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CanPlay Lab

Examining Relationships Between Children's Sex, Cognitive Development, Executive Functioning, and Home Environment

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Thank You

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SSHRC CRSH
Social Sciences and Humanities Research Council of Canada
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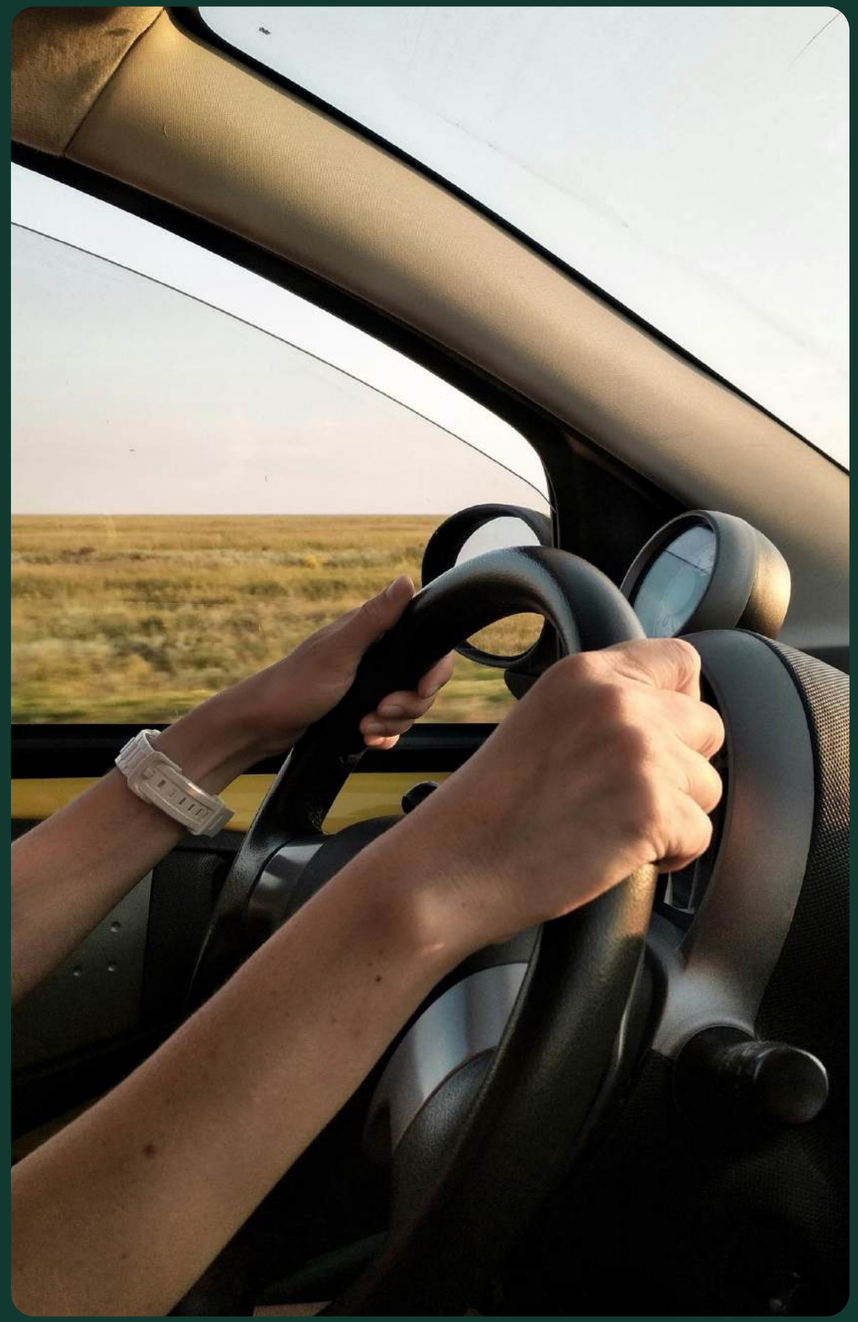
Outline

- Literature Review
- Research Questions
- Our Study
  - Methods
  - Results
  - Discussion
- Future Work

Cognitive Development

The capacity of a child to think, reason, solve problems, and understand the world around them.

Typically measured by IQ.



Executive Function (EF)

EF is replacing the IQ concept, and it refers to a set of cognitive processes that support goal-directed behaviour, including:

- Cognitive Flexibility
- Inhibitory Control
- Working Memory

Research Questions

1. How does EF relate to specific components of cognitive development ?

2. What are the factors influencing children’s EF?

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Our Research

A large-scale study exploring the relationship between children's play and cognitive development.

Participants

- Analyzed 72 children's data
- Mean age of 55.8 Months (SD = 10.4)

Methodology

Child Measures

Wechsler Preschool and Primary Scale of Intelligence (WPPSI)

- Verbal Comprehension
- Visual Spatial Ability
- Fluid Reasoning
- Working Memory
- Processing Speed
- Full Scale IQ

Head-Toes-Knees-Shoulders (HTKS) Task

- Executive function
- Remember rules
- Inhibit dominant responses
- Produce opposite behaviour

Parent Questionnaire (PQ)

- Demographics
- Home learning environment

Analysis & Results

Exploratory Factor Analysis

1

Home Literacy Activities

2

Play-Based and Experiential Learning

3

Parental STEM Attitudes

Partial Correlations

- Controlled for age in months
- Intercorrelation between WPPSI-IV indices
  - Strong construct validity
- EF is moderately to highly correlated with WPPSI indices
  - With the exception of working memory ($p = 0.148$)
- No significant relationship between home learning environment factors and cognitive outcomes
- No evidence of sex differences

Regressions

Forward Regression

- Starts with a null model, adds covariates one by one
- HTKS (EF) was our outcome variable
- Excluded FSIQ

Covariates

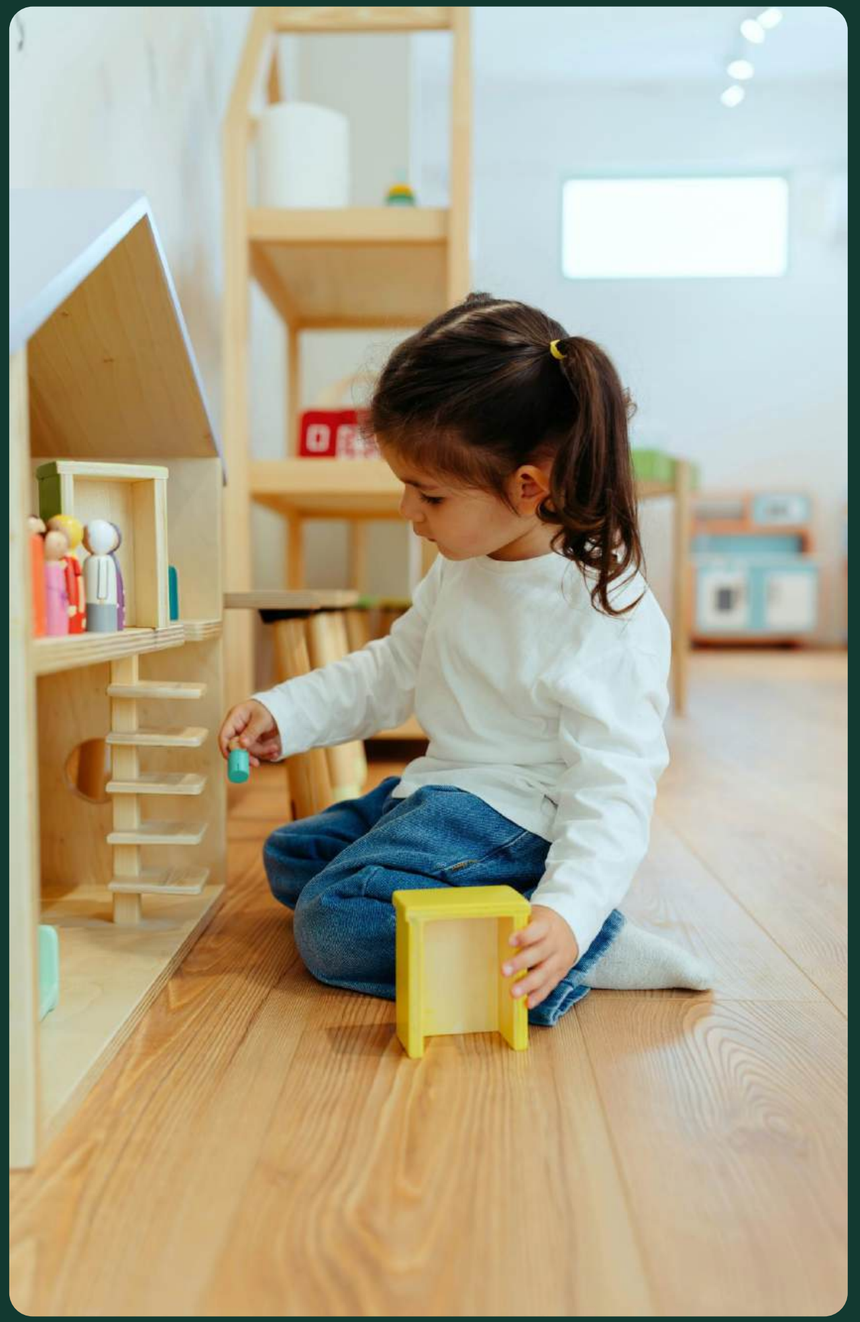
- Parent education
- Parent income
- Child’s sex
- WPPSI subtest scores
- Home learning environment factors

Regressions

- Excluding FSIQ from the analysis enabled examination of specific cognitive domains
- The final model included visual-spatial ability and processing speed
  - Together, they accounted for 38% of the variance in EF performance
- Demographic factors, home learning environment factors, age, sex, and the other WPPSI-IV indices did not account for additional variance

Discussion

- When full-scale IQ is excluded, VSI and PSI emerge as significant predictors of EF performance
  - Highlights domain-specific cognitive skills underlying executive functioning
- Insignificant relationships between home learning factors and EF could be explained by similar family demographics
- Sex did not account for differences in EF in this sample
  - Meaningful contribution to existing literature



Future Work

- Larger sample
- Continued exploration of home environment factors
- Examination of screentime
  - Contentious topic

Thank you!

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References