

# Examining Mediators of the Effect of a Child Care Intervention on Adult Outcomes



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## Introduction

- The Abecedarian (ABC) intervention focused on providing high quality child care to children who were academically at-risk through providing:
  - Nurturing positive attachment relationships with caregivers
  - High-quality language interactions in the classroom.
- The participants of this intervention study have been followed into adulthood. ABC follow-up studies (Campbell et al., Conti et al., 2016) and results from the Perry Preschool Project (PPP; Cuhna & Heckman, 2007) show impacts on:
  - Income
  - Educational attainment
  - Health
- Less is known about why certain programs have long-lasting impacts.
  - This is an important question – especially since treatment effects of many ECE programs fade out in elementary school (Duncan & Magnuson, 2013).
  - Previous studies have found cognitive and behavioral skills to be mediators of ECE interventions (Heckman, Pinto, & Savelyev, 2013)

## The Present Study

- Examines whether early cognitive and behavior skills appear to mediate the effects of the ABC intervention on 30-year-old education and income levels.
- Sex differences in the pathways were also examined based on previous research suggesting differential effects for males and females.



## Method

### Sample

- Four cohorts of 28 infants who were deemed academically at-risk due to conditions of poverty were randomly assigned to treatment and control groups between 1972 and 1977.
  - Treatment Group:** Received full-time, high quality care and education from approximately 4 months of age until entry to formal schooling.
  - Control Group:** Received nutritional supplements, diapers, and medical referrals.
- Descriptive information found in Table 1.

### Measures

- Mediators were collected at approximately 5-years-old. Cognitive measures were collected at the end of the program and behavioral measures were reported by the kindergarten teacher. Adult outcomes were collected when participants were approximately 30-years-old.
- Mediators:
  - Executive Function (EF):** Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967) Block Design subtest, which requires both cognitive flexibility and working memory components of EF.
  - Verbal Skills:** The WPPSI verbal intelligence composite score from the subtest scores measuring skills such as vocabulary and general knowledge.
  - Behavior Ratings:** The participants' kindergarten teachers completed the Classroom Behavior Inventory (CBI; Schaefer, Edgerton & Aaronson, 1978). Independence and behavior problems subscales were obtained from an exploratory factor analysis
- Adult Outcomes:
  - Education:** Examined as years of education (i.e. 14 = Associate's Degree).
  - Income:** The distribution was skewed, so income was dummy coded to capture whether the household income was at or below the federal poverty line.

### Analyses

- Path analyses were conducted in MPLUS. Due to reduced power because of the small sample size, separate path analyses were conducted for each mediator and outcome (for a total of 8 path models).
- For the continuous education outcome, a maximum likelihood estimator was used, but for models with the binary income outcome the weighted least square mean and variance adjusted (WLSMV) estimator was used.
- The models also included a treatment-by-sex interaction which was dropped from the individual models if not significant.
- The dichotomous variable for sex (male = 1) remained in all models as a covariate in addition to controlling for the effect of maternal IQ.
- Indirect effects of the treatment through each mediator was tested via bootstrapping 1000 datasets.

## Results

Table 1. Descriptive statistics

	Control			Treatment		
	N	Mean	Std	N	Mean	Std
Sex (1=M, 0=F)	53	0.43	0.50	57	0.51	0.50
Race (1 = African American, 0 = Other)	53	1.00	0.00	57	0.89	0.31
Mother's IQ	53	84.25	10.87	52	85.46	12.81

Note. \*\*\* p < .001, \*\* p < .01, \* p < .05, + p < .1

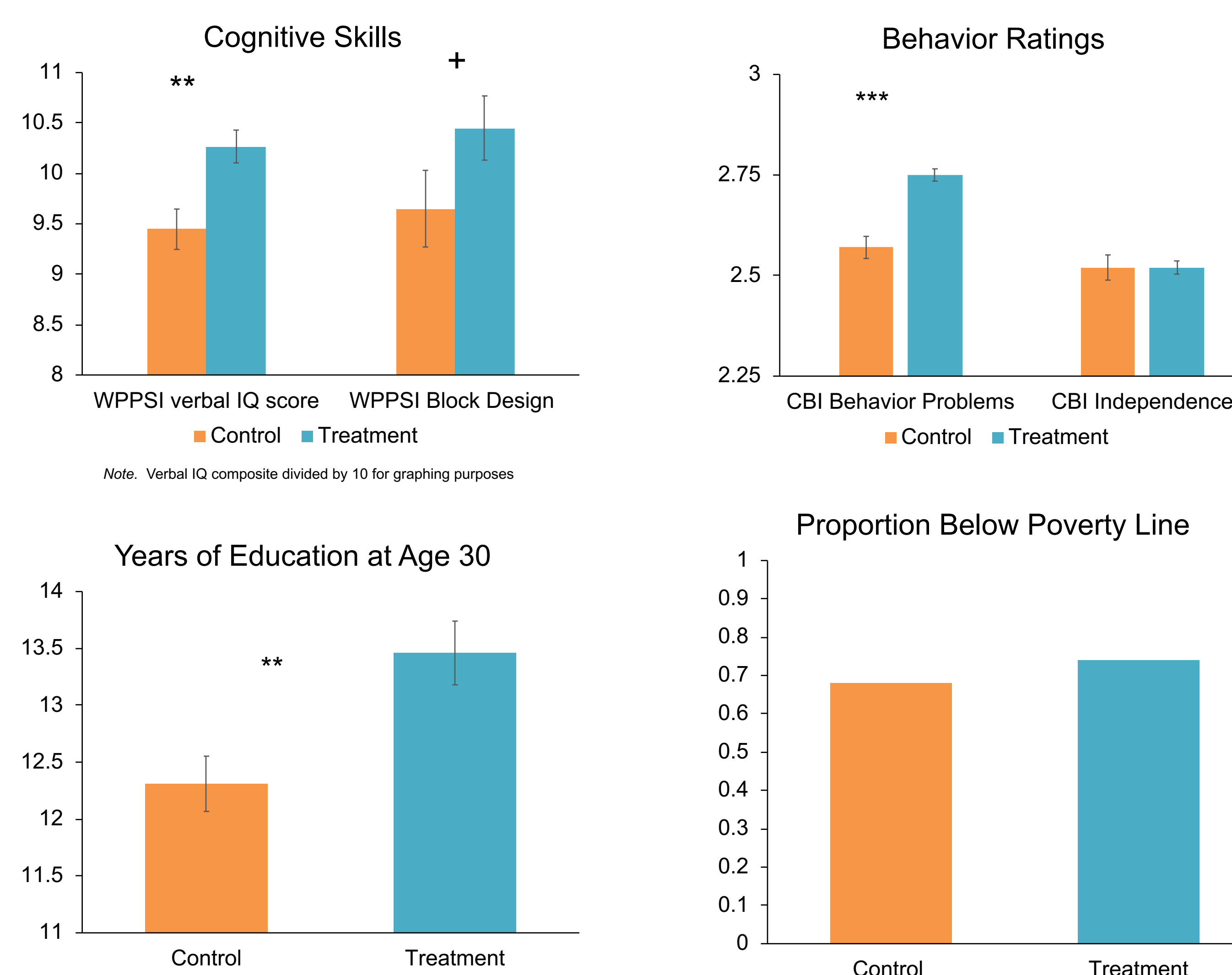


Figure 1. Mediators and outcomes by treatment group.

\*\*\* p < .001, \*\* p < .01, \* p < .05, + p < .1

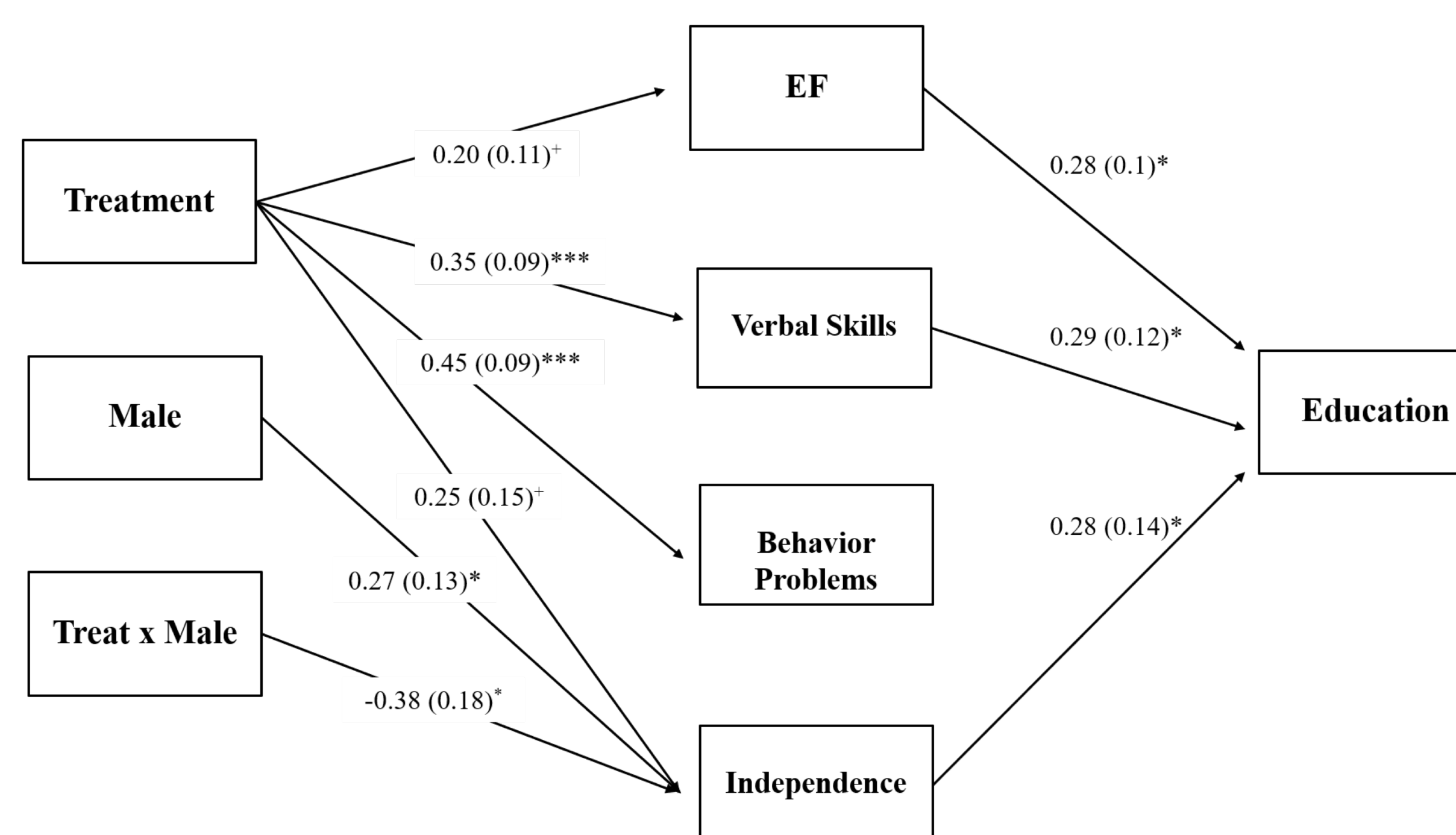


Figure 2. Significant standardized paths. Each mediator tested in separate models due to the small sample size. All models control for path from maternal IQ to the adult outcome.

\*\*\* p < .001, \*\* p < .01, \* p < .05, + p < .1

## Results

- Treatment impacts on one adult outcome (education) and two of four hypothesized mediators.
  - At age 30, the ABC treatment group attained significantly more years of education.
  - The ABC treatment group had significantly higher scores than the control group on the verbal IQ but were rated higher on behavior problems by their kindergarten teacher.
- Significant indirect paths from treatment to verbal IQ to education (indirect  $\beta = 0.09$ , SE = 0.04,  $p = 0.06$ ).



## Conclusions

- The intervention had significant effects on several early childhood skills, but verbal skills appear to be the most promising mechanism through which this ECE intervention had effects on outcomes into adulthood.
- The small sample size and inability to make causal inferences from the mediation results are limitations
- However, these results suggest that similar ECE interventions designed to improve children's verbal skills may have similar positive effects into adulthood.

## References

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