

## Background/Purpose

- Effortful control (EC) is defined as the ability to inhibit a prepotent response in favor of a subdominant response<sup>1</sup>.
- EC has been linked to the anterior attention network<sup>2</sup>, and that it is important for effective self-regulation<sup>3</sup>.
- Effective EC has been linked to numerous children's outcomes, and specifically externalizing problems (EXT).
- For example, low EC has been related to increased aggressiveness<sup>4</sup> and symptoms of ADHD<sup>5</sup>.
- Although negative associations between EC and EXT are frequently identified, some studies have found that EC is not related to EXT<sup>6</sup>.
- Mixed findings between studies suggest that differences in study methodology may contribute to varying outcomes.
- Furthermore, a quantitative synthesis of the accumulating literature examining associations between EC and EXT has not been conducted.
- The goal of the present study is to perform a meta-analysis of the existing literature examining the effects of EC on EXT in children.

## Hypotheses

- It was predicted that the mean effect between EC and EXT would be negative.
- Given existing work, gender<sup>7</sup> and method<sup>8</sup> used to measure EC were examined as potential moderators of the association between EC and EXT.
- Other moderators were also examined: high vs. low risk samples, clinical vs. non-clinical samples, and age of child.

## Method

- As part of a larger meta-analysis of EC and children's outcomes, PsycInfo and MedLine databases were searched using 14 terms for EC (e.g., Effortful Control and Inhibitory Control) and 53 terms for children's outcomes, including EXT related search terms (e.g., Aggression).

## Method- Continued

- Based on database searches, 203 studies were retrieved that met inclusion criteria.
  - Reference lists of studies meeting inclusion criteria were searched, yielding an additional 7 studies
  - 88 studies had relevant data for this investigation.
- After accounting for multiple reports using the same sample, and multiple effect sizes (ES) within single studies:
  - Studies contributed 537 total ES, yielding 82 single ES for analysis; total *N* across studies was 13,742
- Possible Moderator Variables
  - EC measurement: Behavioral, Parent Report, Other Report, Cross Informant (e.g. Parent rated EC and Teacher rated EXT).
  - Age: 0-5 (early childhood), 6-12 (school aged), and 13-17 years (adolescence).
  - Gender
  - Clinical sample: Greater than 66% of the sample was selected based on psychiatric status or group differences were reported between psychiatric and control groups.
  - High Risk: Greater than 66% of the sample was demographically at risk (e.g. low SES, low maternal education, etc)
- Effect Size Coding
  - ES for this study were correlations
  - For studies reporting group differences the standardized mean difference ES was calculated and transformed to a correlation.
- The meta-analysis was conducted using the random effects model<sup>9</sup>
- Consistent with meta-analytic practice homogeneity tests were used to test for the presence/absence of moderators<sup>10</sup>
- If the homogeneity test was significant, follow-up moderator analyses were performed<sup>10</sup>
- To evaluate the potential effects of publication bias on the findings, the fail-safe *N*<sup>11</sup> an sufficiency<sup>12</sup> indices were calculated

## Results

Unit of Analysis	EC Source	<i>k</i>	Mean ES	Std. Error	95% CI	Fail Safe N	Sufficiency	Homogeneity
<b>All Studies</b>	<b>Multiple ES<sup>1</sup></b>	<b>124</b>	<b>-0.33*</b>	<b>0.017</b>	<b>-0.31 to -0.38</b>	<b>83,621</b>	<b>1672.43</b>	<b>124.69</b>
Method	Behavioral	60	-0.23*	0.012				
	Parent Report	22	-0.40*	0.013				
	Other Report	16	-0.44*	0.015				
	Cross Informant	26	-0.33*	0.009				
<b>All Studies</b>	<b>Single ES<sup>2</sup></b>	<b>82</b>	<b>-0.31*</b>	<b>0.019</b>	<b>-0.28 to -0.36</b>	<b>22,379</b>	<b>447.57</b>	<b>77.56</b>
Age	Early Childhood	21	-0.24*	0.021				
	School Age	53	-0.34*	0.010				
	Adolescence	8	-0.23*	0.035				
Clinical	Clinical Sample	39	-0.32*	0.018				
	Non-Clinical Sample	43	-0.32*	0.010				
Demographic Risk	Low	23	-0.28*	0.013				
	High	6	-0.24*	0.036				
	Mixed	5	-0.30*	0.042				
	Cannot Determine	48	-0.38*	0.013				

\* =  $p < .05$  1. Studies contributed more than one ES if EC was measured with multiple methods 2. Each study contributed one ES

## Results

- When the unit of analysis was method of EC assessment and studies were permitted to contribute more than one ES to the distribution the expected moderation effect was not observed.
- Consistent with meta-analytic practice in a subsequent analysis each study only contributed one ES.
- The mean ES ( $r = -0.30$ ) falls between a medium and large effect based on Cohen's criteria<sup>13</sup>.
- EC accounted for approximately 9% of the variance in children's EXT outcomes.
- The random effect homogeneity test was not significant, indicating the absence of potential moderators.
- Qualitative examination (see table) of ES for each moderator also suggests minimal differences between levels within moderators

## Discussion

- The effect of EC on EXT appears to be robust, and methodological differences between studies appear to minimally influence the effect.
- Despite well established gender differences in EC<sup>7</sup>, studies almost never performed analyses based on gender
- Adolescent samples are underrepresented in the literature
- Few studies reported sufficient information regarding demographic risk

## References and Author Contact

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- To download a copy of this poster, including references cited in the poster as well as studies contributing effect sizes to the analyses reported in this presentation, please visit the Emotion Regulation & Temperament Lab website at: [www.niu.edu/emotionreg](http://www.niu.edu/emotionreg)

## In Text Citations

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