The Influence of Community Factors on Academic Achievement in a Clinical Sample of Young Hispanic/Latino Children: The Role of Executive Functioning

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BACKGROUND

- According to Bronfenbrenner's ecological systems theory (1979), a child's development is influenced by various proximal and distal environmental systems
- Even before starting kindergarten, children living in communities with limited resources and high levels of adversity trail behind their wealthier counterparts in cognitive, emotional, and social skills essential for academic success (Lee & Burkam, 2002; Duncan & Murnane, 2011)
- The Child Opportunity Index (COI) has emerged as a useful tool in measuring community resources available to children in their respective neighborhoods and is associated with educational attainment (Sampson & Sharkey, 2008)
- One proposed mechanism in explaining the link between COI and academic achievement is executive functioning (EF), which is linked to both academic performance (Nguyen & Duncan, 2019) and socioeconomic factors (i.e., parent education, total family income; Waters et al., 2021)
- Children with Attention-Deficit/Hyperactivity Disorder (ADHD) living in neighborhoods with low COI scores may be at risk for worse academic outcomes, considering that they demonstrate impaired EF skills compared to typically developing peers (Willcutt et al., 2012)
- Additionally, these difficulties may be compounded for children in minority groups, such as Hispanic/Latino, who are at higher risk for experiencing worse socioeconomic conditions (Flores, 2017)
- However, it is unclear whether community factors, such as the COI, are also associated with both EF and academic performance among children with and without ADHD.

RESEACH QUESTIONS

1) Examine the link between COI and EF and academic performance among children with and without ADHD.

2) Examine whether EF mediates the link between COI and academic performance among children with and without ADHD

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RESULTS

Table 1. Child Opportunity Index and Diagnostic Status Predicting Academic Achievement and Executive Functioning

	KBACS Math Skills	KBACS Reading Skills	WJ-IV Math Achievement	WJ-IV Reading Achievement	DCCS	Flanker Task	HTKS
Child Opportunity Index (COI)	**.18***	0.08	**2.35***	1.20	1.03	1.66	**3.01****
Dx Status	**1.63***	**1.63***	5.58	0.01	3.02	4.43	1.15
Dx Status x COI	0.17	0.17	1.29	1.73	1.2	1.5	1.45

Notes. *$p < .05$, **$p < .01$, ***$p < .001$. Unstandardized beta coefficients are reported. All analyses covaried for maternal education and child sex. Dx = Diagnostic status (Attention-deficit/hyperactivity disorder or typically developing). KBACS = Kindergarten Behavior and Academic Competency Scale. WJ-IV = Woodcock-Johnson Test of Achievement. DCCS = Dimensional Change Card Sort. HTKS = Head-Toes-Knees-Shoulders task.

Figure 1. Executive Functioning Mediating the Association Between the Child Opportunity Index and Math Performance

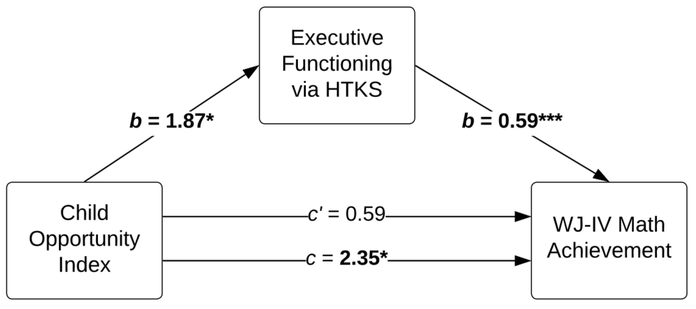
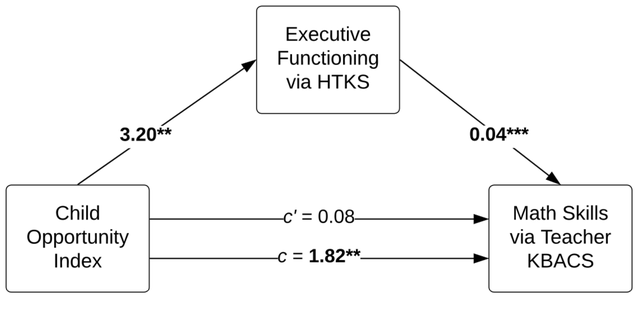


Figure 2. Executive Functioning Mediating the Association Between the Child Opportunity Index and Math Skills via Teacher Report



Notes. *$p < .05$. **$p < .01$. *** $p < .001$.All analyses covaried for maternal education, sex, and diagnostic status. HTKS = Head-Toes-Knees-Shoulders Task; WJ-IV = Woodcock-Johnson Test of Achievement; KBACS = Kindergarten Behavior and Academic Competency Scale (KBACS). *c* = direct effect of COI on math achievement and skills. *c'* = direct effect of COI on math achievement and skills when EF is included in the model.

DISCUSSION & IMPLICATIONS

- Within a sample of predominately Hispanic/Latino young children with and without ADHD, COI significantly predicts math skills, but not reading, via teacher ratings and performance.
- Although children with ADHD exhibit worse EF and academic performance than their TD peers, COI seems to be an important predictor of these outcomes across both groups.
- The link between COI and math skills appear to be partially mediated by COI's impact on EF.
- Addressing community-level disparities may contribute to better academic outcomes for children via its effect on EF.

METHOD

Participants

- 288 children
  - 68.7% boys; Mean age = 5.47 yrs. *SD* = 0.77 yrs.
- **Race/Ethnicity:**
  - 87.5% White, 5.2% Black, 2.1% Asian, 5.2% Biracial/Other
  - 82.6% Hispanic/Latino
- **Diagnostic Groups**:
  - Typically developing (*n* = 140); ADHD (*n* = 148)

Measures

Neighborhood Factors

- **Child Opportunity Index (COI).** The COI was collected from a government website based on the home address provided by parents (diversitydatakids.org). It quantifies the quality of resources and conditions that affect child development in their neighborhoods (i.e., early childhood education, safe housing, access to healthy foods, parks and playgrounds).

Executive Functioning

- **Head-Toes-Knees Shoulders (HTKS).** The HTKS is a structured observational measure of self-regulation which integrates multiple executive functioning (EF) components (Ponitz et al., 2008). The HTKS is a short "game-like" EF assessment appropriate for children aged 4-8 years. The task pairs behavioral rules ("touch your head," "touch your toes"), and then asks the child to perform the opposite behavior. Higher scores suggest better EF.
- **Dimensional Change Card Sort Test (DCCS).** The DCCS is used to assess EF across a wide range of ages (Zelazo, 2006). An overall standard score is derived with higher scores indicating better EF.
- **Flanker Inhibitory Control and Attention Test.** The Flanker task measures the ability to inhibit visual attention to irrelevant stimuli, while also performing a stimulus conflict task (Zelazo et. al., 2013). An overall standard score is derived with higher score indicating better EF.

Academic Functioning

- **Kindergarten Behavior and Academic Competency Scale (KBACS).** Teachers completed a 39-item questionnaire measuring children's readiness for kindergarten across behavioral, social-emotional, and academic skills. This study focused on the preliteracy/reading composite (7 items; α = .97) and the pre-numeracy/math composite (4 item; α = .96). Higher scores indicate better academic functioning.
- **Woodcock-Johnson Test of Achievement (WJ-IV).** Children were administered six subtests of the WJ-IV (Schrank et al., 2014; Mather & Woodcock, 2001), a widely used, norm-referenced measure of academic ability. The six subtests administered were Applied Problems, Calculation, Writing Sample, Letter-Word Identification, Passage Comprehension, and Spelling. The current study examined standardized scores of the derived composites: Brief Reading (Letter-Word Identification, Passage Comprehension) and Brief Math (Applied Problems, Calculation).