Growing Familiar: How Pubertal Development Shapes Adolescent Brain Responses to Familiar Faces

Kendall R. Nelson, Cailee M. Nelson, Caitlin M. Hudac

Department of Psychology, Institute for Mind and Brain, and Carolina Autism and Neurodevelopment (CAN) Research Center at **University of South Carolina**

Brain Research Across Development Laboratory
PI: Dr. Caitlin Hudac
www.b-radlab.com

Funding: R01HD107593

SCAN ME

Background

- Adolescence is a critical period of social development marked by heightened sensitivity to social stimuli, including faces.
- Faces provide important information related to identity, trust, and social belonging, and the brain contains specialized mechanisms for recognizing familiar individuals.
- Pubertal maturation contributes to ongoing changes in social cognition and neural development beyond those explained by chronological age

Objectives

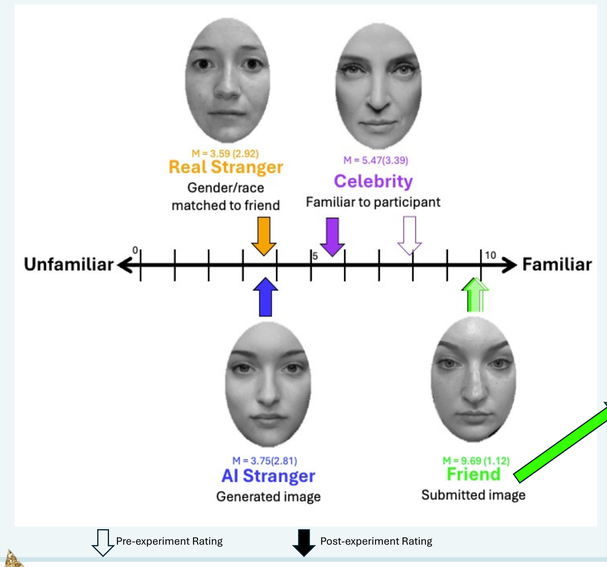
1. evaluate brain responses to varying levels of facial familiarity and AI generated images

Friends < Celebrity < Strangers

2. determine whether pubertal development, controlling chronological age, influences these neural responses

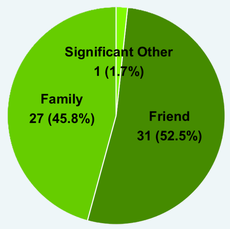
↑ Maturity, ↓ P3 to Friends

Methods

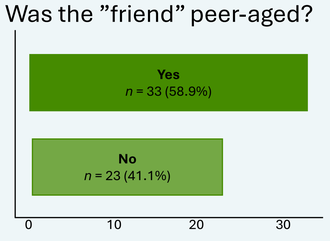


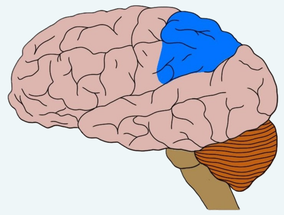
Friend Demographics (N = 77)

Who was the "friend"?



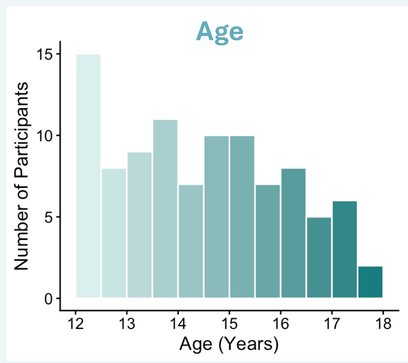
Was the "friend" peer-aged?

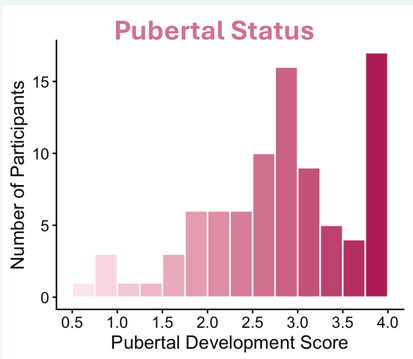




P300 ERP Component = attention allocation, stimulus evaluation, and familiarity processing.

Amplitude = magnitude of neural engagement
Latency = Speed of stimulus evaluation and categorization

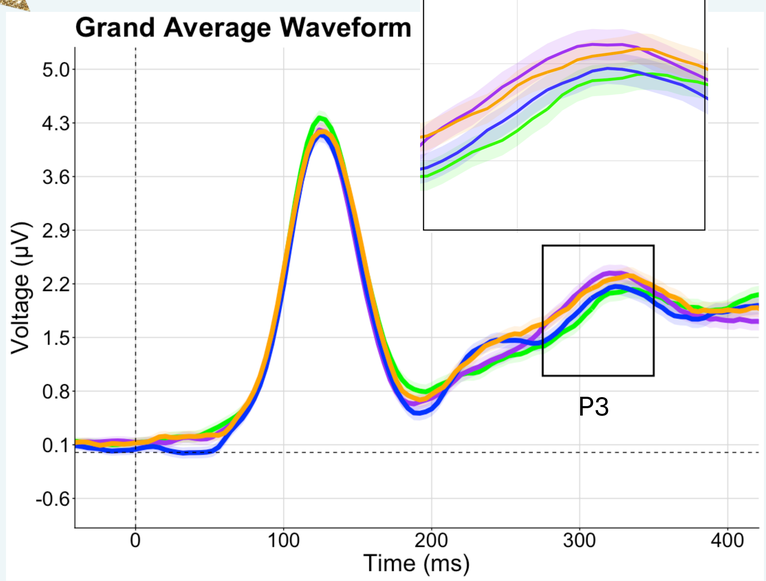




Demographics (N=90)	Mean	SD	Range	Possible Range
Age	14.65	1.60	12-17	12-17
Puberty (n = 80)	2.85	0.79	0.75-4	0-4

Results

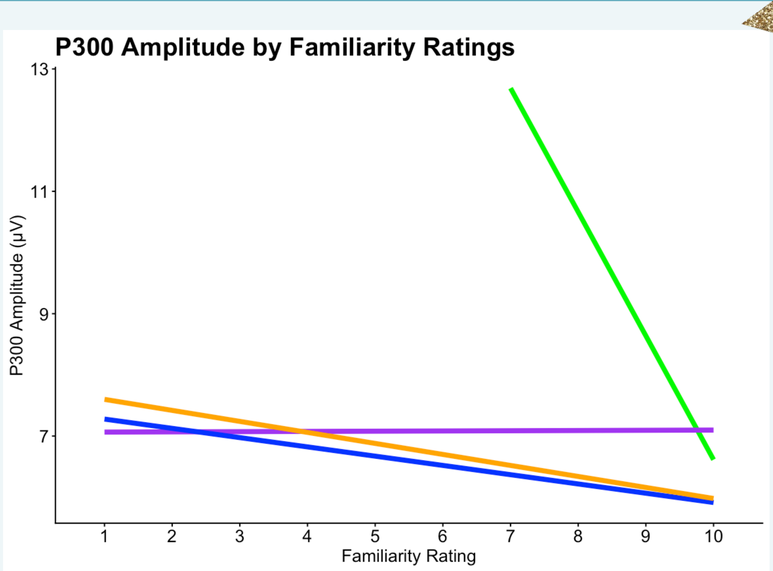
1



P300 amplitude significantly differed via face condition (p = .005).
Post-hoc analysis revealed smaller P300 amplitudes to:

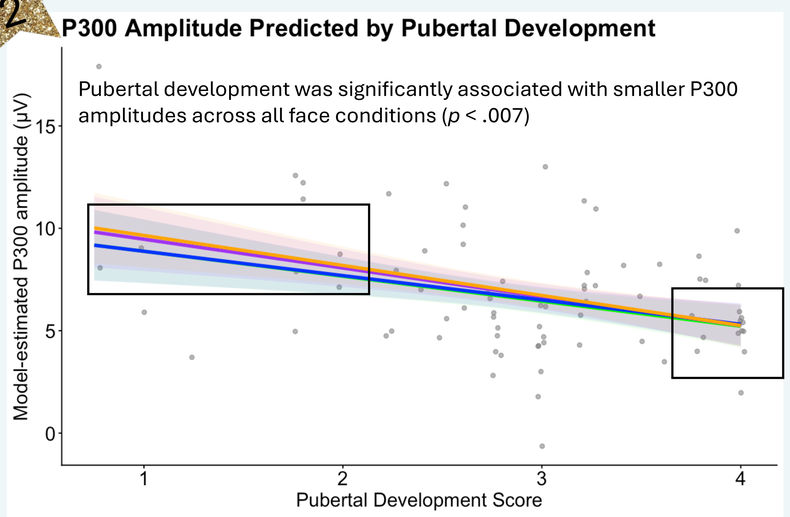
Friend < Celebrity/Real Strangers (p <.031)
AI Stranger < Celebrity/Real Strangers (p < .033)

P300 latency significantly differed via face condition (p =.001).
Post-hoc analysis revealed longer P300 latency to:
Friend > Celebrity (p = .028)



Lower familiarity ratings for **friend** faces was associated with greater P300 amplitude (p= .042).

2



Pre & early pubertal (PDS = 1 and 2):
Friend < Real Strangers (p <.021)
AI Stranger < Real Strangers (p < .021)

Postpubertal (PDS = 4):
No cond. Diff.

Key Takeaway:

Lower self-rated familiarity of Friend faces predicted increased P300 amplitude, which may indicate an **increased neural processing when less certain about face relevance**.

Maturation broadly reduces P300 amplitude. Critically, **less mature teens had smaller P300 amplitudes to personally-relevant faces (Friend, AI Stranger).**

References 1. Blakemore et al., 2008 2. Crone & Dahl, 2012 3. Polich, 2007 4. Petersen et al., 1988