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The Relation Between Spatial Language During Informal Learning and Children's STEM-Related School Readiness Scores

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The Relationship Between Spatial Language During Informal Learning and Children's STEM-Related School Readiness Scores



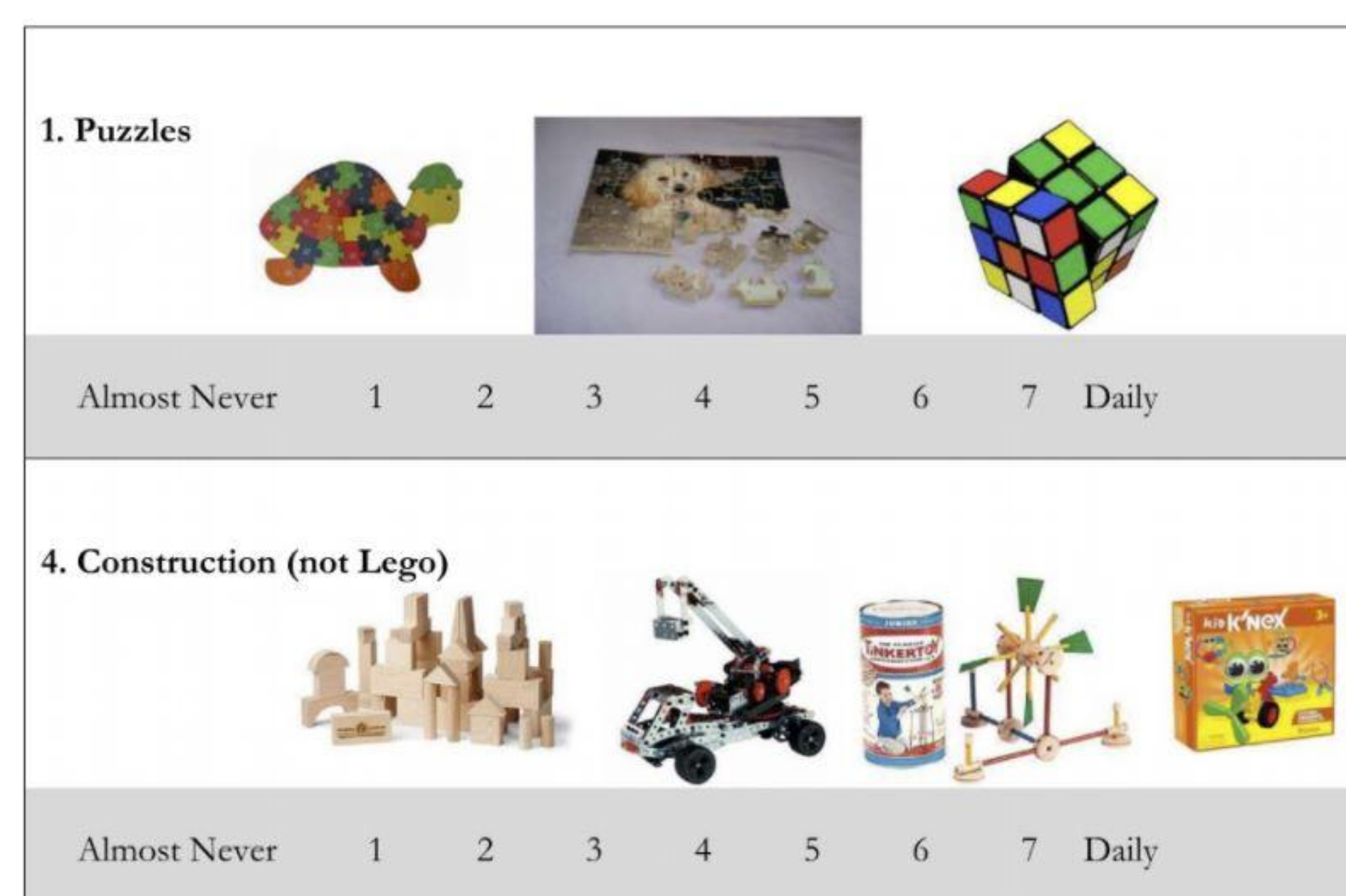
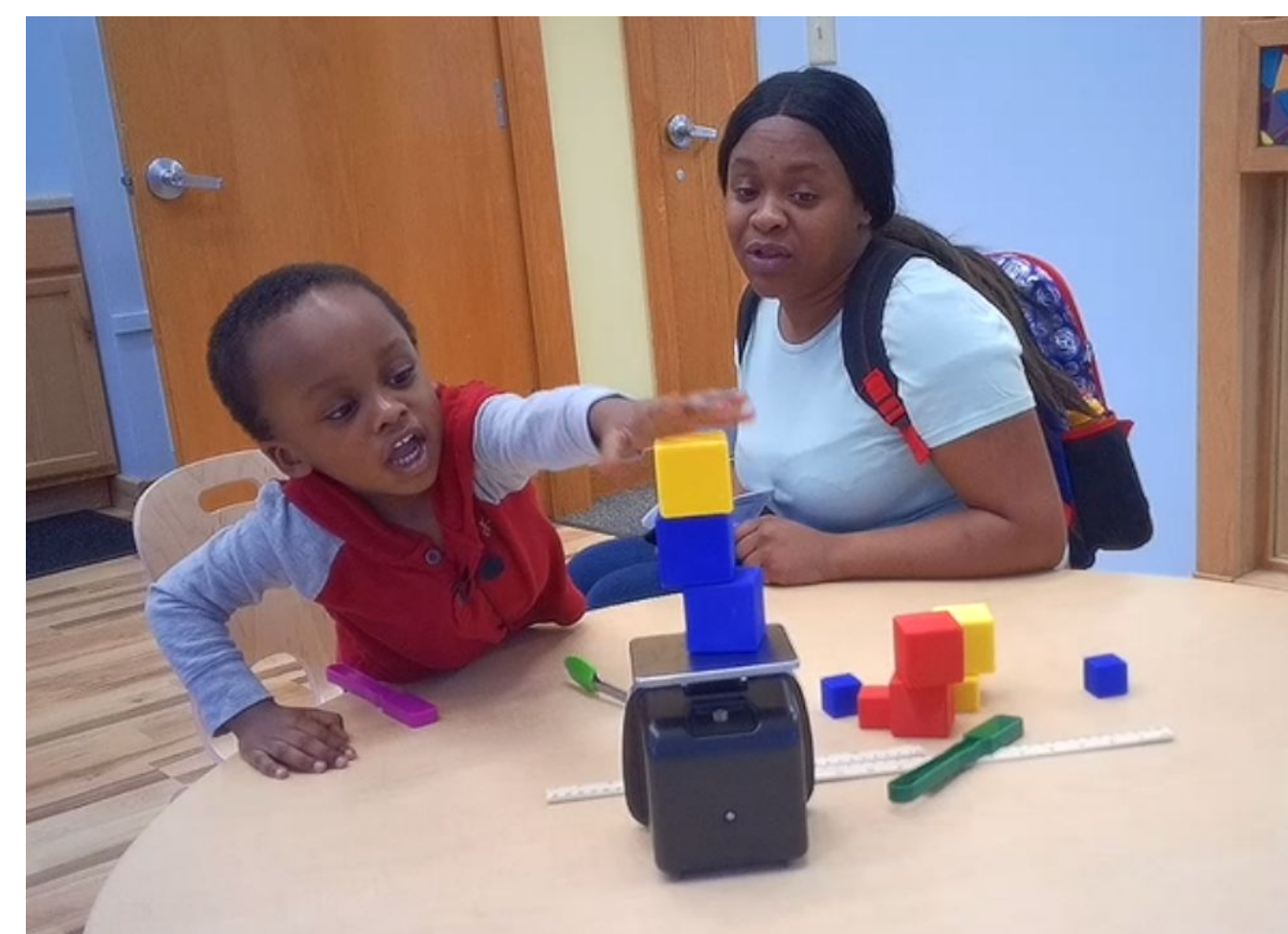
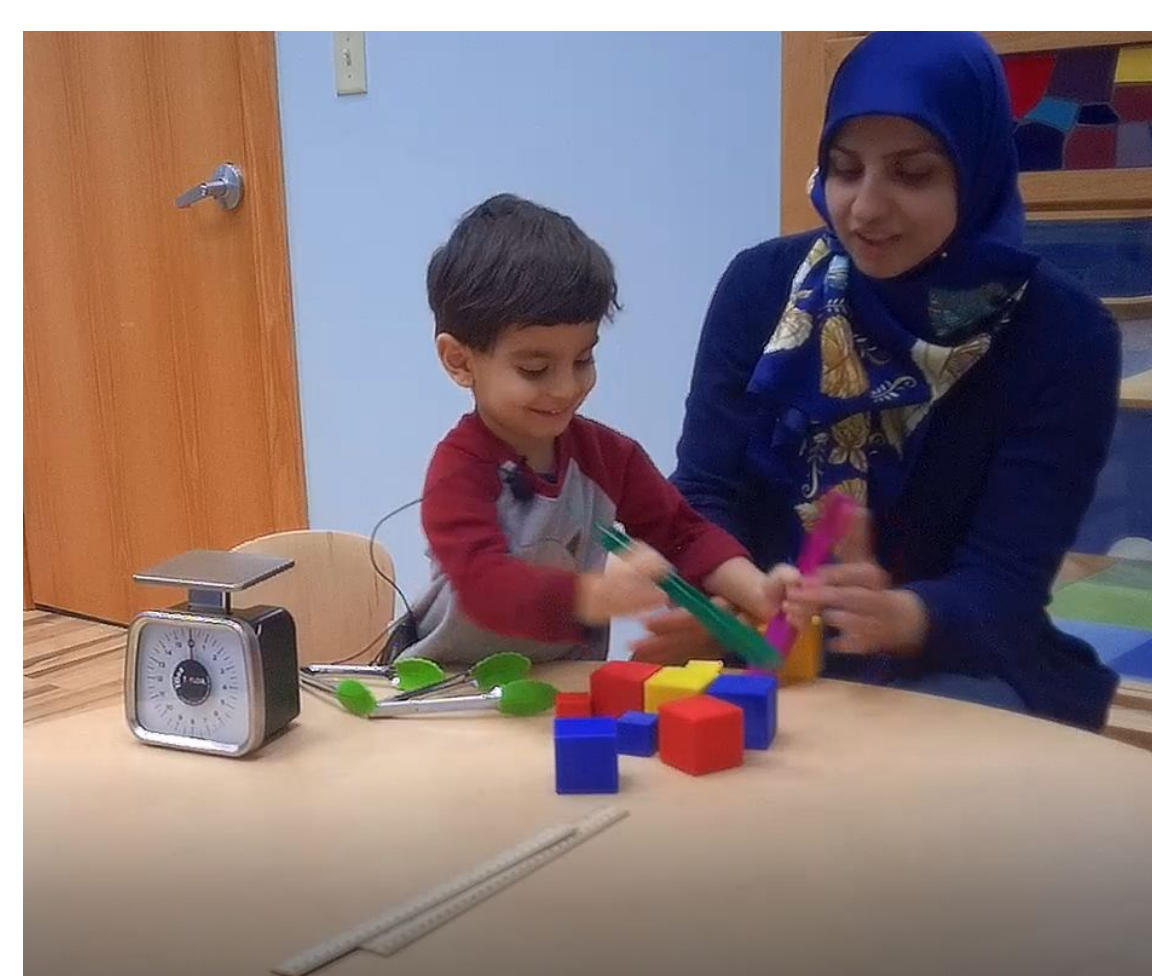
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INTRODUCTION

- There are learning gaps in children of low SES households
- Enrollment in programs like Head Start help bridge the learning gap
- Kachuro et al. (2019) found that enrollment in Head Start significantly improves school readiness
- Young children's interest in STEM can develop through everyday experiences; often in science-related informal settings and museums (Bell et al., 2009; Haden et al., 2014; McClure et al., 2017)
- Parental spatial language is important in creating a foundation in STEM learning (Verdine et al., 2014)
- Given the importance of informal learning, there could be correlations between at home play with spatial language and overall school readiness

BLOCK TASK & QUESTIONNAIRE



HYPOTHESES

1. Families who use more spatial language during informal block play will report playing more with the spatial, STEM-related toys at home
2. Families who use more spatial language will have children who score higher in school readiness
3. School readiness will increase during the children's enrollment in the Head Start program

PARTICIPANTS

N=23 children, 12 females
Age: 3-5 years old, M=3.97 years old
Children's ethnicity: 11 White non-Hispanic, 3 African American, 2 Asian, 2 Hispanic, 1 Iranian, 4 mixed-ethnicity

METHOD

- Block Task: 12 blocks of different sizes, weights, colors and 4 different tools
- Play Questionnaire: Adapted from Tougu et al. (2017)
- Spatial Language: Adapted from Canon et al. (2007) coding manual
- School Readiness: Program Quality Assessment (PQA), used by most Head Start programs, was used at the beginning and the end of the school year to assess school readiness

RESULTS

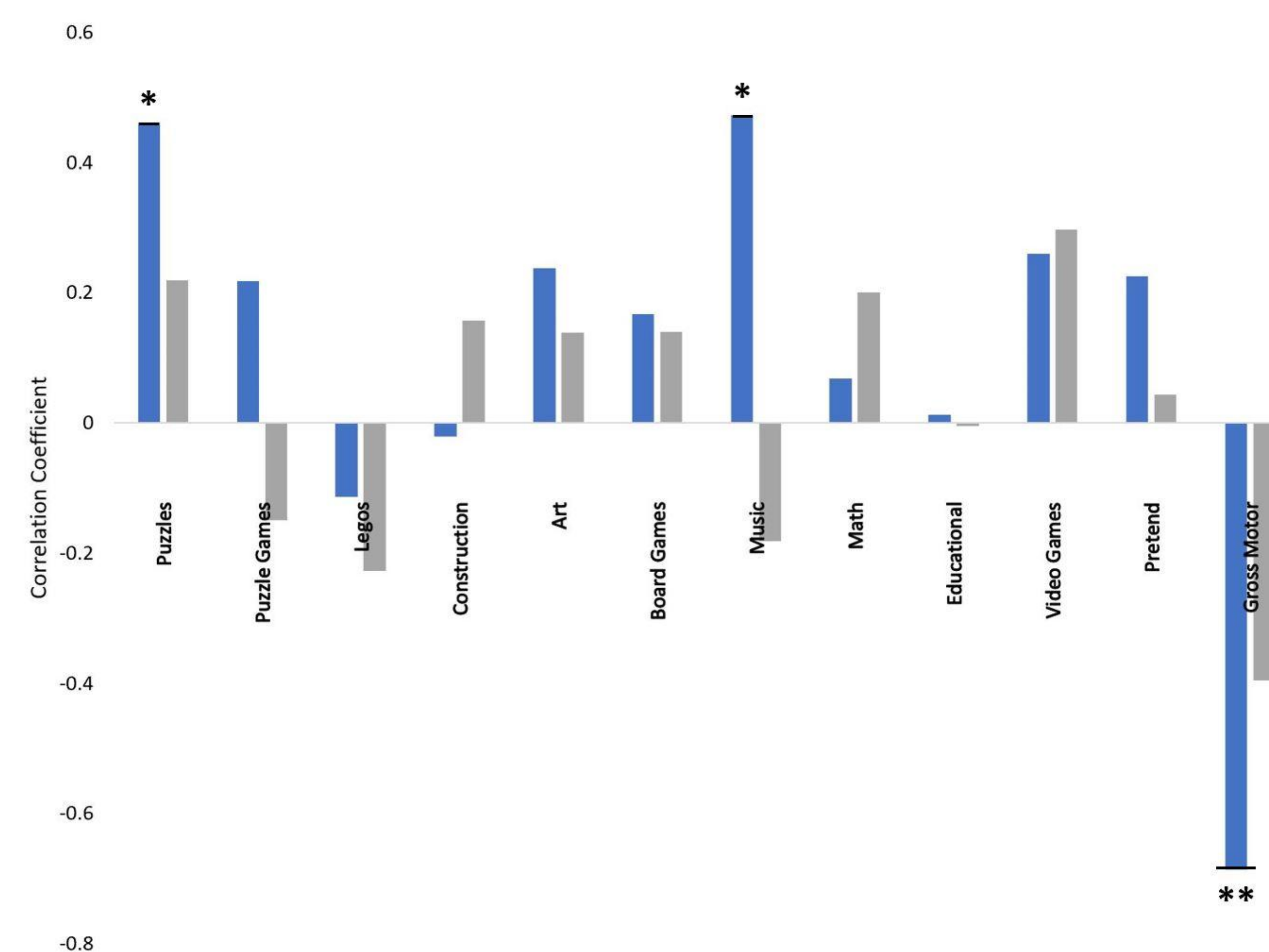


Figure 1. The correlation coefficients between adult and child spatial talk and responses to the play questionnaire. Increased adult spatial talk was significantly correlated with increased play with puzzles and music, $p < .05$. Increased adult spatial talk was also significantly correlated with increased gross motor play, $p < .01$.

RESULTS

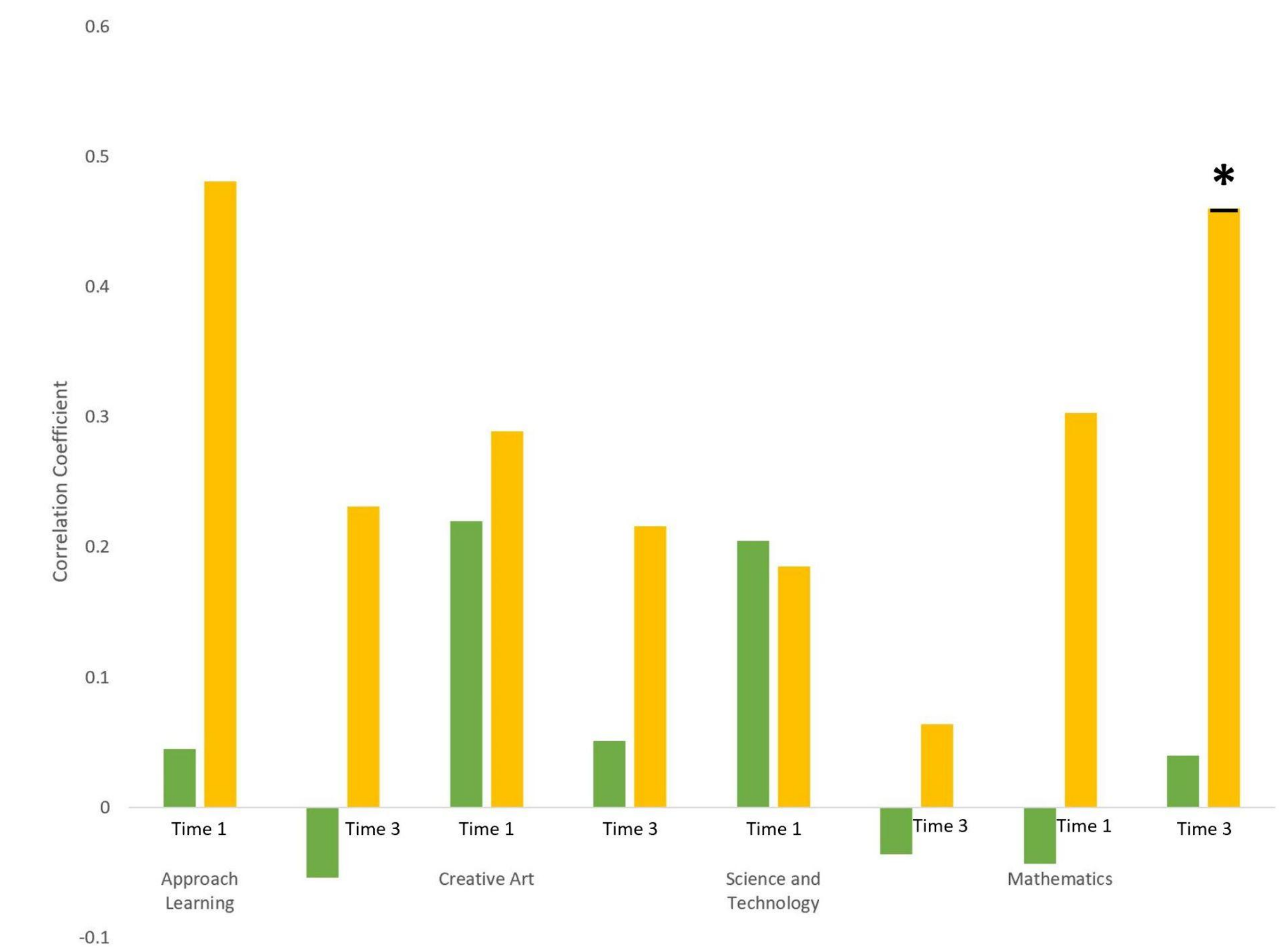


Figure 2. The correlation coefficients between school readiness at the beginning and end of the year with adult and child spatial talk. There was a significant positive correlation between child spatial talk and mathematics school readiness scores at the end of the year, $p < .05$.

DISCUSSION AND FUTURE RESEARCH

- The first hypothesis was not supported, there was a strong correlation between adult spatial talk and music
- The play questionnaire was filled out by the guardian so that could be influenced by demand characteristics
- The second hypothesis was supported in that child spatial talk had a strong, positive correlation with school readiness scores in mathematics at the end of the year
- The third hypothesis was also supported in that there was significant improvement in school readiness following enrollment in Head Start
- Limitations include that the guardian completed the play questionnaire, many spatial language categories had no registered language, and only STEM related school readiness scores were compared to spatial language
- Future research should examine sex differences in child spatial talk with how it relates to the responses on the play questionnaire and school readiness

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