



INHIBITION DEFICITS, EMOTION DYSREGULATION, AND AGGRESSION IN CHILDREN WITH ADHD

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BACKGROUND

What is ADHD?

- developmental disorder
- Characterized by being excessively active, impulsive, and disorganized with off task behaviors (that is not age-appropriate) (Mitchell et al., 2017; American Psychiatric Association, 2013)
- clinically classified as
 - primarily inattentive
 - primarily hyperactive/impulsive or
 - a combination of both (Nigg & Casey, 2005).

Often have emotion regulation deficits and executive function deficits (Bunford et al., 2014; Nigg & Casey, 2005).

BACKGROUND

Emotion Regulation

- Process of influencing what emotions are felt and when, and how you experience and express them (Gross, 1998).
- How?
 - Modulating responses, discriminating emotions
 - Cognitive regulation
 - Ex. selection of situation, deployment of attention, reappraisal, (Martin and Ochsner, 2016; Gross, 1998)

BACKGROUND

Executive Function

- top down control overriding thoughts actions and emotions in favor for goal (Hare and Casey, 2005)
 - Inhibition
 - Ex. Does the child have trouble putting brakes on his/her actions?

BACKGROUND

Aggression

- Looking specifically at
 - Reactive Aggression- frustration and provocation, poor executive function and impulsivity
 - Those with reactive aggression often have greater difficulty with Emotion regulation (Ahmed et al., 2015)
 - Higher prevalence in ADHD (Shaw et. al., 2007)

OUR HYPOTHESES

- emotion dysregulation is associated with both inhibition and aggression, and this association is higher in those with ADHD.
- emotion dysregulation has an effect on aggression, but this effect is a result of inhibition deficits

METHODS

Participants

- 61 one participants
 - typically developing (TD) children (n=28, 12 female)
 - ADHD children (n=33, 15 female).
 - Between 8-12 years old (mean=10.2 for TD, 9.2 for ADHD)

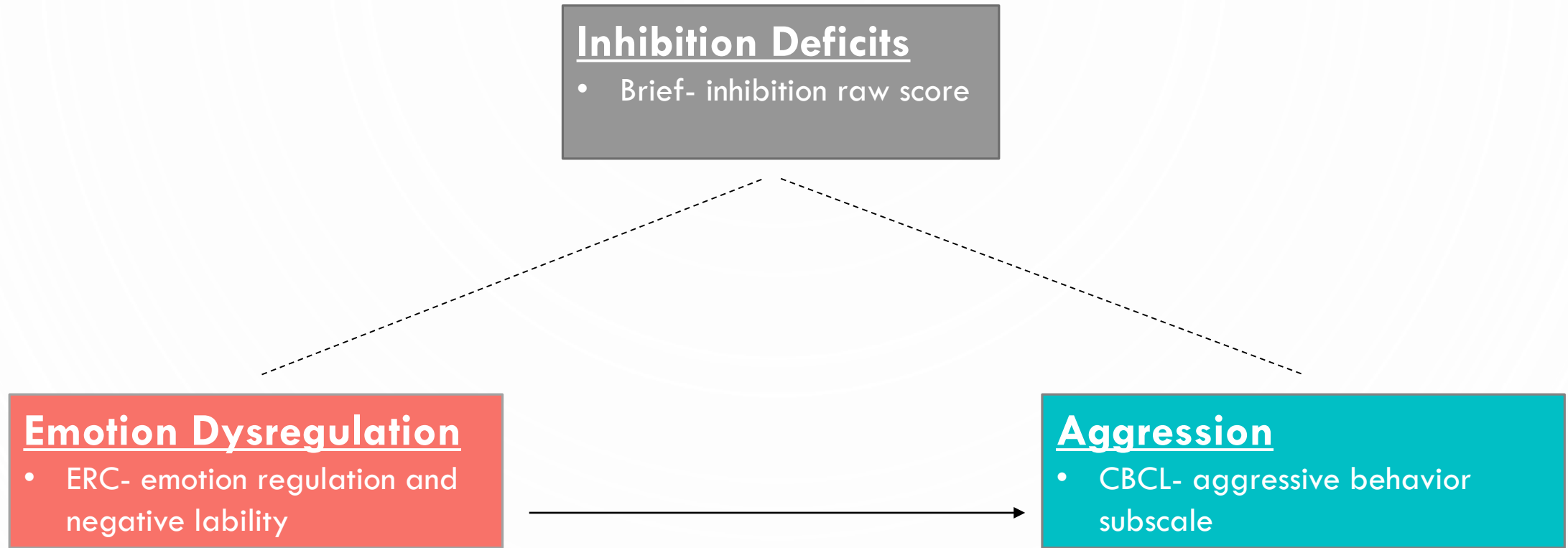
METHODS

Measures

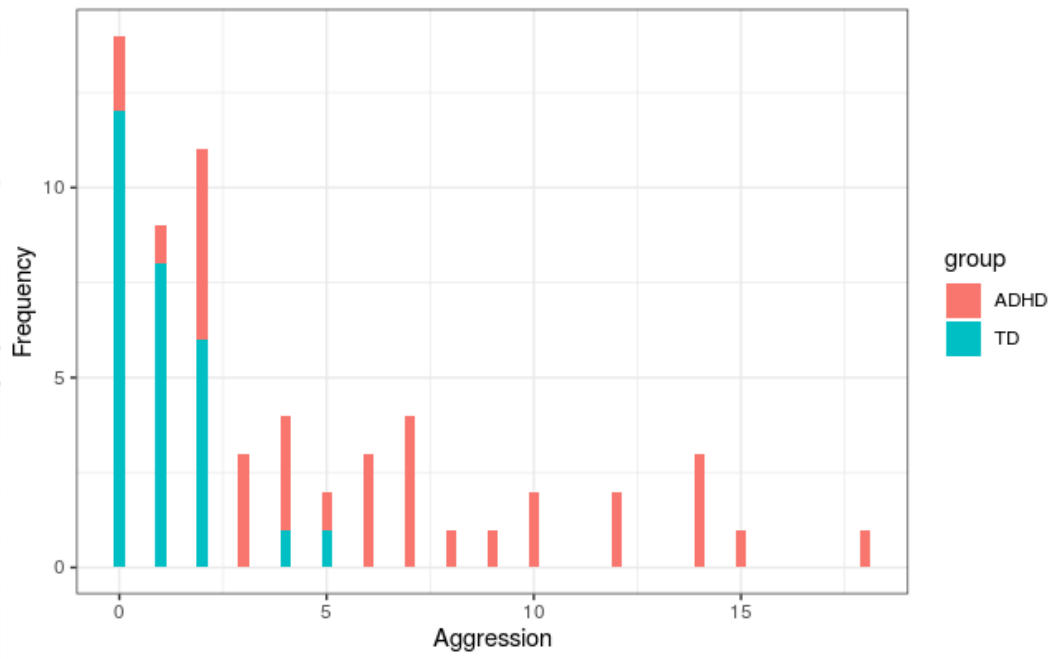
- Emotion dysregulation - **Emotion Regulation Checklist**
 - Emotion regulation and negative lability
 - Ex. if the child displays appropriate negative emotions (anger, fear, frustration, distress) in response to “hostile, aggressive or intrusive acts by peers.” (Shields & Cicchetti, 1997; Molina et al., 2014)
- Inhibitory Deficits- Behavior Rating Inventory of Executive Function
 - Ex. “Does the child get out of control more than friends or interrupts others..” (Gioia et al. 2000).
- Aggression- **Child Behavior Checklist**
 - Ex. Does child “child gets into fights” or “argues a lot” (Achenbach & Rescorla, 2001)

MEDIATION ANALYSIS -

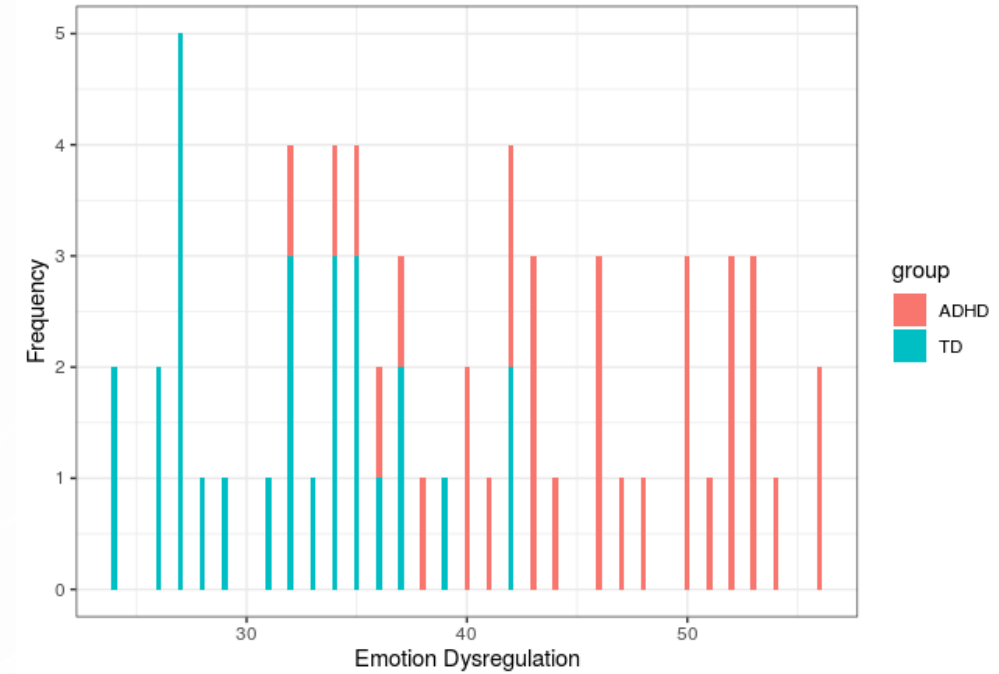
Do inhibitory control deficits mediate (or account for) the relationship between emotion dysregulation and aggression



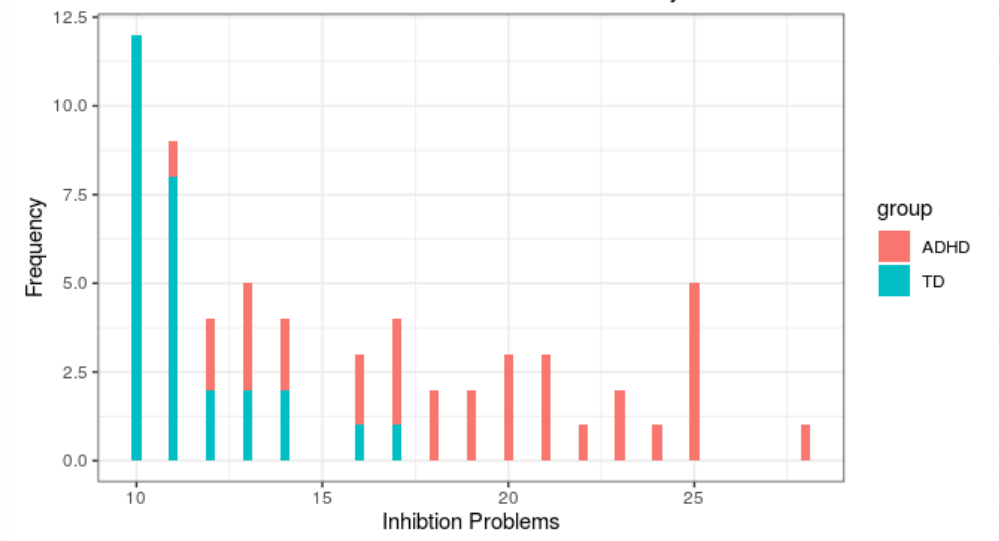
Agresion of TD + ADHD Subjects



Emotion Dysregulation of TD + ADHD Subjects



Inhibition Problems of TD + ADHD Subjects



COMBINED ADHD AND TD GROUP

Inhibition Deficits

- Brief- inhibition raw score

Coefficient .71***

Coefficient 0.01

Emotion Dysregulation

- ERC- emotion regulation and negative lability

Coefficient .74***

Aggression

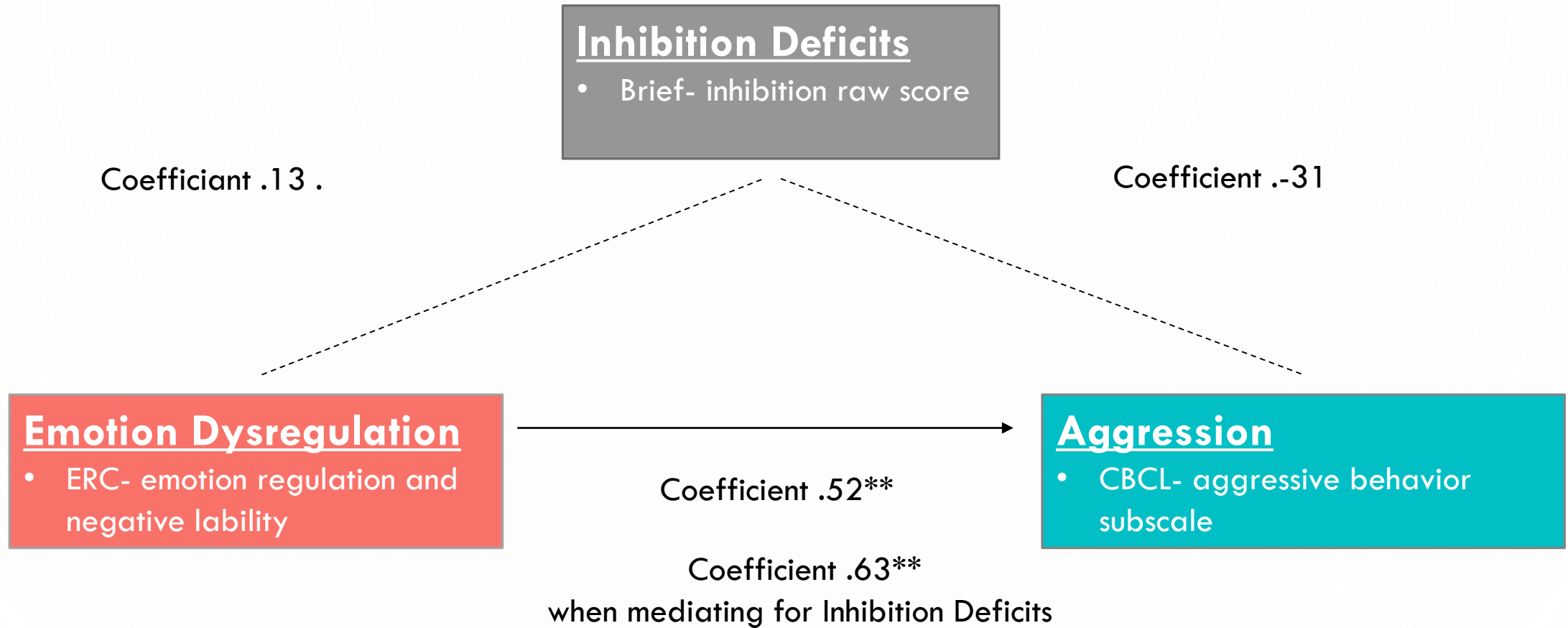
- CBCL- aggressive behavior subscale

Coefficient 0.73***

when mediating for Inhibition Deficits

Significance Key: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

TYPICALLY DEVELOPING(TD) GROUP



Significance Key: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

ADHD GROUP

Inhibition Deficits

- Brief- inhibition raw score

Coefficient .39.*

Coefficient -.495

Emotion Dysregulation

- ERC- emotion regulation and negative lability

Coefficient .58***

Coefficient .60***

when mediating for Inhibition Deficits

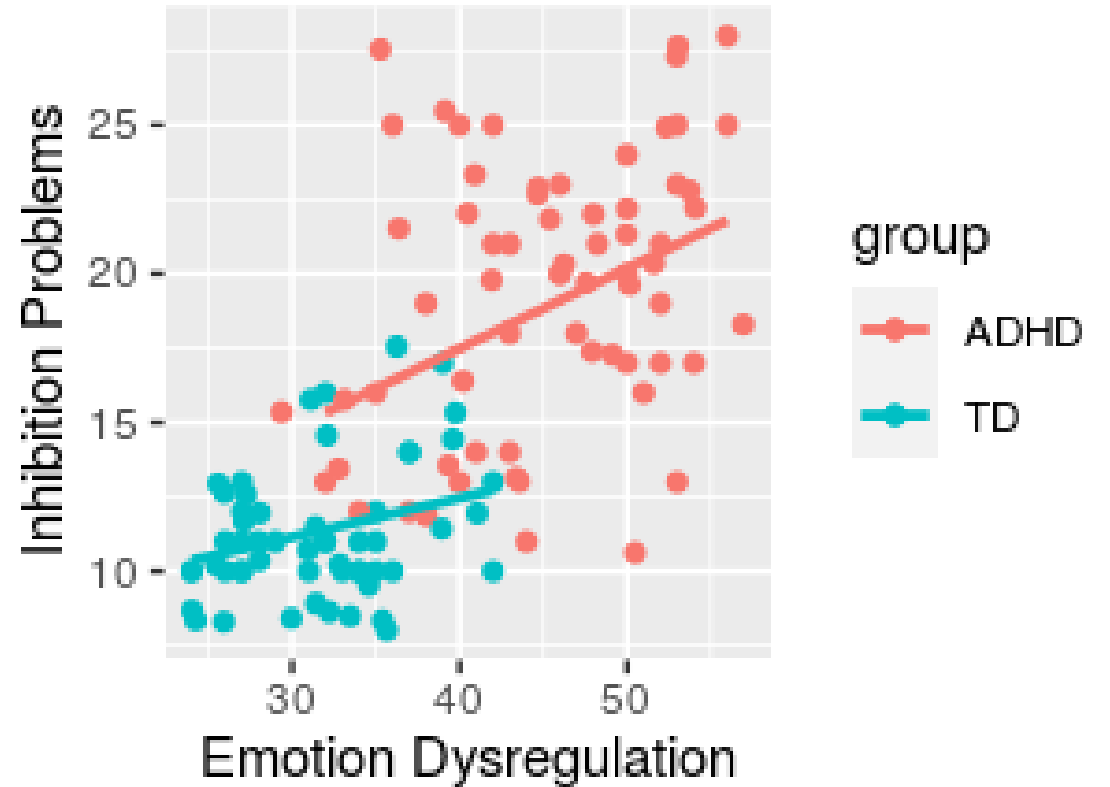
Aggression

- CBCL- aggressive behavior subscale

Significance Key: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

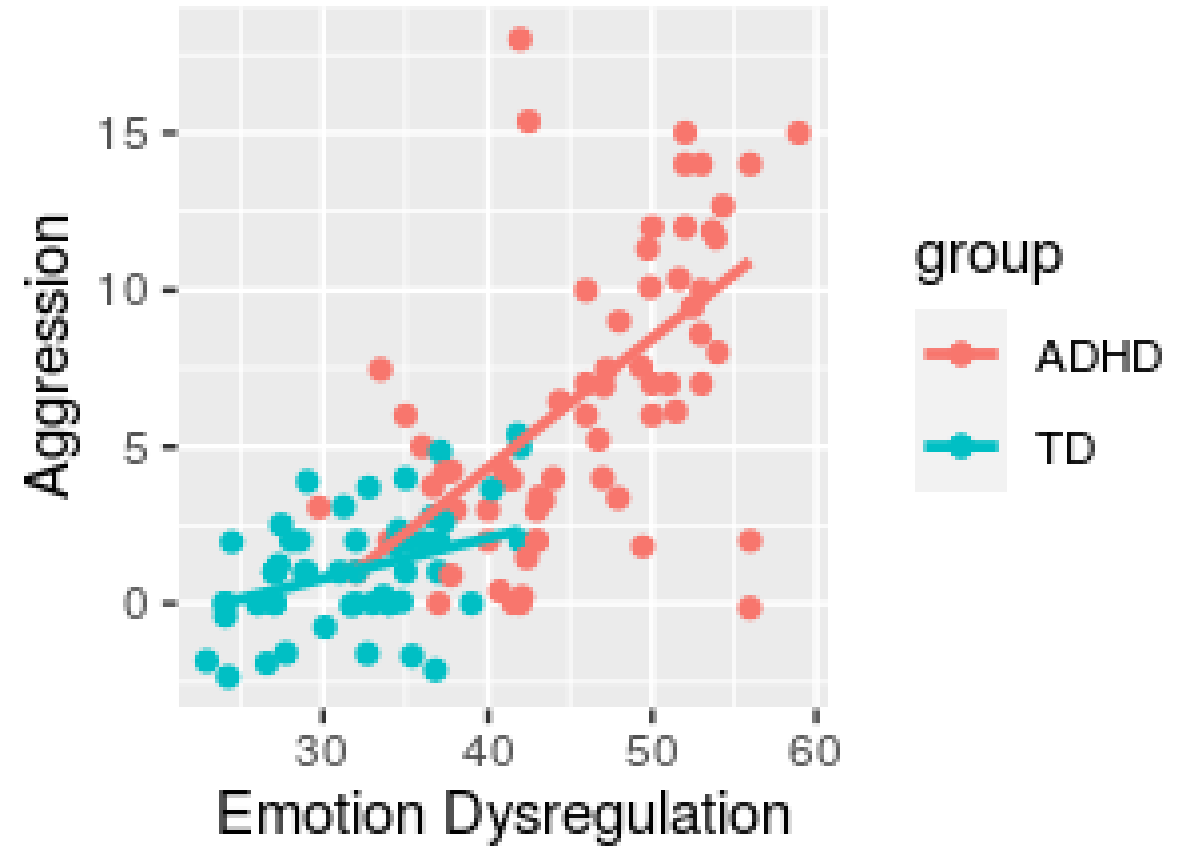
EMOTION DYSREGULATION AND INHIBITION DEFICITS

- Emotion Dysregulation found to have a significant effect on Inhibition Deficits
 - Same brain areas associated with inhibition and emotional appraisal (Ochsner, 2015)
- Greater in ADHD Group
 - Greater inhibitory deficits and struggle with emotional control (Bunford, 2014)



EMOTION DYSREGULATION AND AGGRESSION

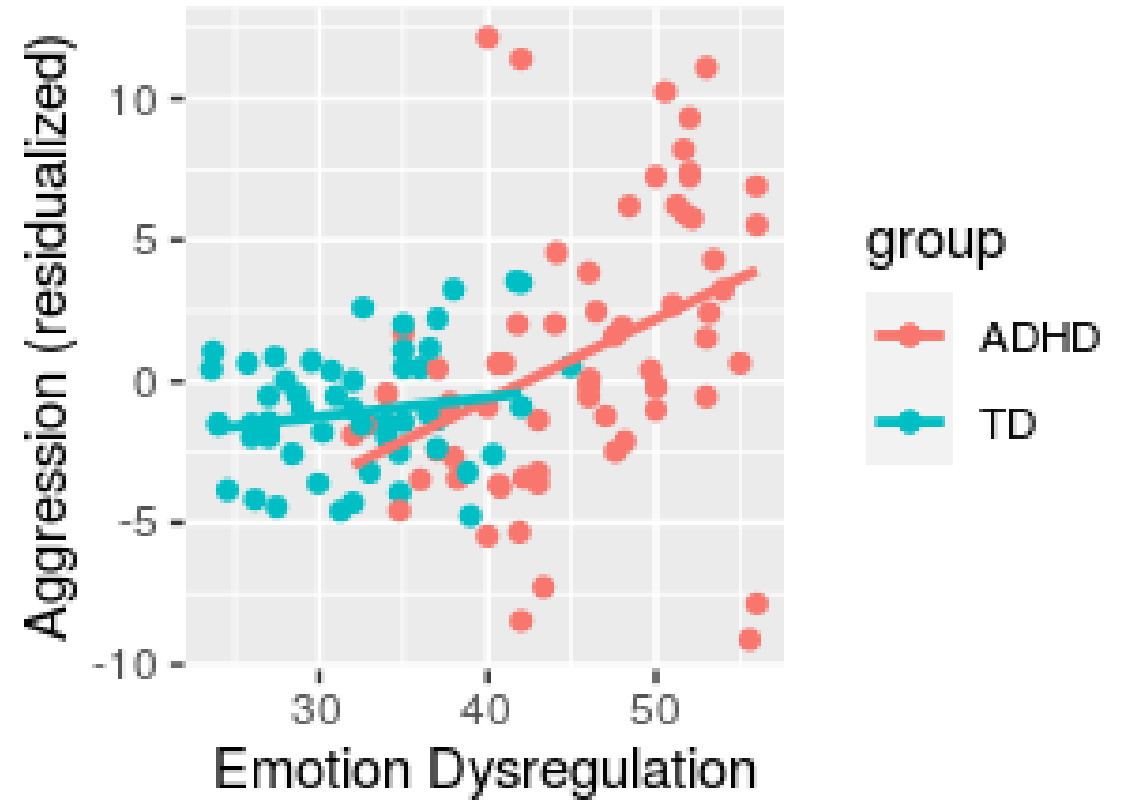
- Emotion Dysregulation found to have a significant effect on Aggression
 - Reactive aggression, increased amygdala activity, and difficulty regulating emotions (Shaw, 2014)
- Greater in ADHD Group
 - ADHD and aggression (Murray et al.; Shaw et al, 2014)
 - ADHD and emotion dysregulation (Bunford, 2014)



EMOTION DYSREGULATION AND AGGRESSION

(WHEN ACCOUNTING FOR INHIBITION DEFICITS)

- Emotion Dysregulation still had a significant effect on aggression even when accounting for Inhibition Deficits, indicating *that inhibition is not a significant mediator of this relationship*



OUR HYPOTHESES

- emotion dysregulation is associated with both inhibition and aggression, and this association is higher in those with ADHD.
 - Supported
- emotion dysregulation has an effect on aggression, but this effect is a result of inhibition deficits
 - Not supported.. Why?
 - Measures of emotion regulation involved inhibition (bring question example of this)
 - Ex. Can child “modulate excitement.
 - Cool EF vs. Hot EF
 - Hot EF- situations that are emotionally or motivationally significant
 - Cool EF- neutral contexts (Zelazo and Carlson, 2012)

CONCLUSIONS

- future research regarding aggression
- testing possible treatment approaches
 - Future work is needed to clarify efficacy of aggression treatments in children with and without ADHD.
 - Hot EF approach

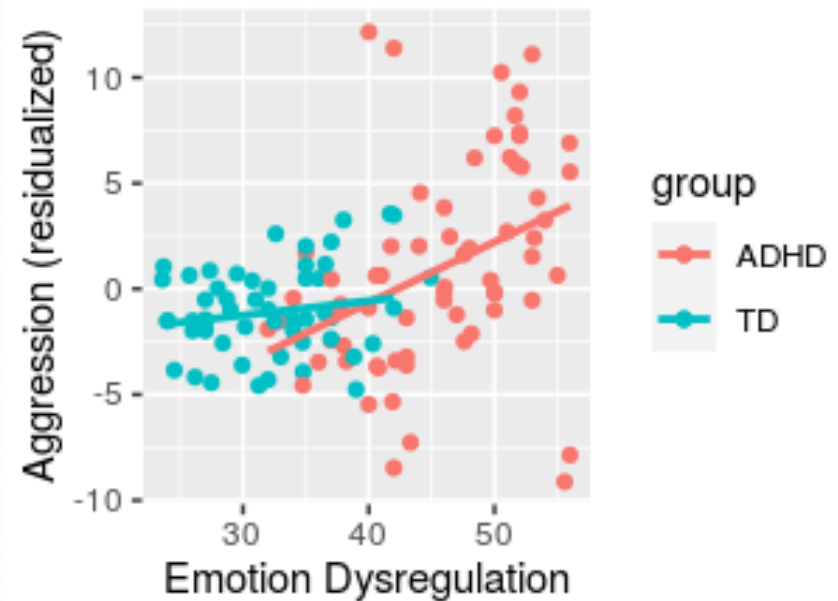
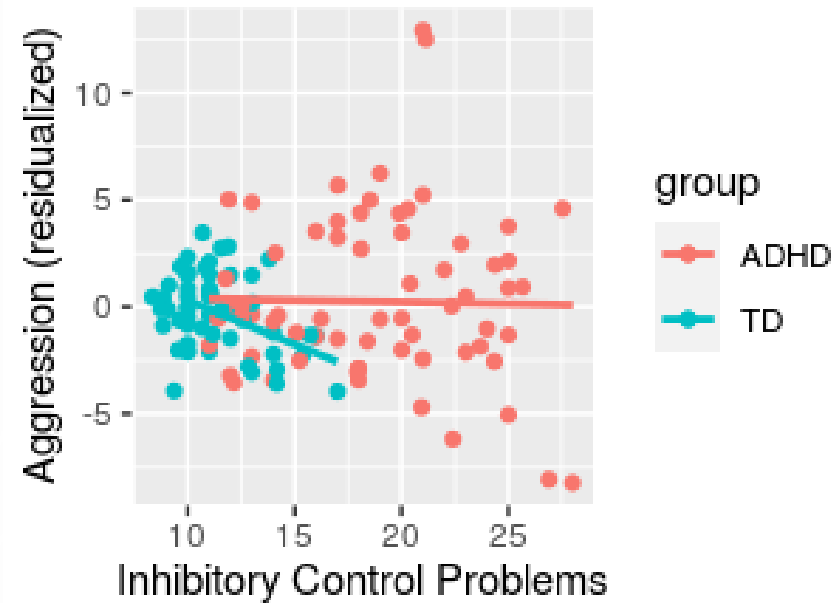
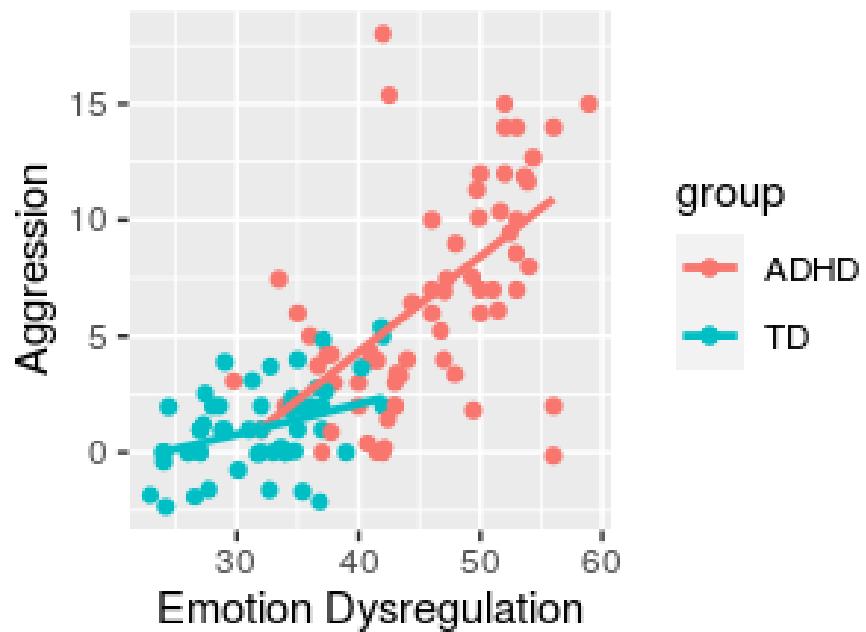
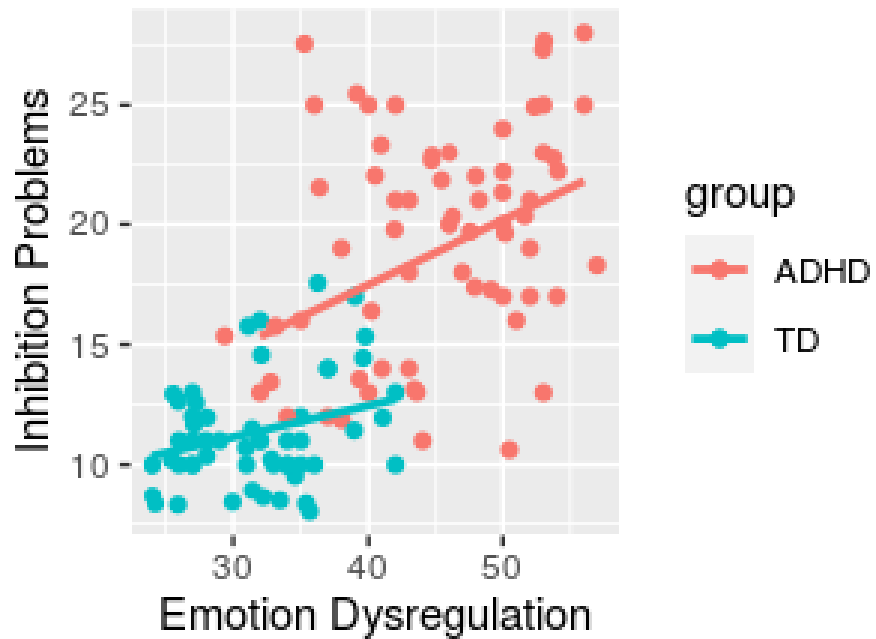
FUTURE DIRECTIONS

- Look at Brain activity during emotion regulation and inhibition tasks
- Look at emotion experience rather than emotion regulation
- Same tests with more than just inhibition subscales

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THE END

THANKS FOR LISTENING



MODERATION

Inhibition Deficits

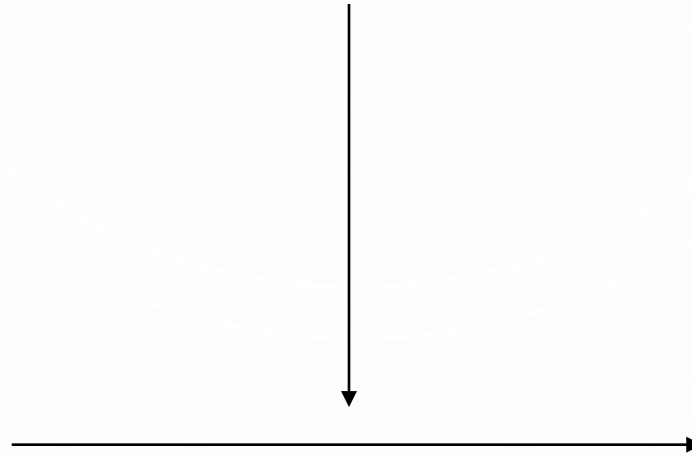
- Brief- inhibition raw score

Emotion Dysregulation

- ERC- emotion regulation and negative lability

Aggression

- CBCL- aggressive behavior subscale



RESULTS

Moderation

- Both- not significant
- TD- not significant
- ADHD- not significant

| | ADHD and TD | ADHD | TD |
|---------------|--------------------------|----------------------------|----------------|
| ED | .40(.73 standardized) | 1.00(.58 standardized)* | .64(.59)* |
| Inhibition | .12(.02) | 1.32(-.07) | 1.30(-.10) |
| EDxInhibition | -.003 (-.03) | -0.03055(-.20) | -.04296(-.33). |

- *Inhibition was not found to significantly increase or decrease the relationship between ED and Aggression*