

# Functional Connectivity Predicts the Emergence of High Violence Proneness in Developing Adolescents

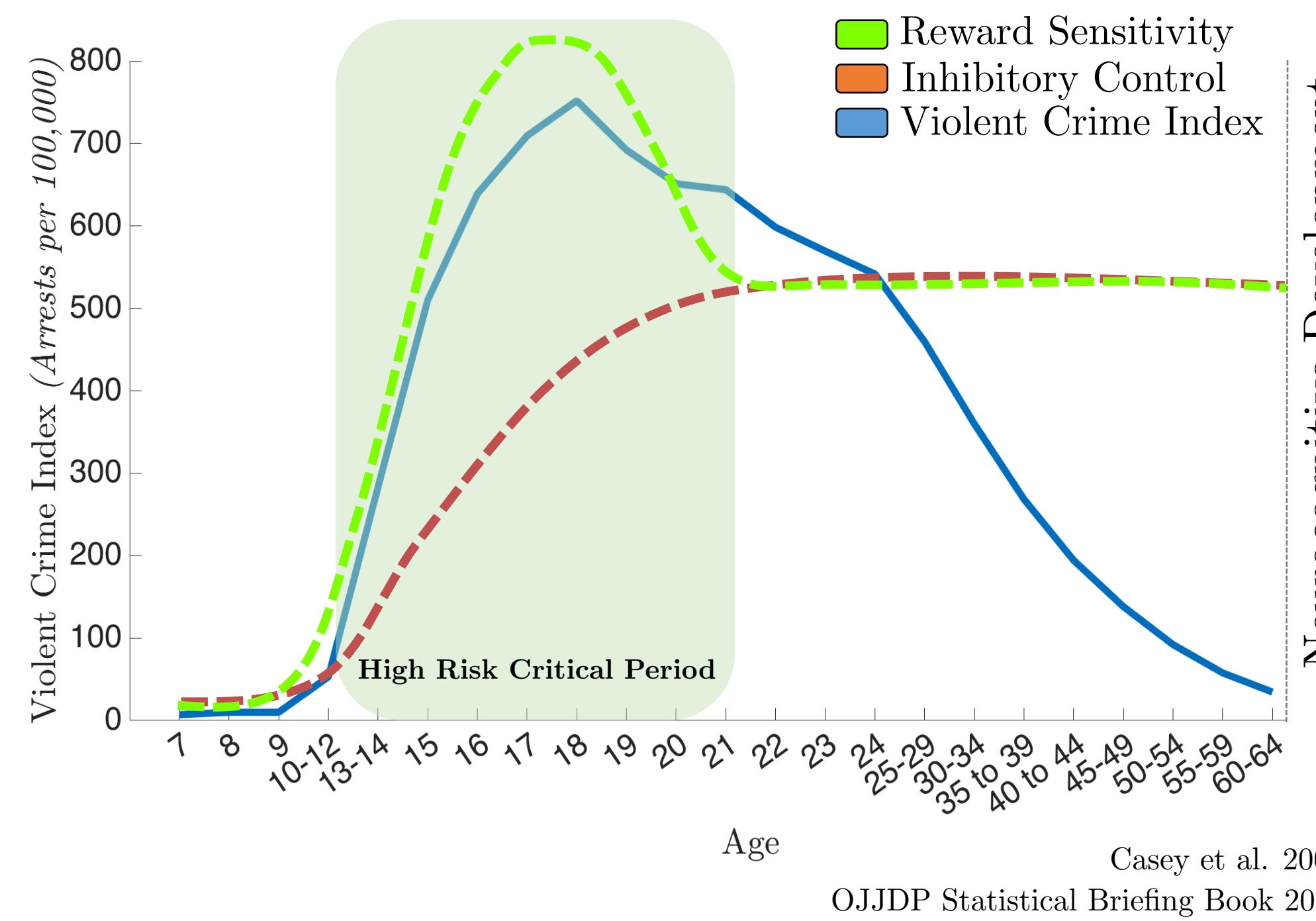
Shady El Damaty<sup>1</sup>, Kelly Martin<sup>1</sup>, Goldie-Ann McQuaid<sup>1</sup>, Valerie Darcey<sup>1</sup>, Emma J. Rose<sup>2</sup>, Diana Fishbein<sup>2</sup>, John VanMeter<sup>1</sup>

<sup>1</sup>Georgetown University, Center for Functional & Molecular Imaging, <sup>2</sup>Pennsylvania State University

## Background

### The Age-Crime Curve

#### Underlying Developmental Factors?

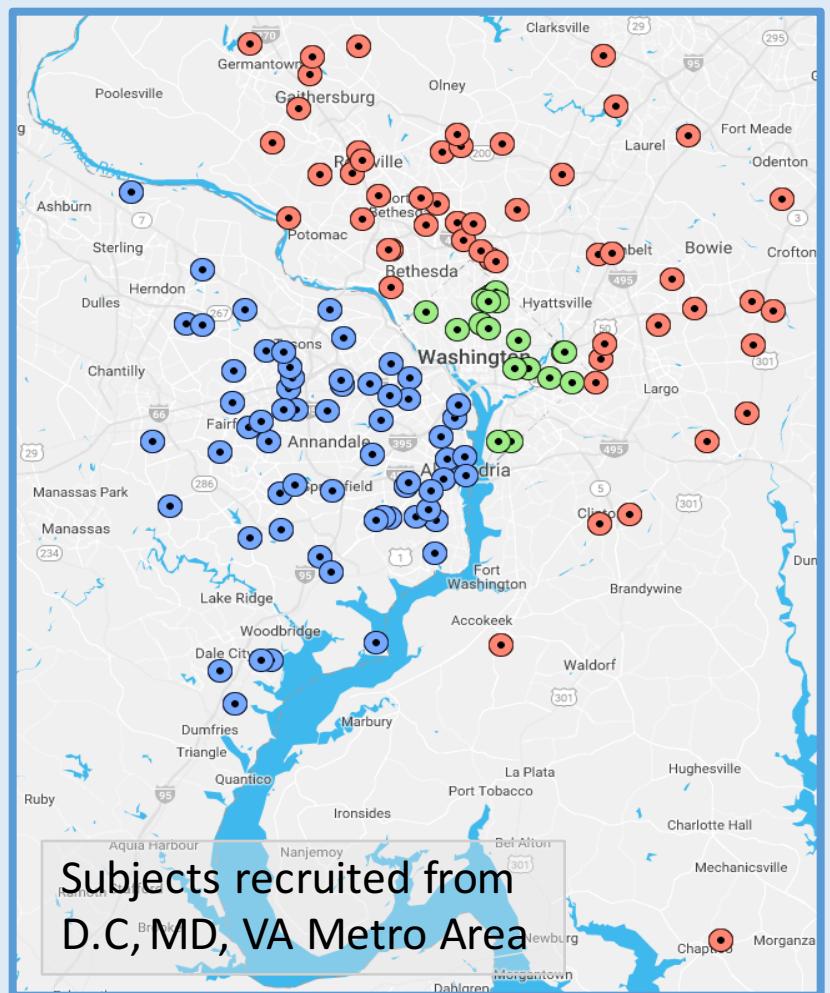


- The incidence rate of violent crimes follows a similar trajectory as age-dependent maturational changes during adolescence.
- Decreased inhibitory control, increased reward sensitivity and heightened aggression are all hallmarks of this transitional developmental period.
- Does an underlying neurodevelopmental trajectory predict a future pro-violent disposition?**

## Methods

### Adolescent Development Study (ADS)

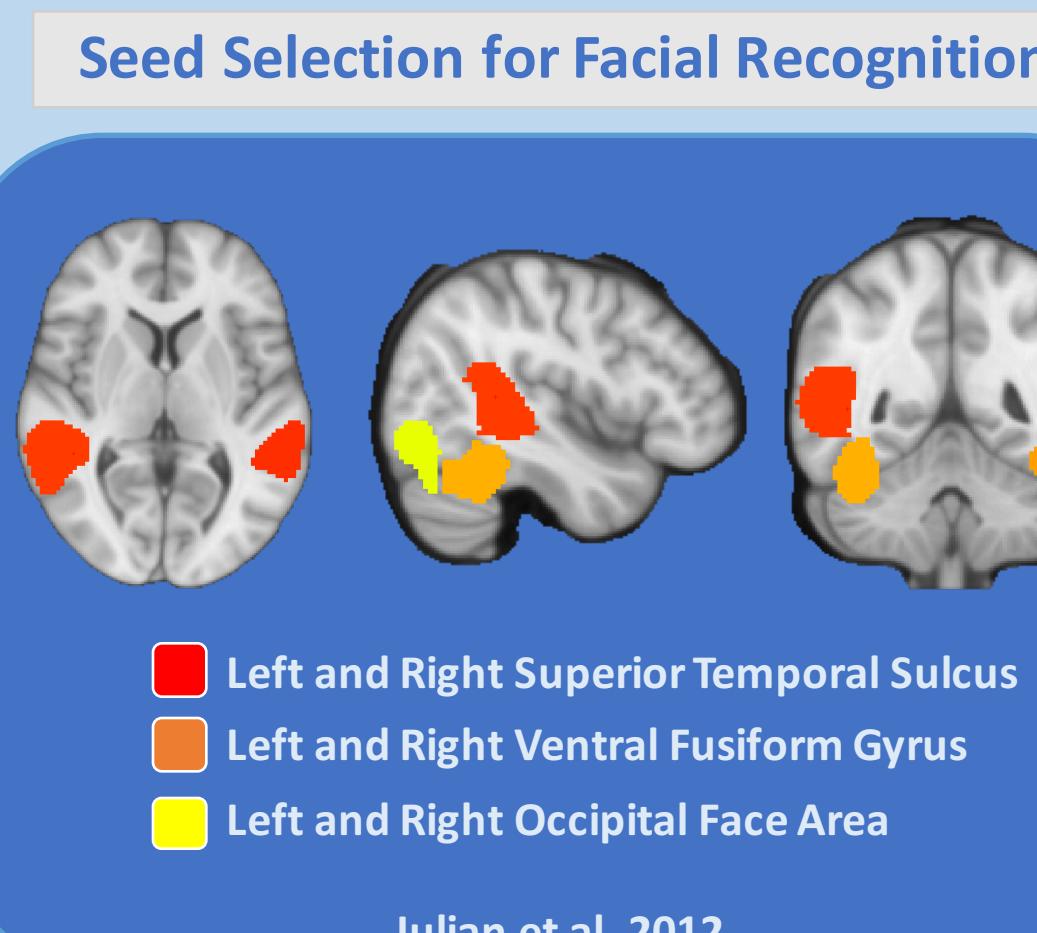
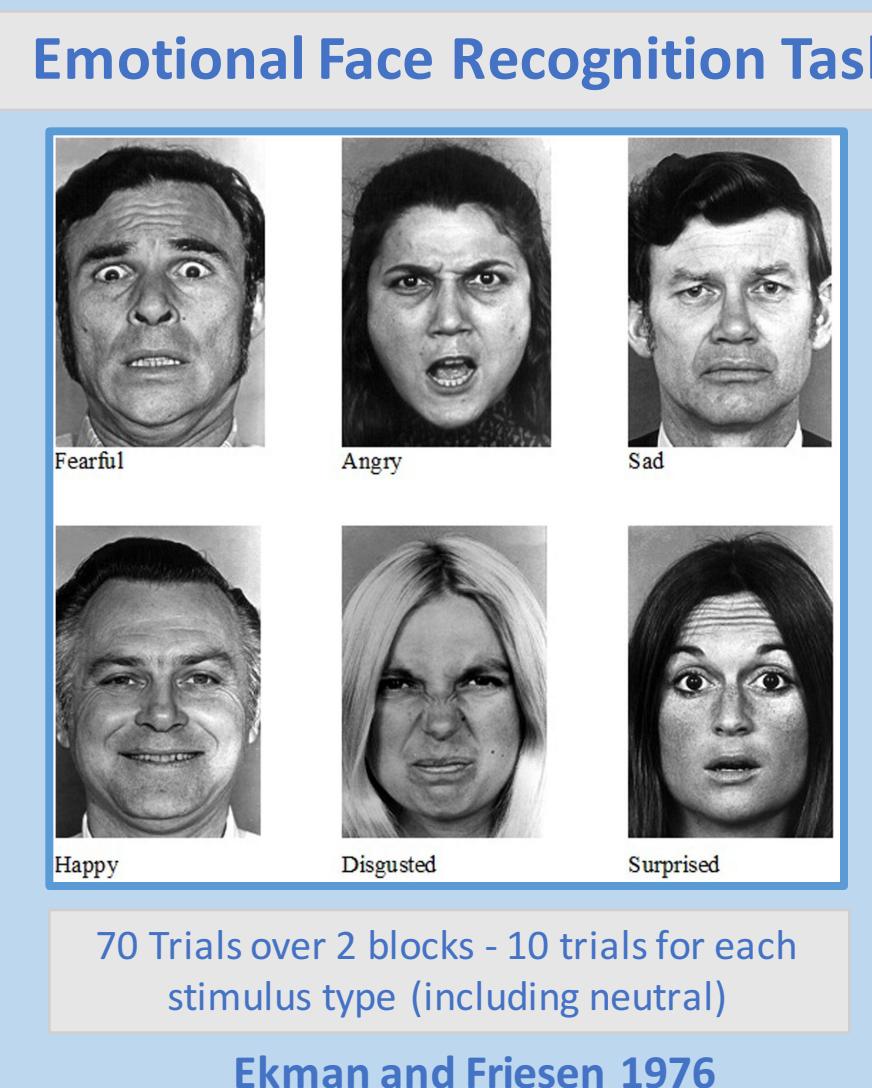
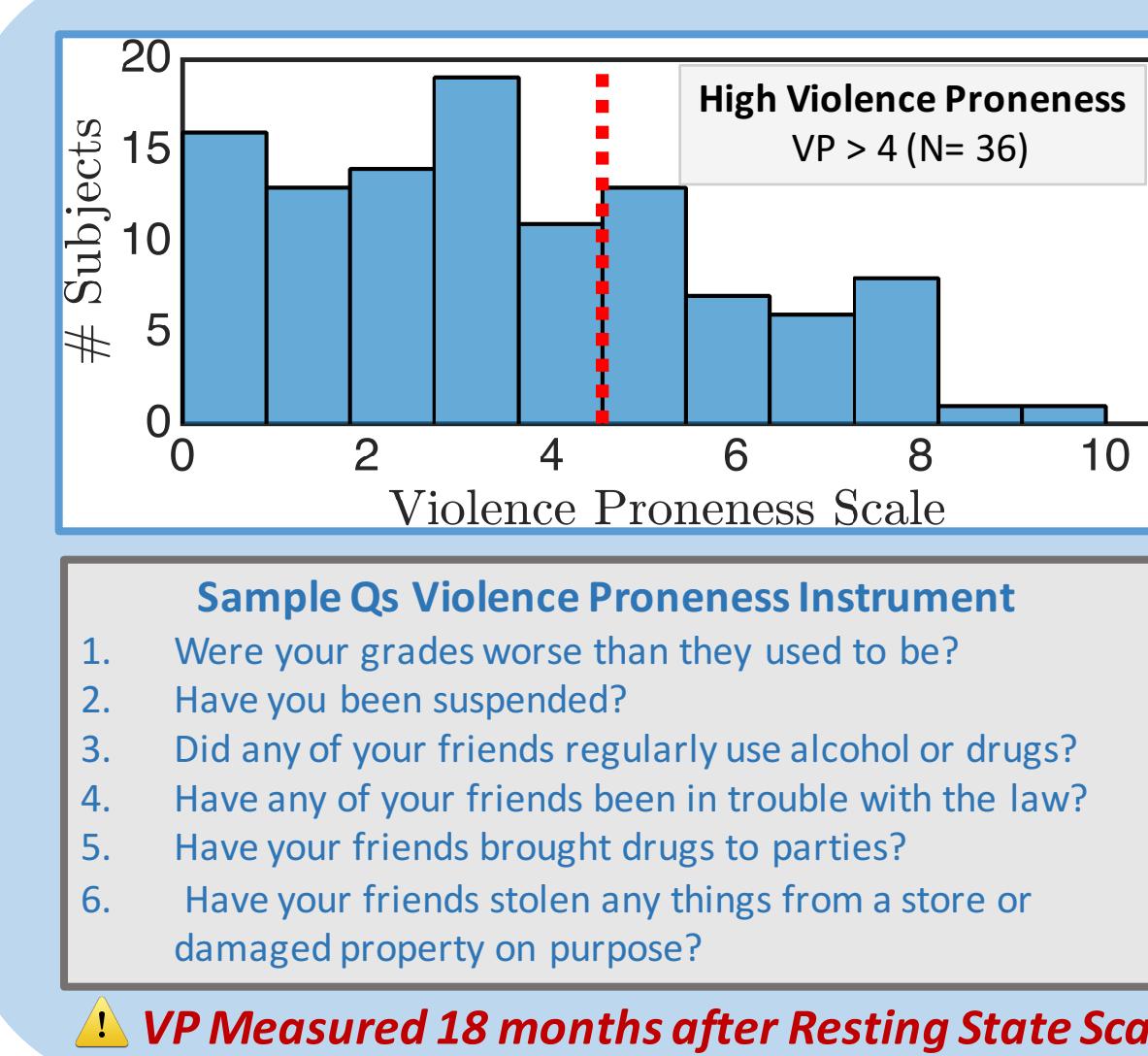
ADS is a prospective neurobehavioral longitudinal development study. 135 subjects were between ages 11-13 and reported drug naïvety at baseline. Subjects come in for three waves of data collection separated by ~18 months each.



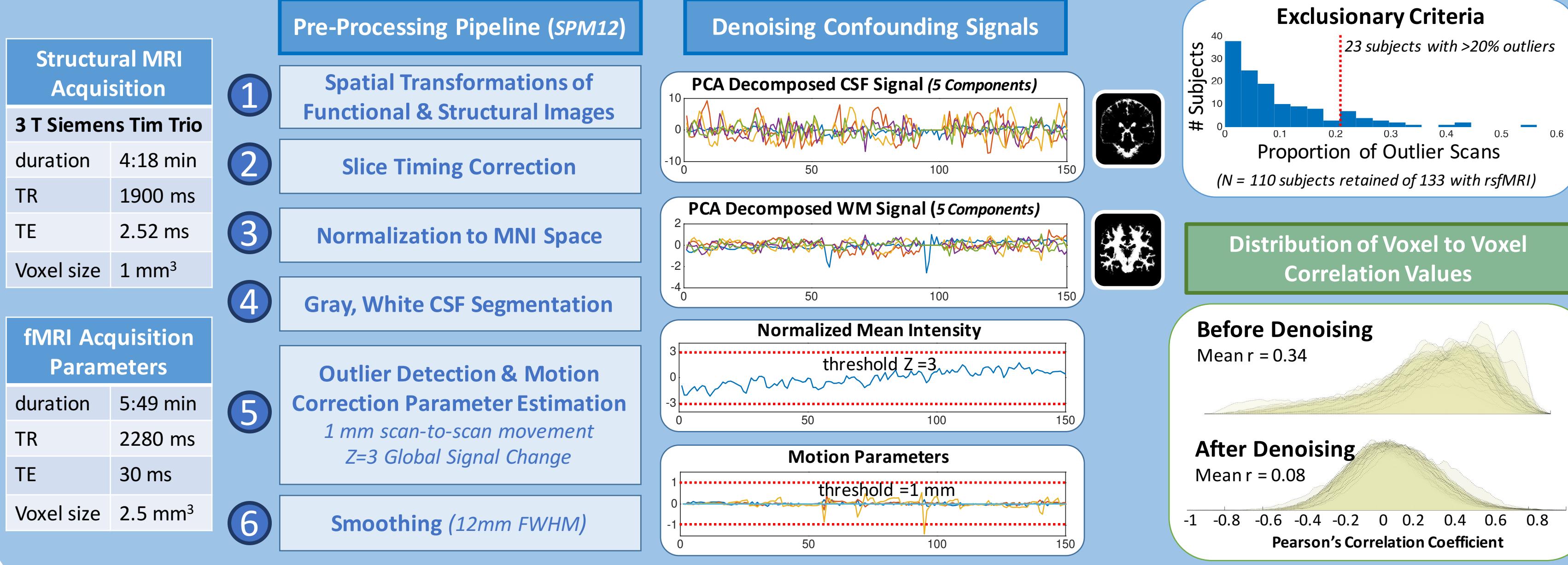
	High Violence Proneness	Low Violence Proneness	p (two-tail)
N	36	62	---
Age at Baseline	12.8 (0.70)	12.5 (0.70)	<b>0.036*</b>
Age at Follow-Up (18mos +/- 3 mos)	14.0 (0.76)	13.7 (0.72)	0.059
Race and Ethnicity			---
African American	16.6%	41.9%	
Caucasian	63.9%	46.8%	
Hispanic/Latino	8.3%	3.2%	
Other	11.2%	8.1%	
Sex (% Female)	20 F (55.6%)	32 F (53.3%)	0.710
Socioeconomic Status Index (z-score)	0.19 (0.87)	-0.024(0.97)	0.274
IQ (KBIT)	110.2 (14.0)	109.2 (14.2)	0.750

#### Drug Use Survey Inventory – Revised<sup>6</sup>

- Risk for Developmental Mood Disorder Subscale
  - Risk for Antisocial problem behavior Subscale
  - Violence Proneness SubScale
- Analyzed Data from wave 2 (ages 14-15)



### MRI Acquisition of Resting State Data & Functional Connectivity (FC) Analysis



## Acknowledgements

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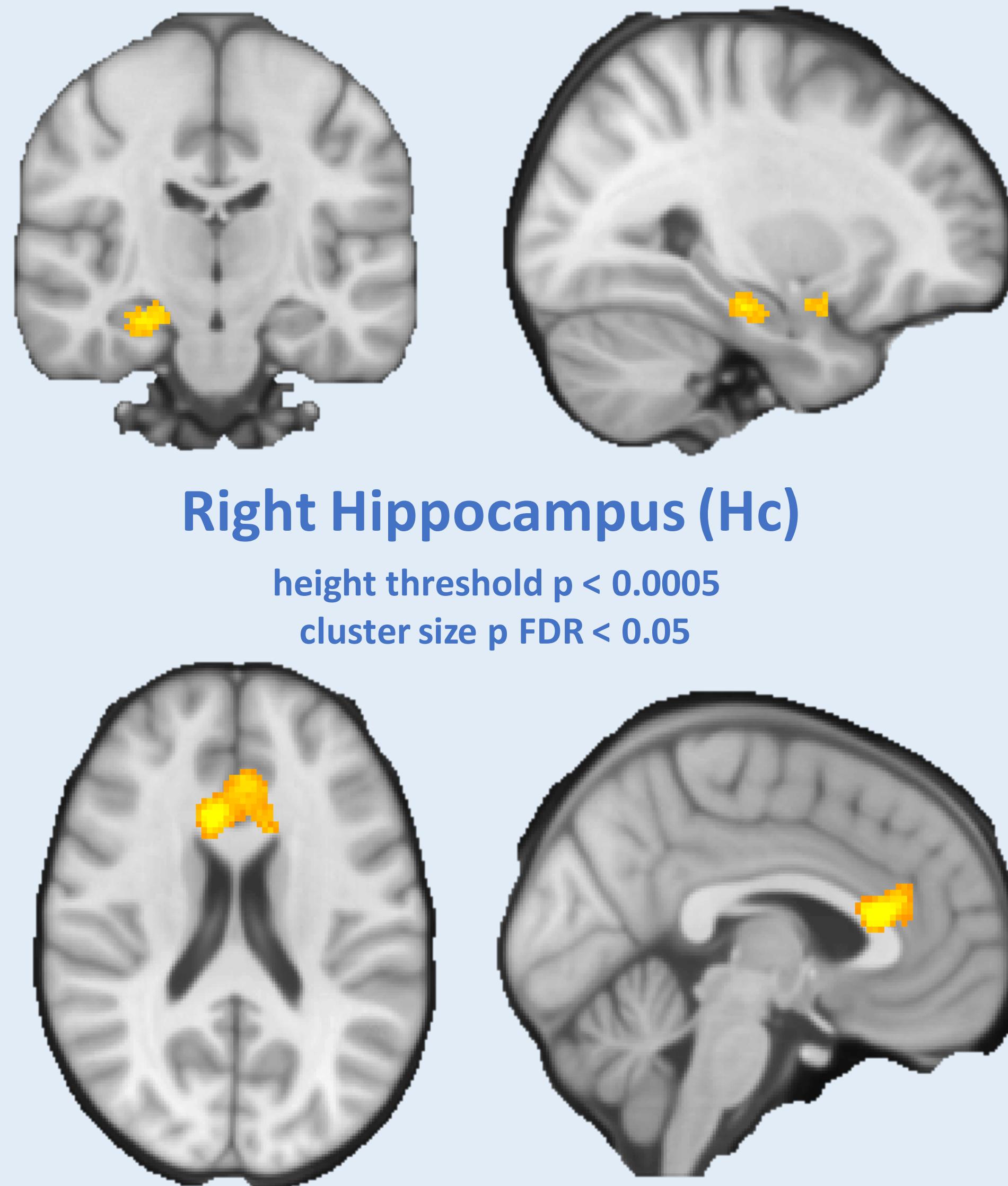
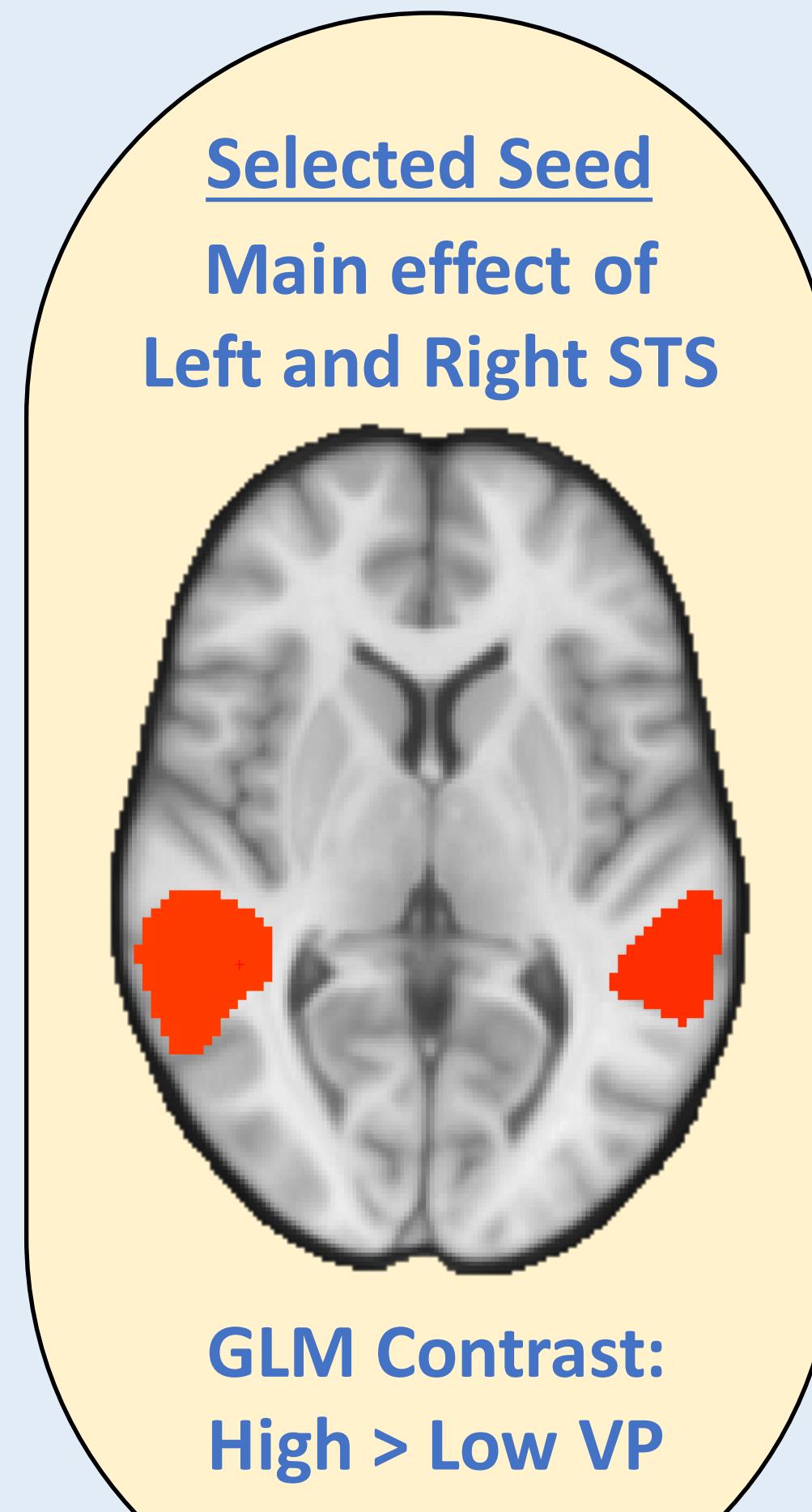
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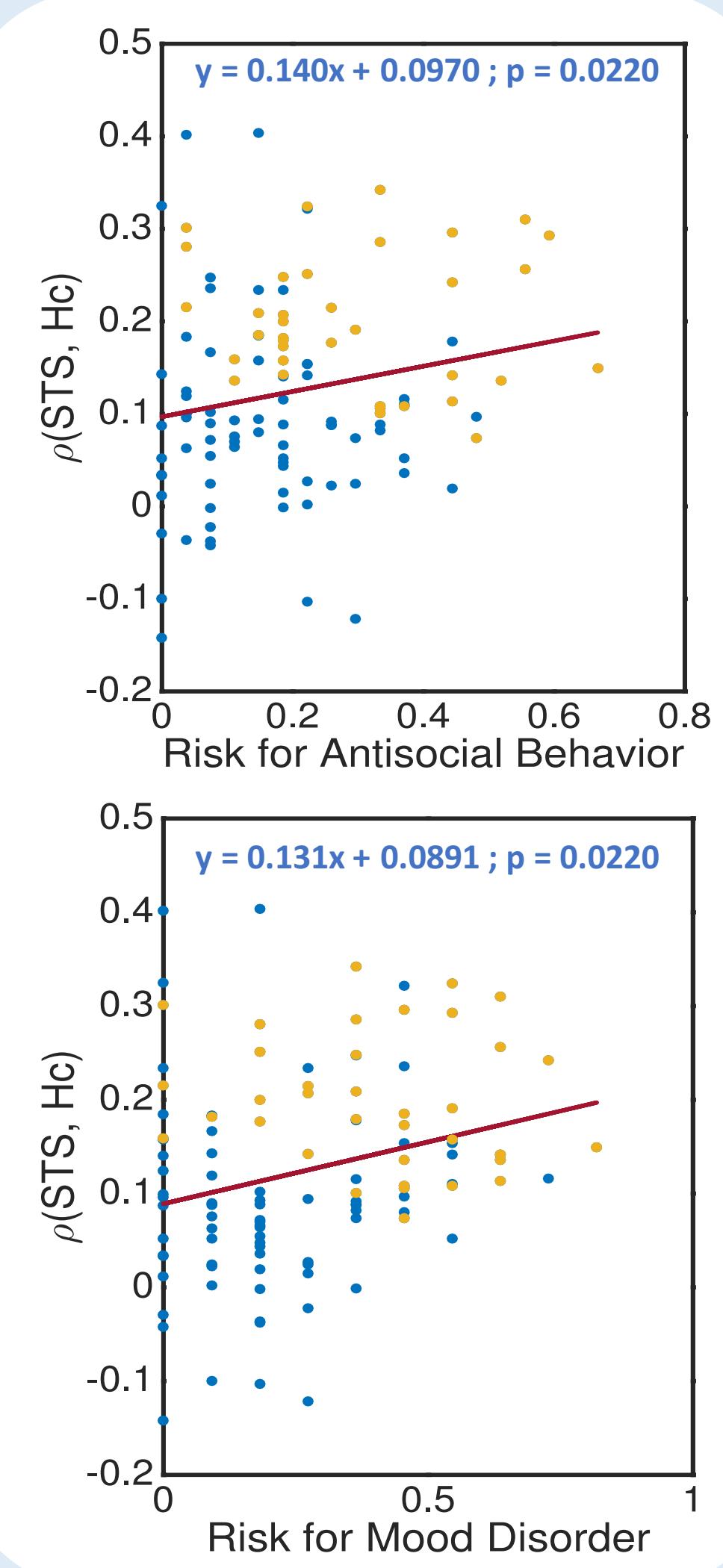
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## Results

### STS <-> Hc & ACC Functional Connectivity Predicts High Violence Proneness 18 Months Later

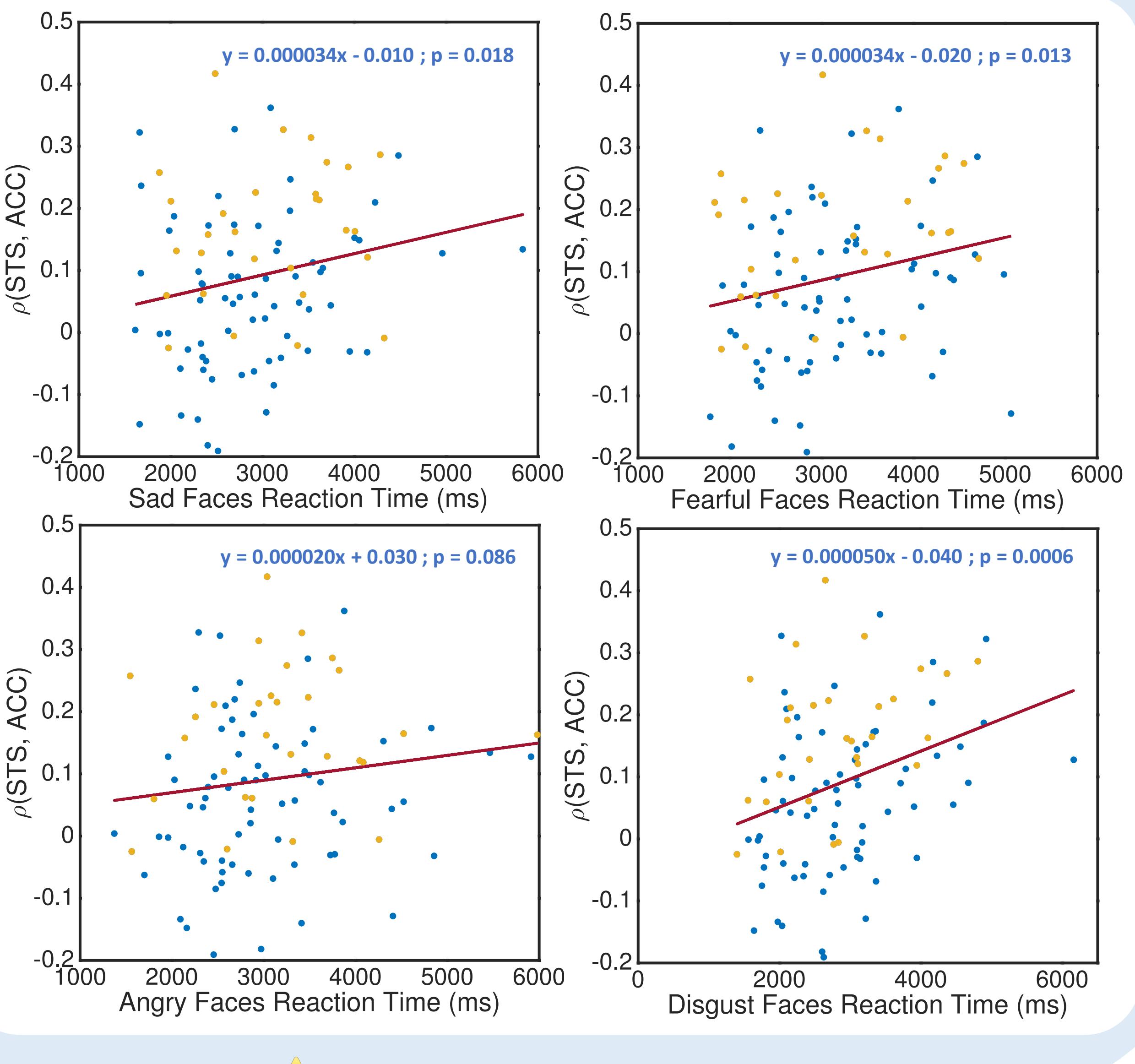


#### STS – Hc FC Correlates with Risk for Antisocial Behavior and Mood Disorders



## Conclusions

### STS – ACC FC Correlates with Reaction Time for Recognition of Emotional Faces



- Baseline functional connectivity between the Superior Temporal Sulcus (STS) and the Hippocampus (Hc) & between the STS and Anterior Cingulate Cortex (ACC) predicts high violence proneness 18 months later.
- STS, Hc functional connectivity is correlated with elevated baseline risk for developmental mood disorders and antisocial behavioral problems.
- STS, ACC functional connectivity linearly covaried with reaction time on emotional face recognition tasks, suggesting greater processing difficulty.
- These findings suggest violence proneness in adolescents is predicted by increased connectivity between cortico-limbic structures important for social decision making and emotional processing.

## References

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