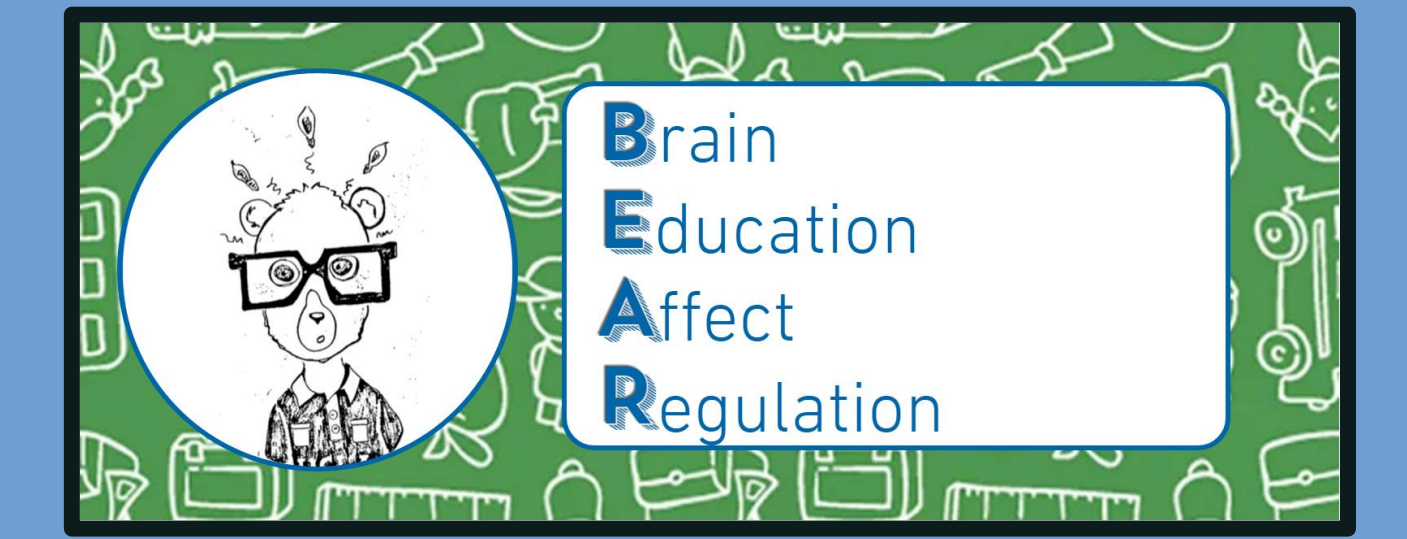




Gender & Cognition: Task Persistence in Elementary-Aged Students

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INTRODUCTION

Executive function (EF) skills:

- Aid children in attending to educators and participating in cognitively challenging activities that arise in schooling without becoming excessively frustrated or easily disengaged (McClelland, Acock, & Morrison, 2006).
- Are critical for acquisition of academic skills in elementary school above and beyond initial and literacy skills at school entry (Blair & Razza, 2007).
- Link to learning-related behaviors, such as **persistence** when measured via teacher report (Vitiello, et al., 2011).

Persistence:

- Ability to continue effort despite a cognitive challenge (Berhenke, et al., 2011).
- Higher when context promotes autonomy, competence, and social relatedness (Ryan & Deci, 2000).

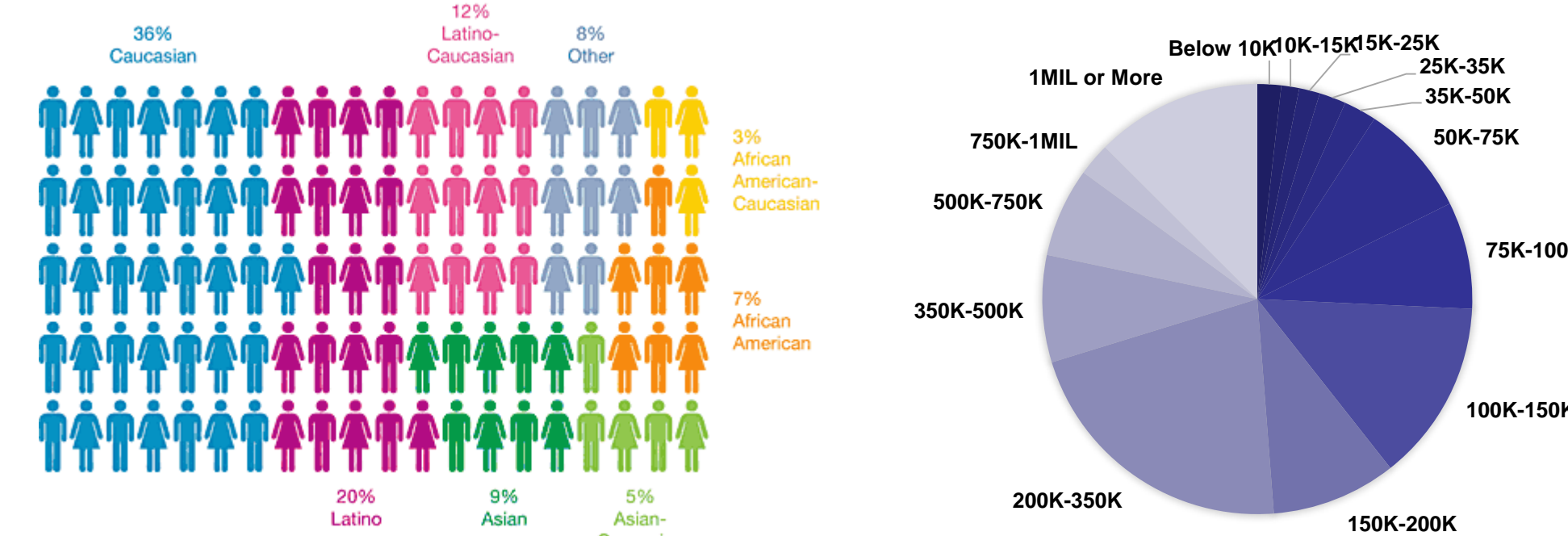
Contextual factors:

- Differences in gender socialization (Deci & Ryan, 1980; Burnett, 2002) may influence student levels of autonomy, competency, and social relatedness.
- Boys are socialized to value independence and achievement and are more likely to be praised for their ability (Kostner, 1989) and intellectual substance (Dweck, et al., 1978).
- Girls are socialized to value dependence and interpersonal relationships and are more likely to be praised for their good behavior, hard work (Dweck, et al., 1978), and effort (Kostner, 1989).

METHOD

Participants: A total of 43 kindergarten, first, and second-grade students were tested (Male=18; Mage = 7.22 years).

School Demographics:



Executive Function: Tested using a standardized task the Head, Toes, Knees, Shoulders (HTKS; Ponitz, et al., 2008).

Persistence: Measured as time attempting a challenging puzzle.



RESULTS

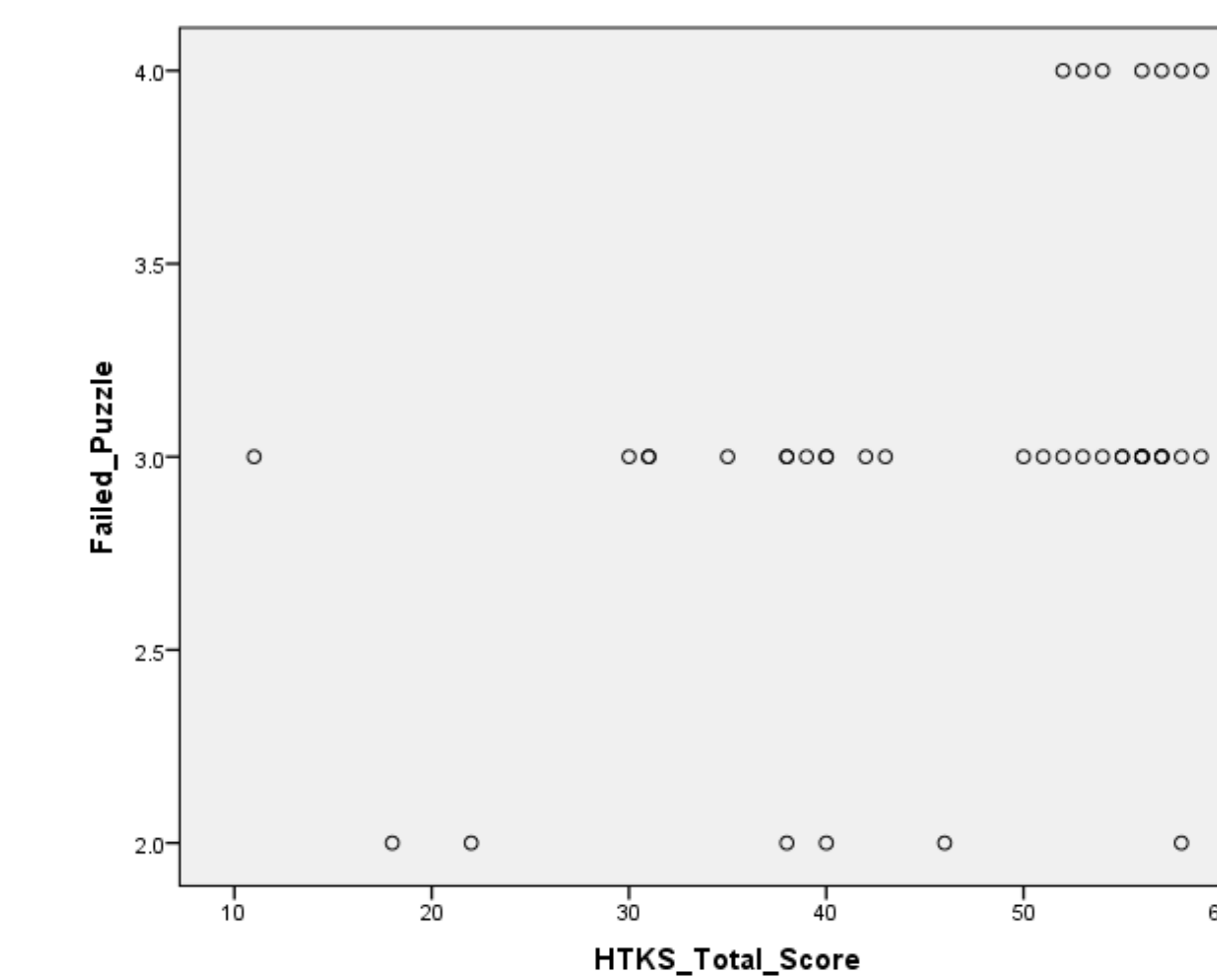


Fig 1. Relation of HTKS and puzzle challenge.

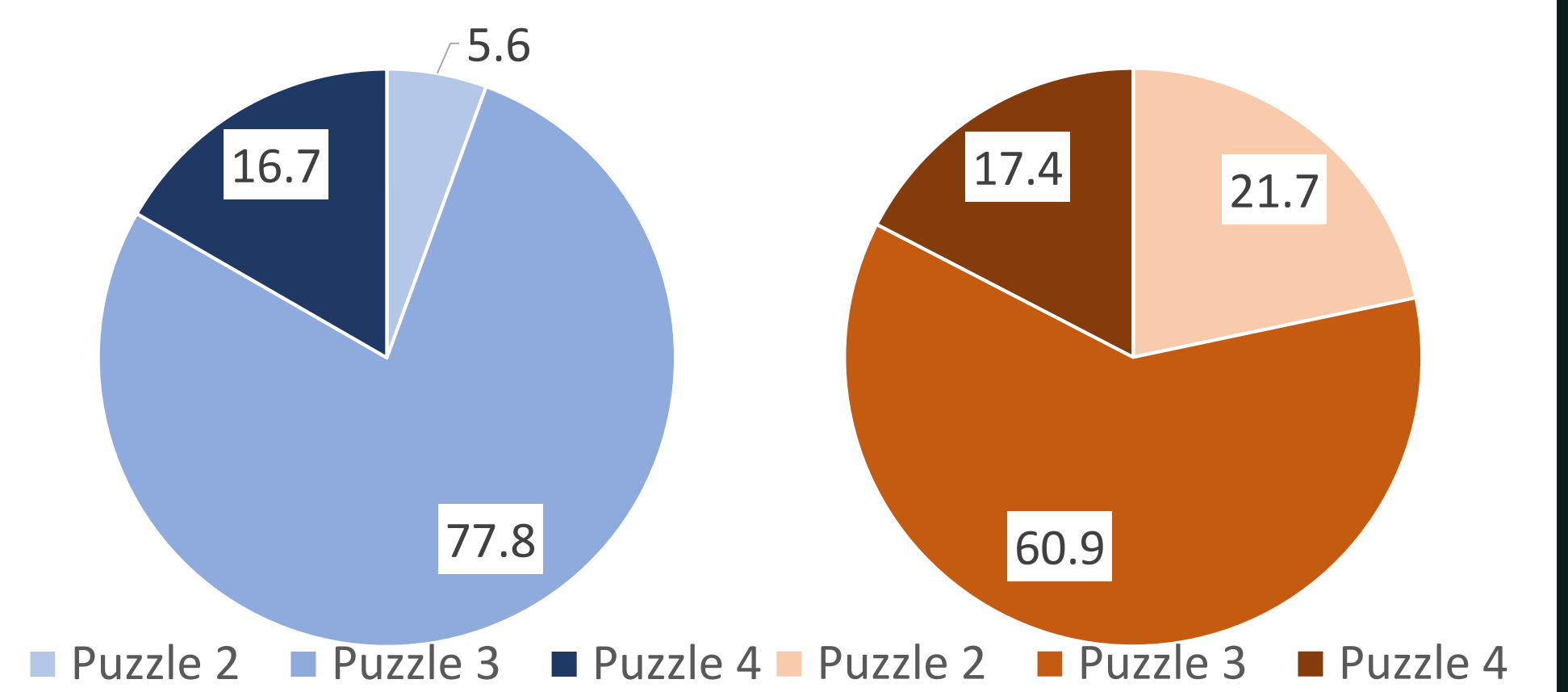


Fig 2. Puzzle difficulty reached. Percent boys (blue) and percent girls (orange).

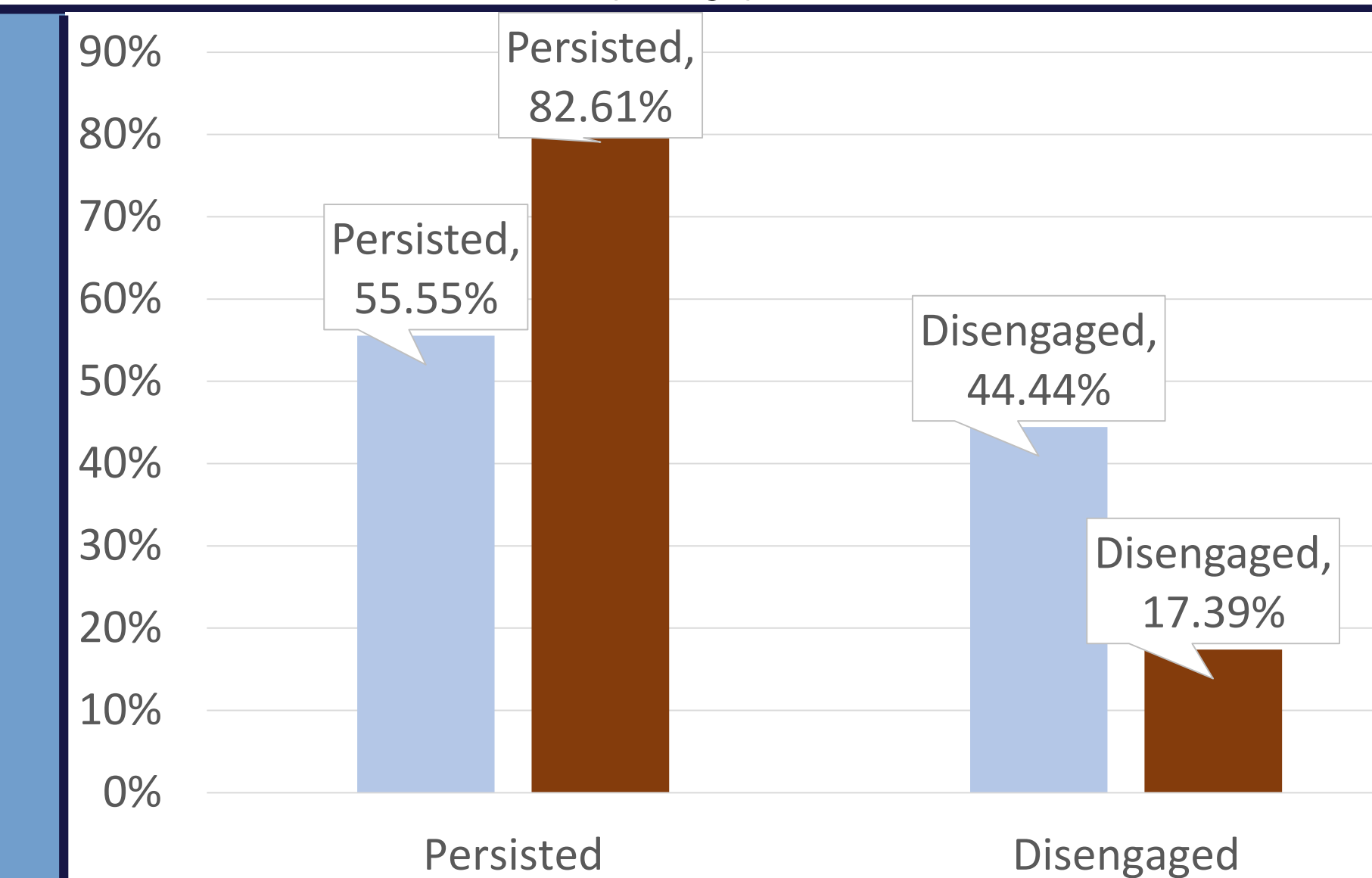


Fig 3. Percent persisted to max time by gender.

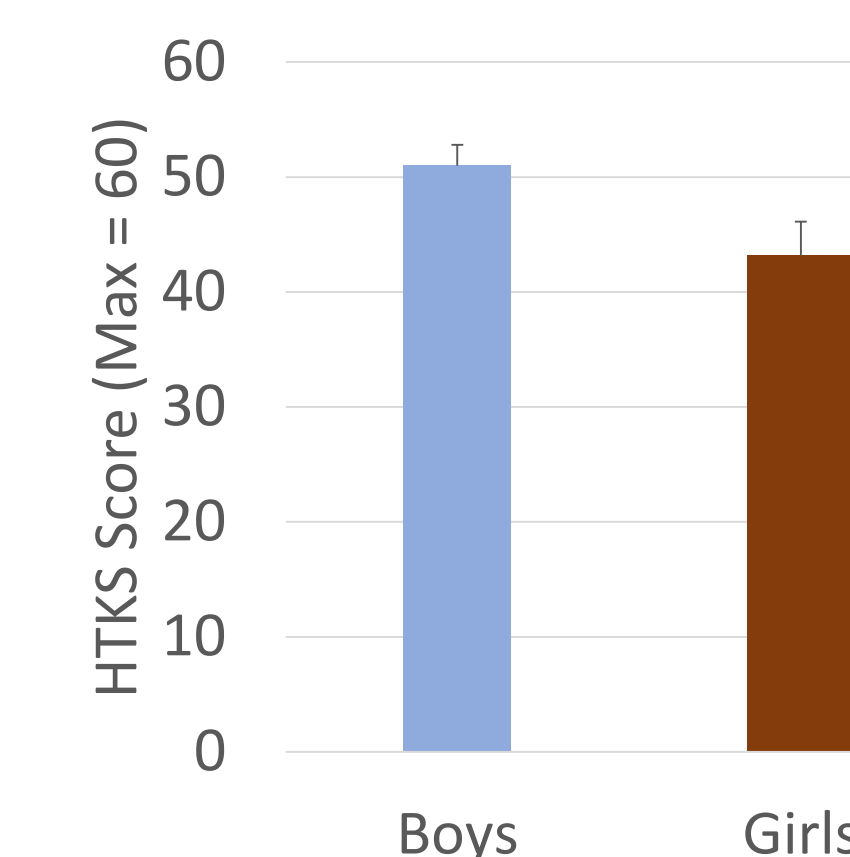


Fig 4. HTKS score by gender.

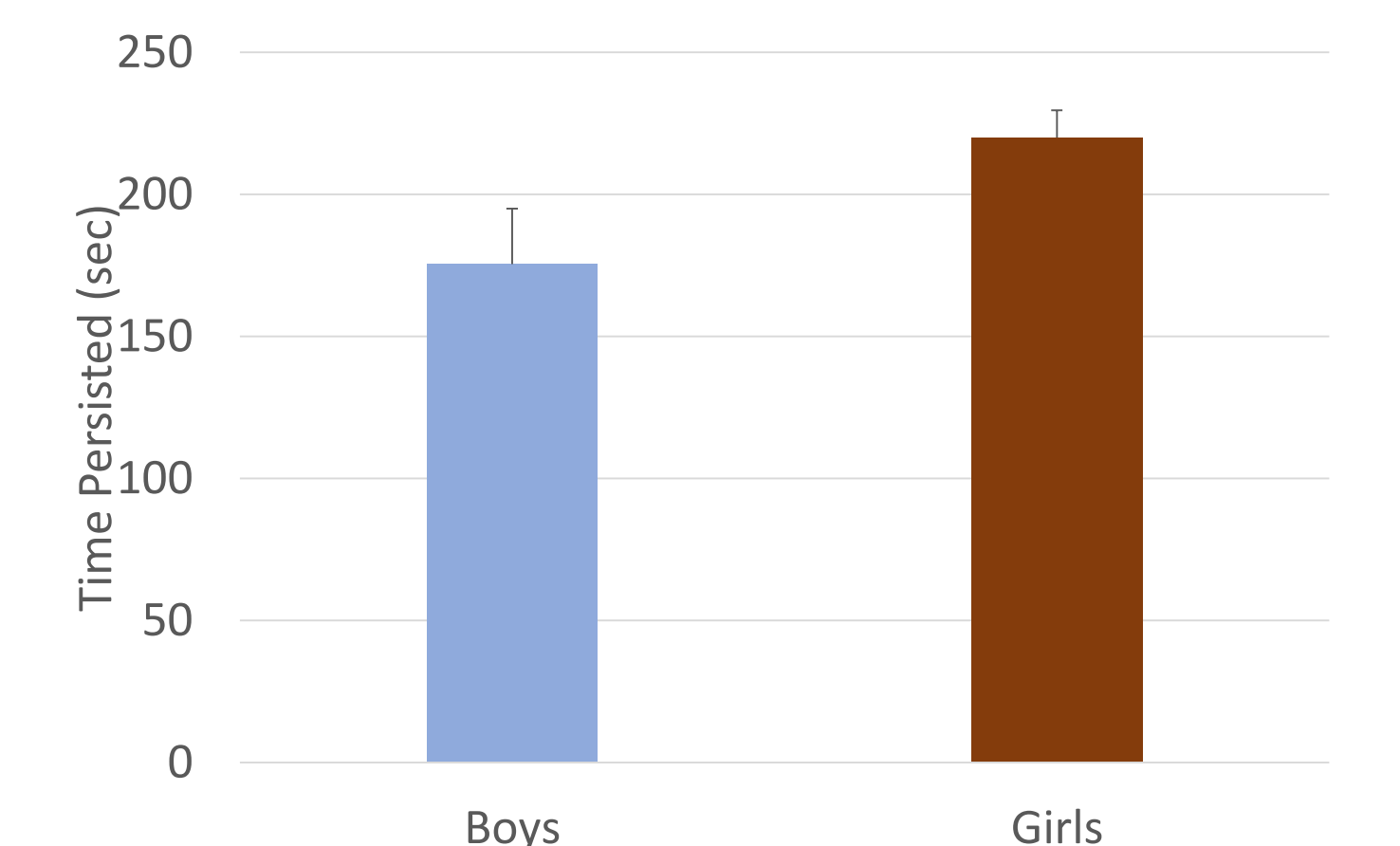


Fig 5. Puzzle persistence by gender.

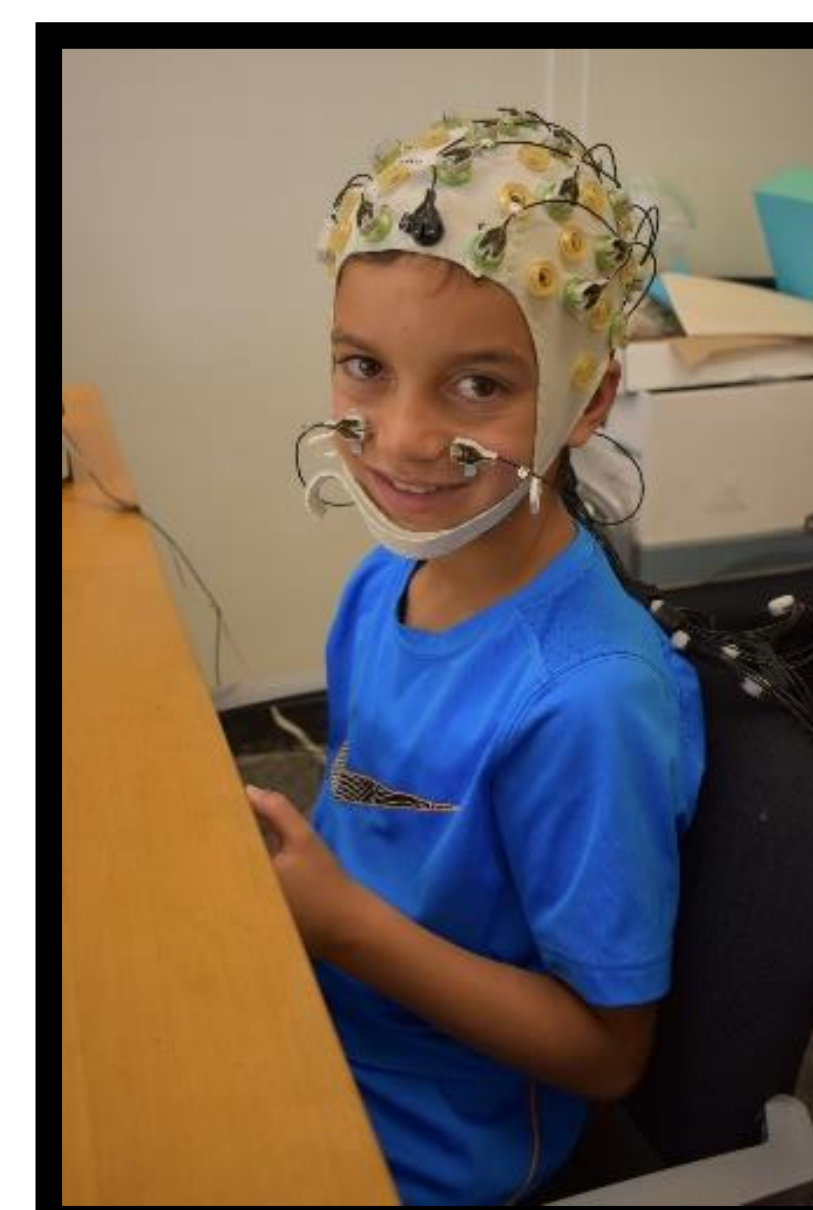
Study Aims

RQ1: What is the relation between executive function skills and persistence in early elementary school?

Aside from teacher report, little work has investigated the relation among skills important for academic success as they are emerging in early elementary school.

RQ2: Does performance on executive function and persistence tasks differ by gender?

Differences in gender socialization may impact children's effort on challenging tasks, particularly when in the presence of a social agent such as a teacher, or experimenter.



RELATING DEVELOPMENT, EDUCATION, AND NEUROSCIENCE

What are the complex, multiple forces shaping children's cognitive growth?

- A neurological perspective can enhance our understanding of the developmental trajectory and the relation between EF skills and academic abilities in elementary school.

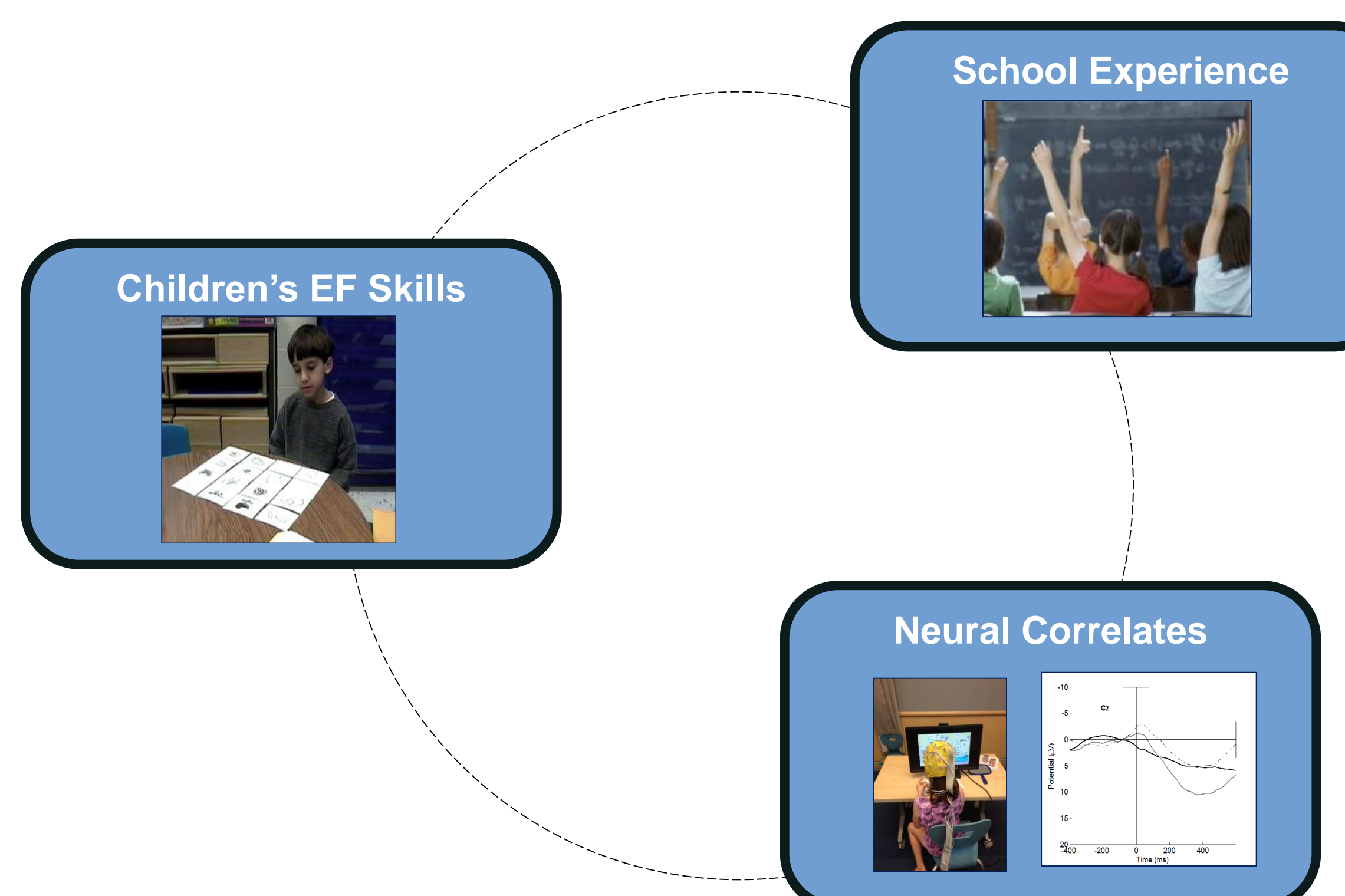
How are instructional environments influencing the development of cognitive skills important for student learning?

- Changes in brain activity may emerge prior to behavioral indicators of learning. Examining schools' influence on the timing of development could provide insight into the mechanisms underlying the development of EF and academic skills.

What are the neurological sources for the individual differences observed in children's cognitive skills?

- Analyzing brain activity underlying critical academic skills like EF, moves science closer to specifying neurological sources of individual differences among children who learn well and those who struggle to acquire EF skills.

STUDYING COGNITION IN THE SCHOOL CONTEXT



DISCUSSION & IMPLICATIONS

RQ1: Regardless of gender ($t(39)=-.860, p=.395$) HTKS score predicted ($r(41)=-.431, p=.005$) further progression in the challenging puzzle game, such that children with higher EF also successfully completed more puzzles. This suggests that the HTKS and puzzle task are recruiting similar cognitive skills to support performance. However, no correlation ($p>.5$) was found between persistence time and EF, perhaps due to skew in data with almost all of the girls persisting for the entirety of allotted time.

RQ2: Gender differences were found for both HTKS performance ($r(41)=-.320, p=.041; M_{boys}=51, M_{girls}=43.17; Max=60$) and persistence ($r(41)=-.331, p=.035, M_{boys}=175.5, M_{girls}=220; Max=240$). On average boys scored 7.83 points higher than girls on the HTKS which is atypical, suggesting that perhaps the sampled school environment supports more behavioral regulation skills for boys. Girls persisted 44.5 seconds longer on average, suggesting that girls may be more attuned to try and please the social agent (the experimenter) by showcasing continued effort than boys.

Overall, these findings provide evidence that gender socialization may be influencing the development of skills related to academic success such as executive functions and persistence. Further work is needed to investigate whether these skills may be observed differentially depending on the context of the student and what underlying mechanisms support the relation between context and behavior.

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