



# Age-Related Effects on Response Inhibition in Youth at Familial Risk for Bipolar Disorder

Simona Graur, Cecile D. Ladouceur, Anna Manelis, Kelly Monk, Lisa K. Bonar, Genna A. Bebko, Michele Bertocci, Boris Birmaher, Mary L. Phillips  
 Department of Psychiatry, University of Pittsburgh School of Medicine, Pittsburgh, PA



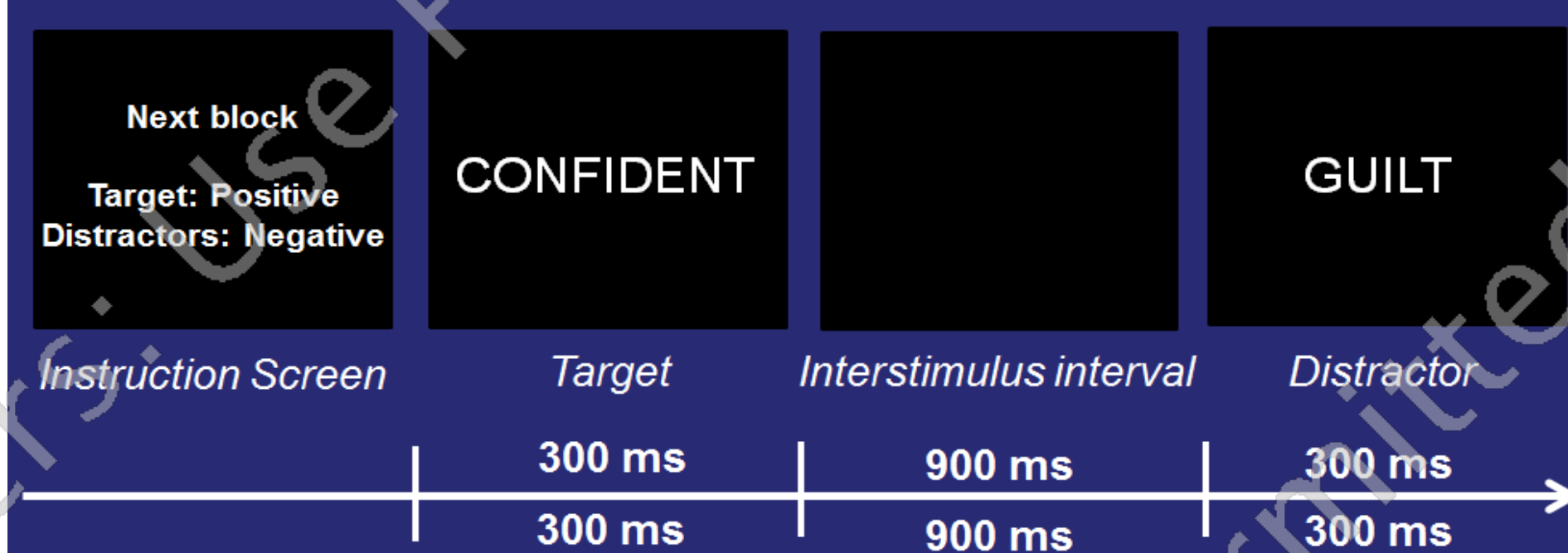
## BACKGROUND

- Impulsivity: core feature of Bipolar Disorder (BD)<sup>1</sup>
- Possible cognitive endophenotype for BD<sup>2</sup>
- Impulsivity measured via Response Inhibition (RI) in context of emotionally salient information
- Adults with BD exhibit altered RI in context of emotionally salient information
- More studies needed to determine extent RI in emotionally salient context is altered in youth at risk for BD
- Cambridge Neuropsychological Test Automated Battery (CANTAB), Affective Go/No-Go Task (AGN) commission errors variable used to measure altered RI

**Hypothesis:** In comparison to controls, and other at-risk groups, at-risk BD youth exhibit altered RI via commission errors on AGN task

## METHODS

### Affective Go/No-Go Positive Trial Example



### Affective Go/No-Go Negative Trial Example



### Variables of interest

- Omission errors: no response for target word
- Commission errors: response for distractor word
- Reaction time (RT) of correct responses

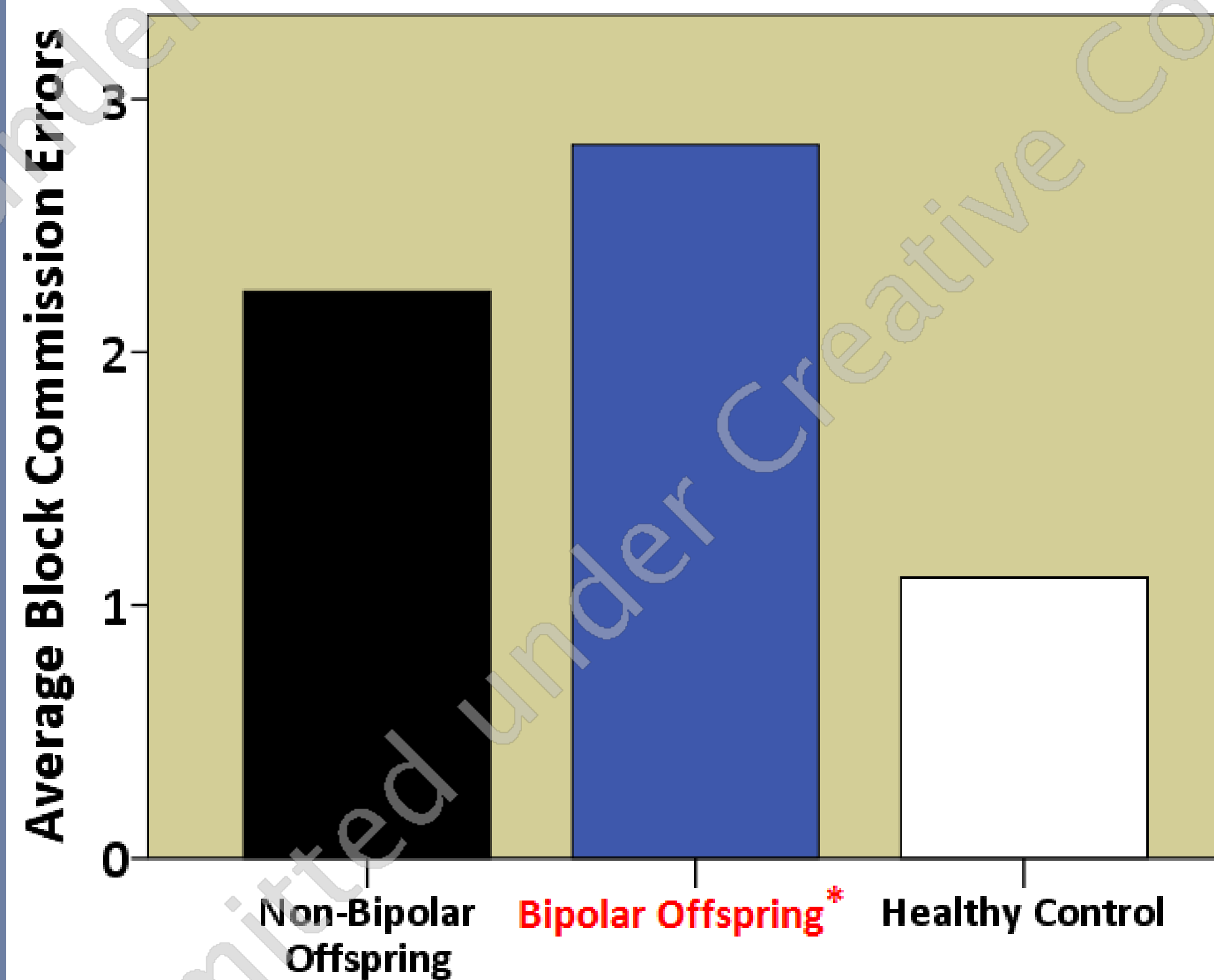
## METHODS

**32 BO (BD Offspring):** offspring of parents with BD  
**28 NBO (Non BD Offspring):** offspring of parents with non-BD diagnoses  
**23 HC (Healthy Controls):** psychiatrically healthy offspring of psychiatrically healthy parents

Demographic measures	BO	NBO	HC
Age (years)	13.9 ± 2.4	13.4 ± 2.3	13.5 ± 1.8
Sex, male/female	17/15	15/13	14/9
IQ	102.6 ± 14	101.6 ± 12	103.8 ± 13.9
SES (highest education)	5.4 ± 0.9	5.5 ± 1	5.1 ± 0.9
Clinical Measures			
Current Any DSM-IV Dx	12/32	10/28	na
Multiple DSM-IX Dx	6/32	5/28	na
ADHD Dx	7/32	4/28	na
Anxiety Dx	4/32	4/28	na
MDD Dx	3/32	2/28	na
ODD Dx	2/32	2/28	na
Phobias Dx	2/32	2/28	na
Current Psychotropic Rx	3/32	4/28	na

Mean ± SD (Range) or Proportion \*No significant differences between groups

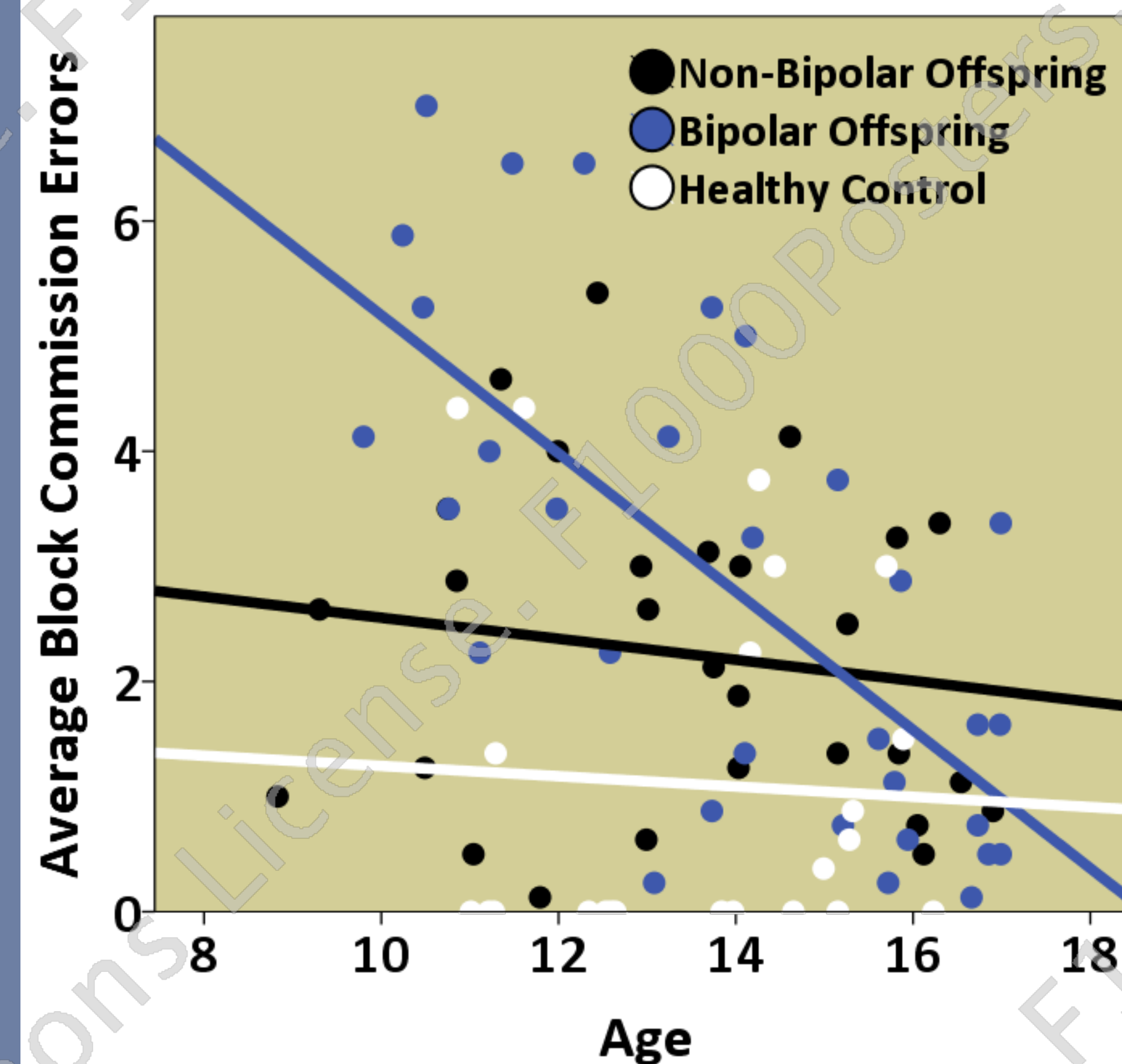
## RESULTS



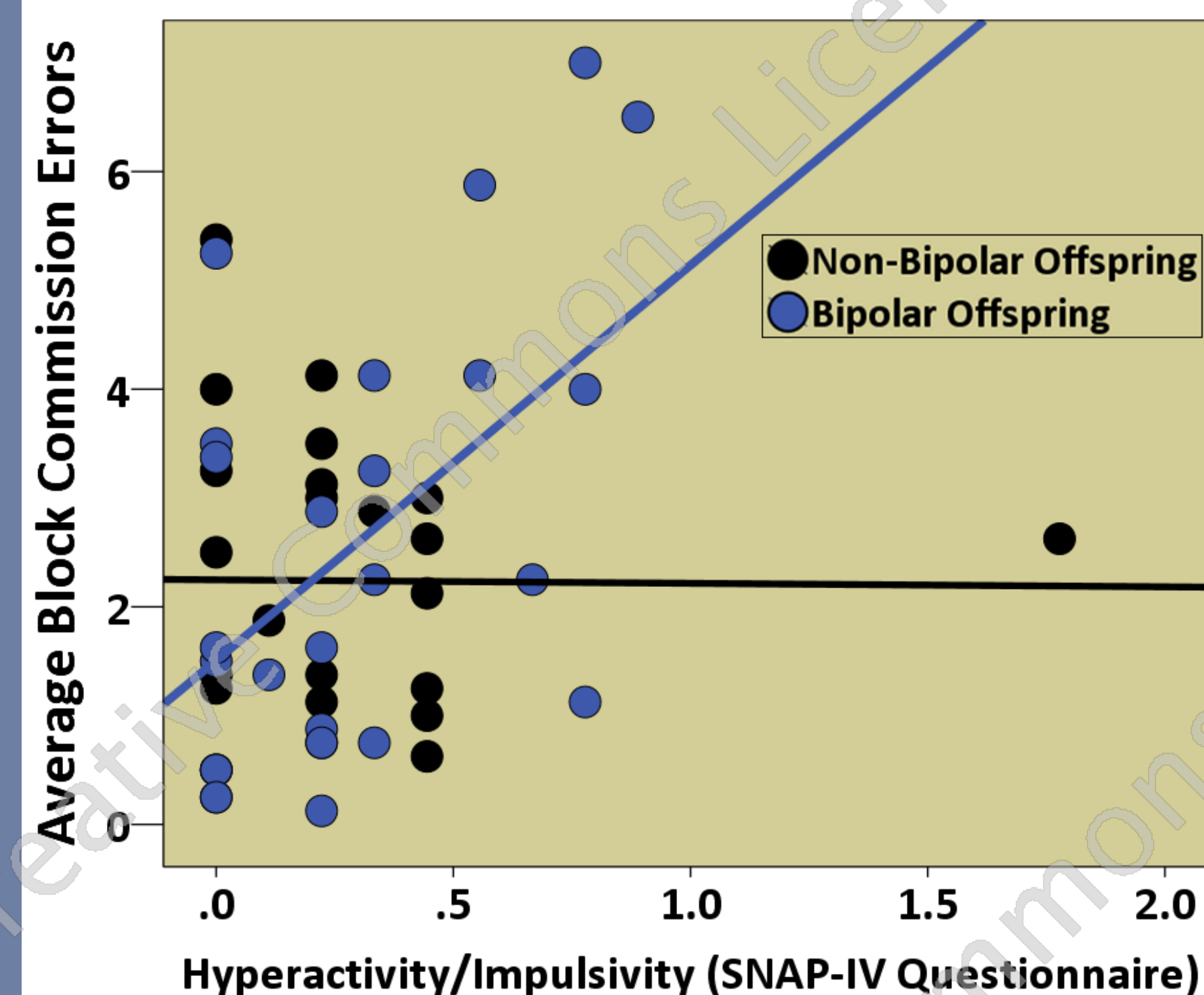
\*Bonferroni post hoc comparisons indicate significant difference from Healthy Control Group

## RESULTS

**Commission Errors:** significant group by age interaction ( $F(2,77)=5.76, p=.005$ ). Negative association between age and errors of commission for BO participants ( $r=-.68$ ), but not in NBO ( $r=-.15$ ) or HC ( $r=-.05$ ) participants (Fisher's test  $p=.01, p=.007$ ).



**Commission Errors:** positively associated w/ hyperactivity and impulsivity score in BO ( $r=0.53$ ), but not in NBO ( $r=-.01$ ) (Fisher's test,  $p=.05$ ), when ADHD dx's removed



Secondary analyses revealed no effect of medication or diagnoses (ADHD or otherwise), on commission errors, omission errors, or reaction time.

## RESULTS

Symptom Measures	BO	NBO	Statistics
SNAP-IV Questionnaire: Hyperactivity/Impulsivity	0.56 ± 0.67	0.28 ± 0.36	t(58)=2.0 p=.05
SNAP-IV Questionnaire: Inattention	1.1 ± 0.54	0.54 ± 0.45	t(58)=3.1 p=.003
SNAP-IV Questionnaire: Inattention/Overactivity	0.86 ± 0.46	0.66 ± 0.12	t(58)=2.9 p=.006
SNAP-IV Questionnaire: Academic Impairment	0.84 ± 1.0	0.27 ± 0.47	t(58)=2.7 p=.008
SNAP-IV Questionnaire: Department Impairment	0.51 ± 0.15	0.82 ± 0.44	t(58)=2.1 p=.045

Mean ± SD (Range) or Proportion \*Significant when controlling for ADHD

## CONCLUSION

- Higher commission errors in younger compared to older BO, but not in NBO or HC, suggests age-related alterations in RI could represent marker of BD risk.
- When participants with ADHD were removed from sample, effect remained.
- No effect of valence on performance

### Future Directions

- Include neutral block
- Concurrent neuroimaging in order to determine extent to which alterations in underlying RI circuitry contributes to behavioral effects.
- Participant follow-up to examine extent findings associated with future BD

## REFERENCES

- American Psychiatric Association (2013) Diagnostic and Statistical Manual of Mental Disorders DSM-5 (5th ed). American Psychiatric Publishing, Washington, DC
- Bora, E., Yucel, M., Pantelis, C., 2009. Cognitive endophenotypes of bipolar disorder: a meta-analysis of neuropsychological deficits in euthymic patients and their first-degree relatives. J. Affect. Disord. 113, 1–204.