- Differences in neural adaptation to faces comparing adults with ASD to TD adults <sup>3</sup>
- Differences only with social-visual stimuli <sup>3</sup>
- Lower social communication score correlated with slower neural adaptation <sup>3</sup>



## RESEARCH QUESTIONS

Are there any differences in neural adaptation to social and non-social visual stimuli in TD children and children with ASD?

- How does neural adaptation to repeated faces differ between TD children and children with ASD?
- How does neural adaptation to repeated objects differ between TD children and children with ASD?

## ERP COMPONENTS

ERP	Cognitive Process	Rationale
N250	Facial processing regarding <u>identification</u> <sup>1,7,8</sup>	Reflects neural adaptation to repeated <i>social</i> stimuli
N400	Facial/object processing regarding <u>recognition</u> <sup>2,6</sup>	Reflects neural adaptation to repeated <i>social and non-social</i> stimuli

## METHODS

Testing goals:

- 40 6-12-year-old children with ASD (5 ASD participants tested this summer)
- 40 age and 40 language matched TD participants (3 TD participants tested this summer)

Testing Sessions:

- In-person, 2.5 hrs; EEG and behavioral tasks
- Zoom, 1.5 hrs; behavioral and lexical prediction tasks and standardized tests

EEG Visual Neural Adaptation Task:

- Participants viewed high-repetition and low-repetition blocks of faces and objects
- Block of stimuli were followed by a smiley face for attention

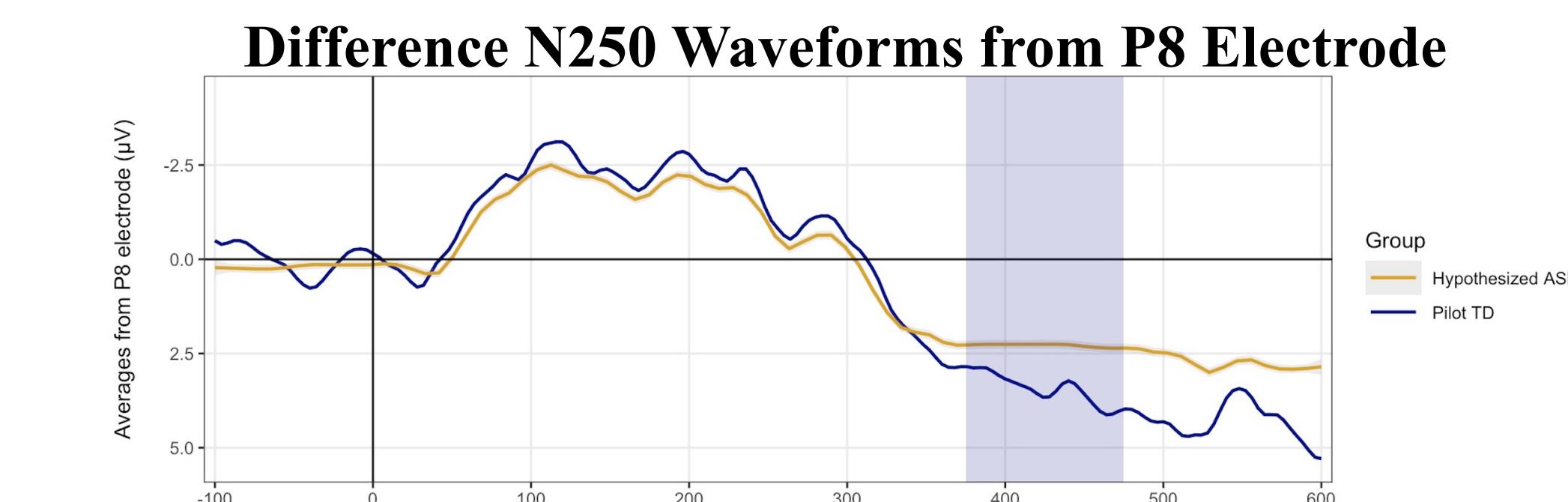
## STIMULI

	High-Repetition	Low-Repetition
Faces		
Objects		

## HYPOTHESES

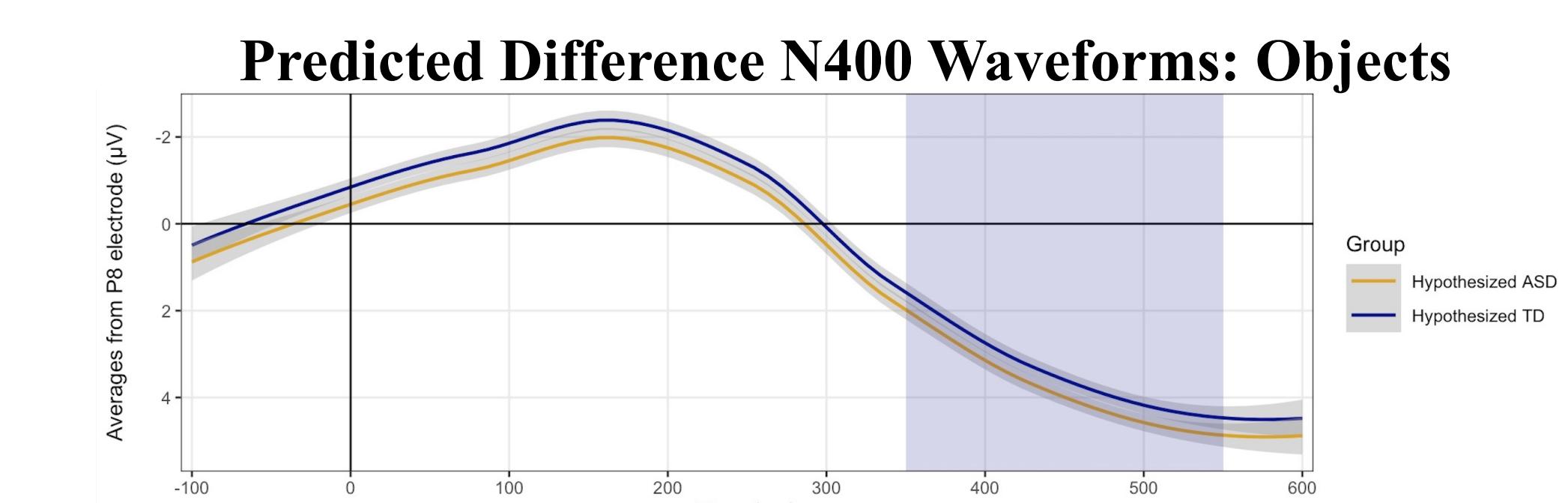
1) Adaptation to faces

- We expect children with ASD to exhibit diminished neural adaptation to social stimuli compared to TD children



2) Adaptation to objects

- We expect ASD children to exhibit typical neural adaptation to non-social stimuli compared to TD children



## FUTURE DIRECTIONS: EXPLORING ANIMACY

How does adaptation to repeated *animate* and *inanimate* objects differ between TD children and children with ASD?

- fMRI research has found different patterns of brain activation for animate and inanimate visual stimuli <sup>10</sup>
  - Does neural adaptation vary as well?
  - If no difference, could indicate domain-specific deficit in social-visual stimuli
  - If difference, could indicate domain general deficit in animate stimuli

## REFERENCES

- <sup>1</sup>American Psychiatric Association (2013); <sup>2</sup>Andrews et al. (2017); <sup>3</sup>Benda (2021); <sup>4</sup>D'Mello et al. (2023); <sup>5</sup>Olivares et al. (2015); <sup>6</sup>Perry et al. (2007); <sup>7</sup>Schendan et al. (2003); <sup>8</sup>Schweinberger et al. (2002); <sup>9</sup>Tanaka et al. (2006); <sup>10</sup>Webb et al. (2010); <sup>11</sup>Wiggett, et al. (2009)