

## Background

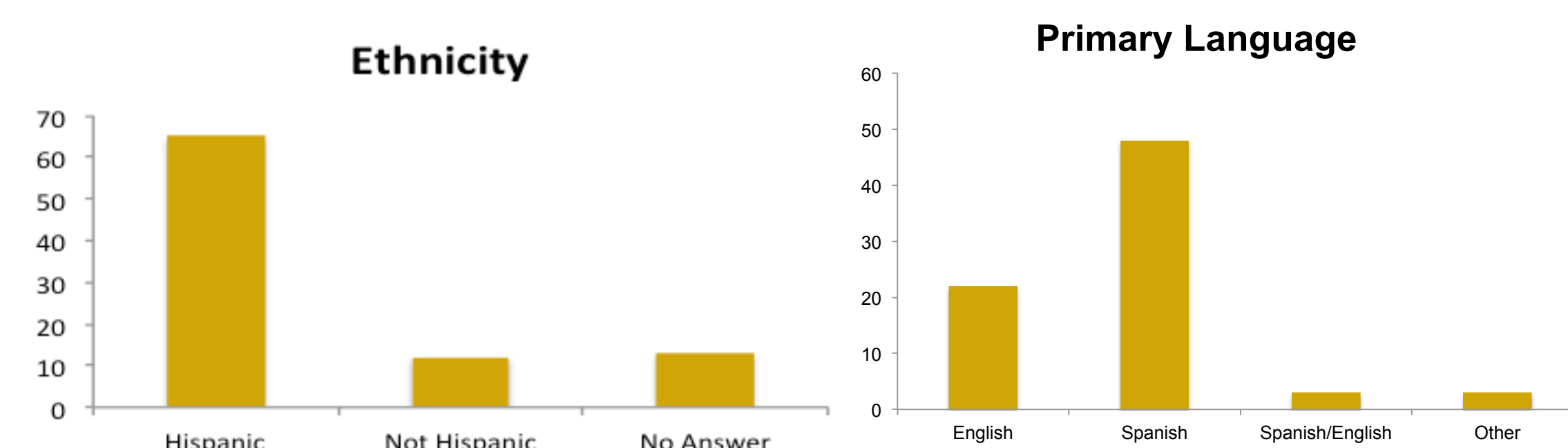
- Boys have been found to outperform girls on spatial tasks as early as the preschool years (Levine, Huttenlocher, Taylor & Langrock, 1999).
- Pre-kindergartners who hear more spatial language from their parents (i.e., *big, little, tall, short, triangle, rectangle, curvy, corner*) perform better on spatial tasks (Pruden, Levine & Huttenlocher, 2011).
- Parents use more spatial language with boys than with girls (Pruden & Levine, 2012).
- Pre-kindergartners spend a large amount of their day in the early education setting.
- The current study seeks to understand how sex differences in spatial thinking develop by exploring the spatial language boys and girls hear and produce in the classroom setting.

## Objectives

- Do boys hear more spatial language than girls from their pre-kindergarten educators?
- Do boys produce more spatial language than girls in the early education setting?
- Does the quantity of spatial language children hear from their educators mediate sex differences found in children's spatial skills and spatial language use?

## Participants

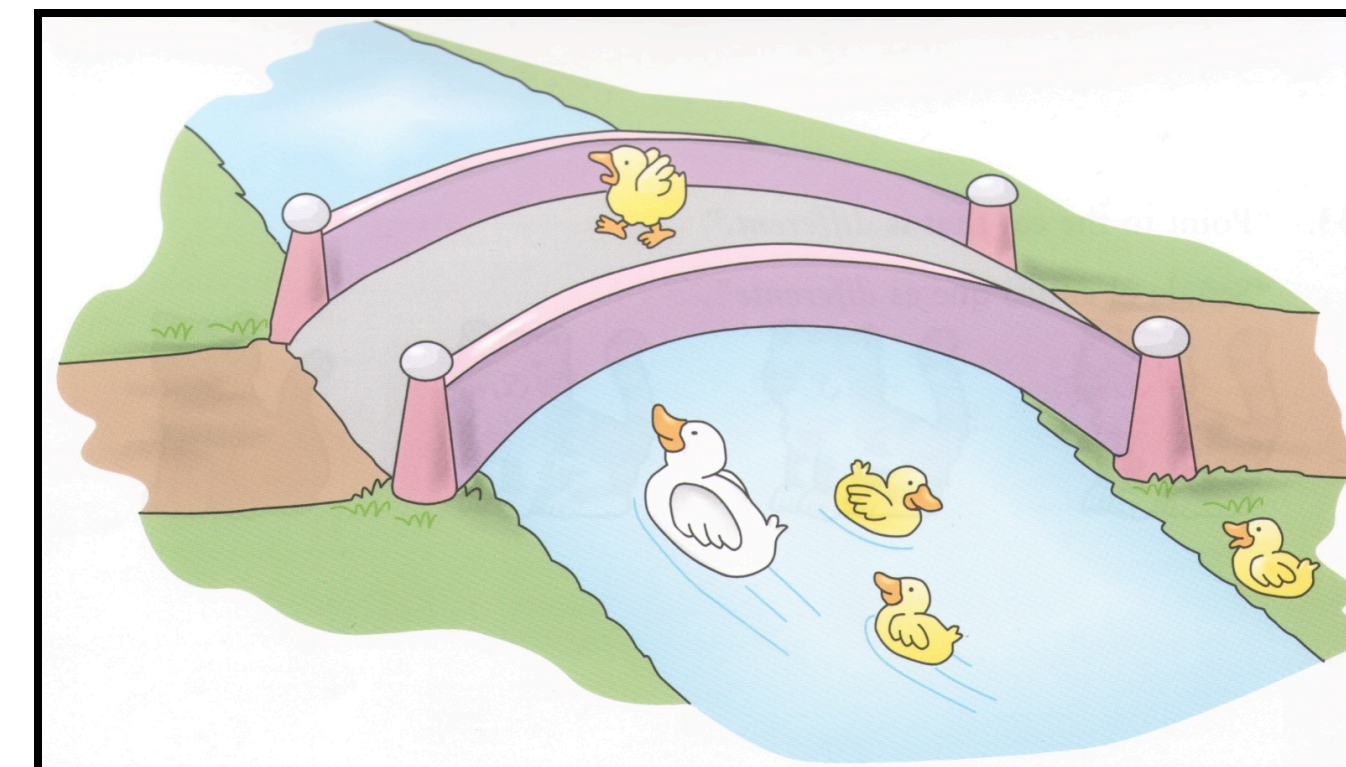
- 90 pre-kindergarten children (52 boys; 38 girls) enrolled in Florida's Voluntary Pre-Kindergarten program.
- 14 pre-kindergarten teachers from 7 Miami-Dade County Preschools.



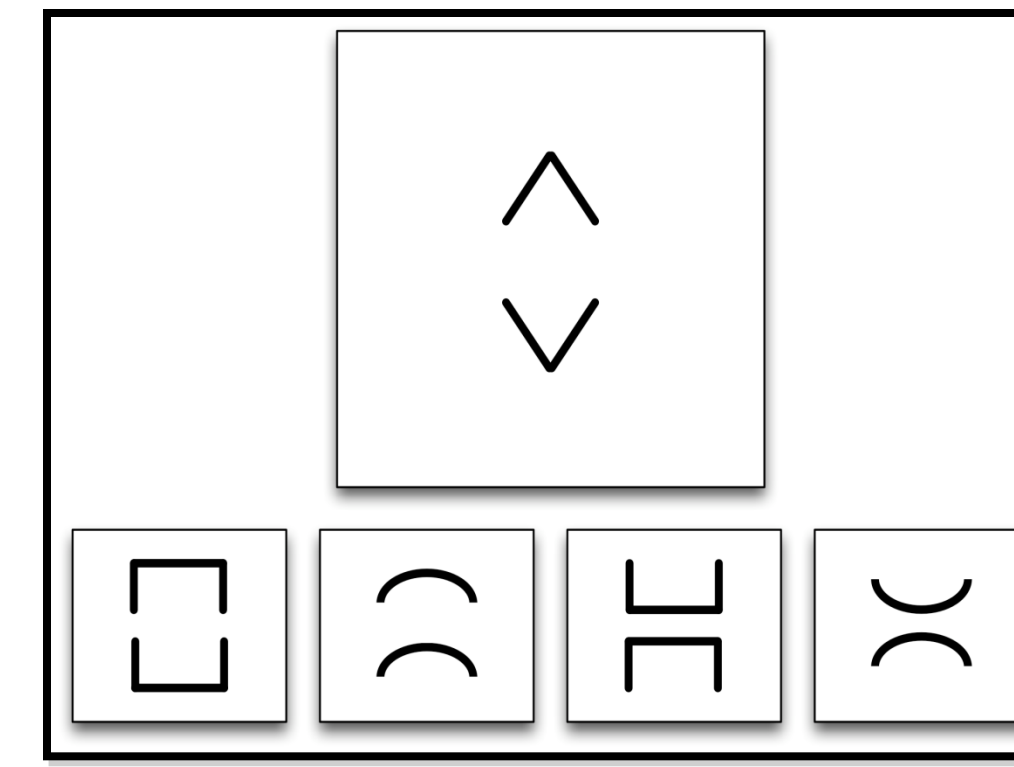
## Materials

Children received a spatial, numeracy and vocabulary assessment battery during Fall and Spring semesters.

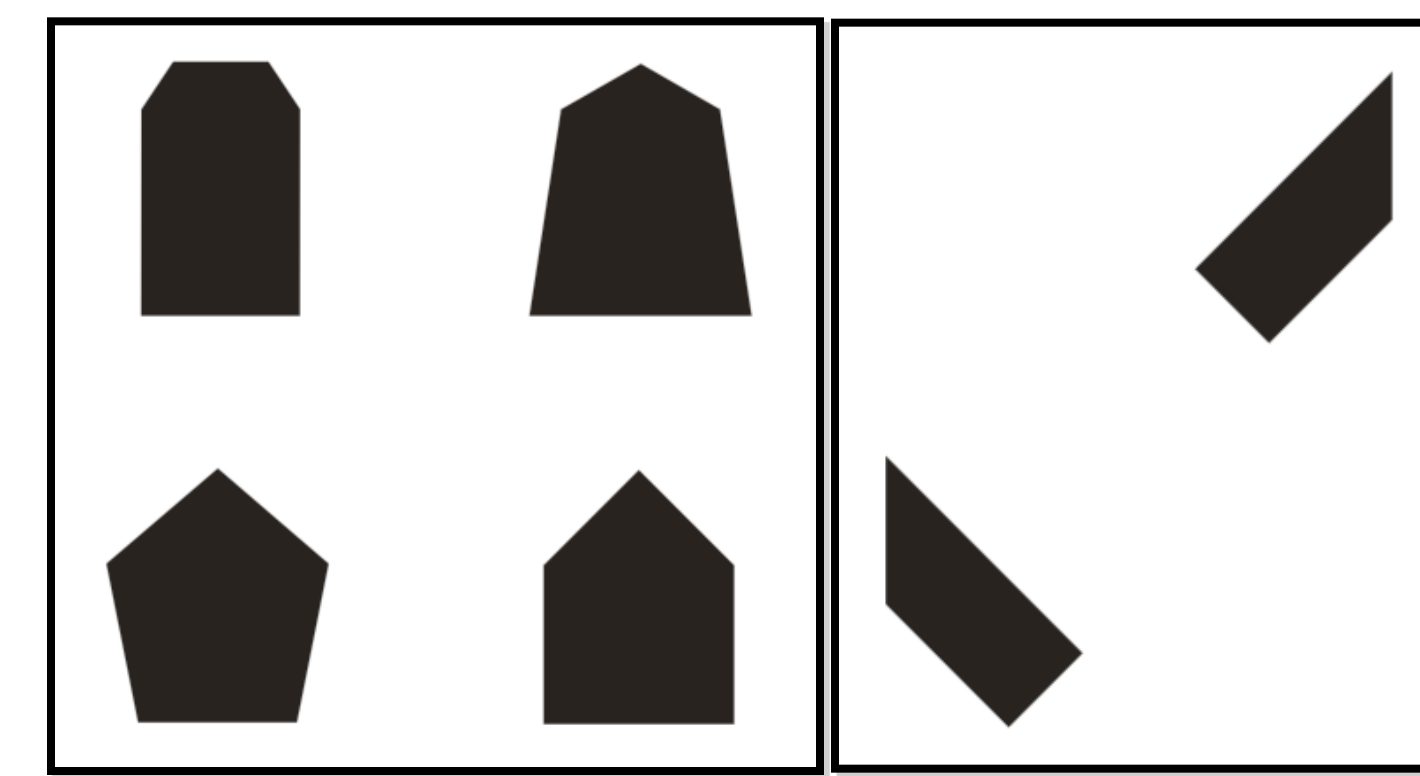
### Spatial Assessment Battery



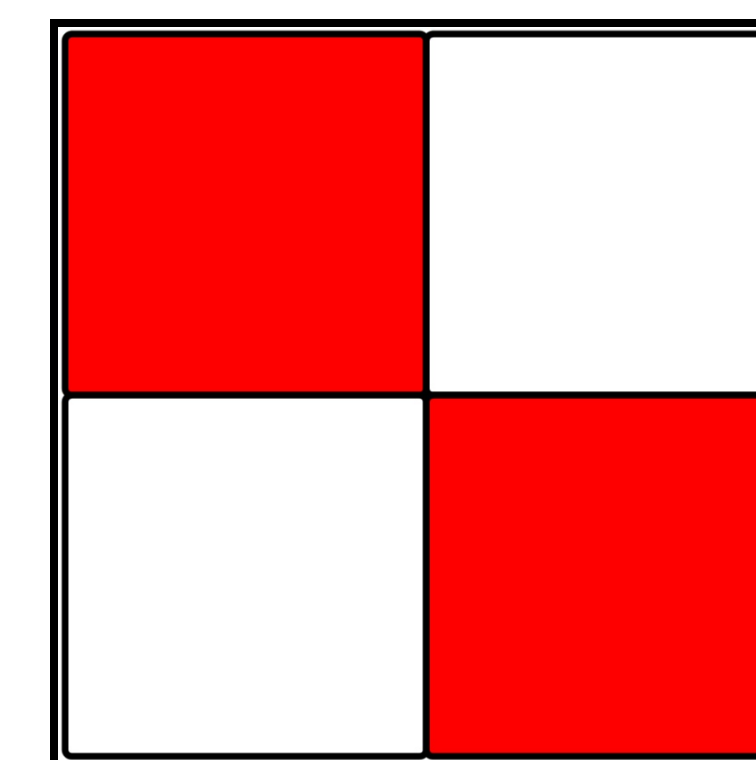
**Boehm Test of Early Concepts - 3:** "Point to the duck going across the bridge."



**Spatial Analogies Task:** "Which one of these pictures 'goes best' with the target picture?"

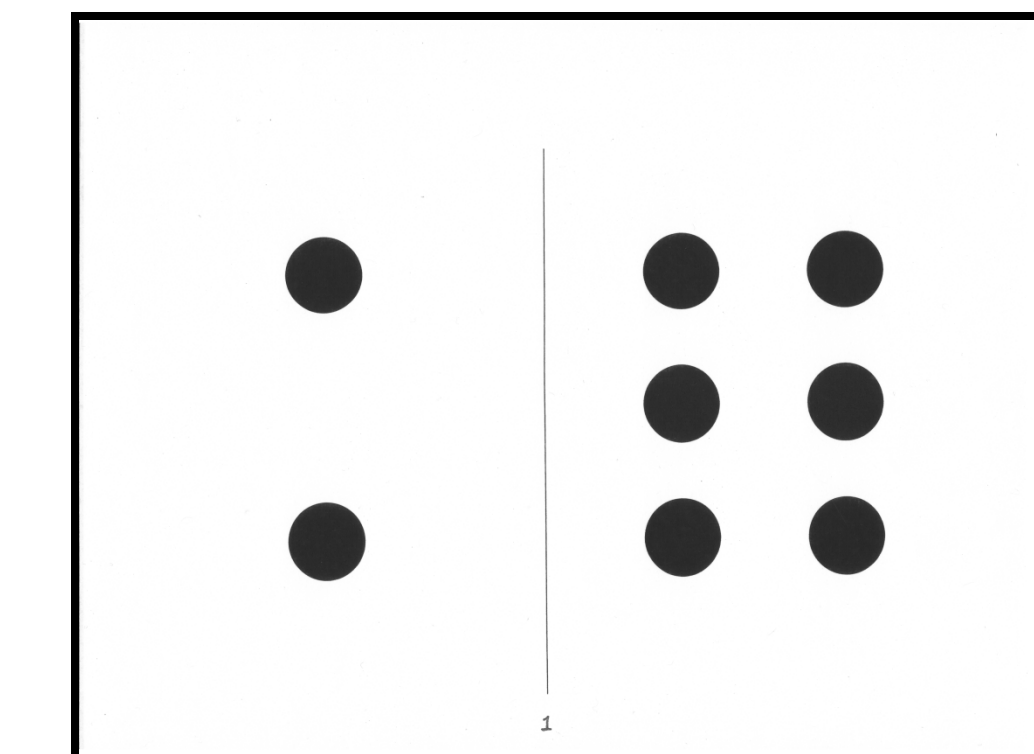


**Children's Mental Transformation Task:** "Look at these pieces. Now look at these shapes. If you put these pieces together, they will make one of these shapes. Point to the shape the pieces make."



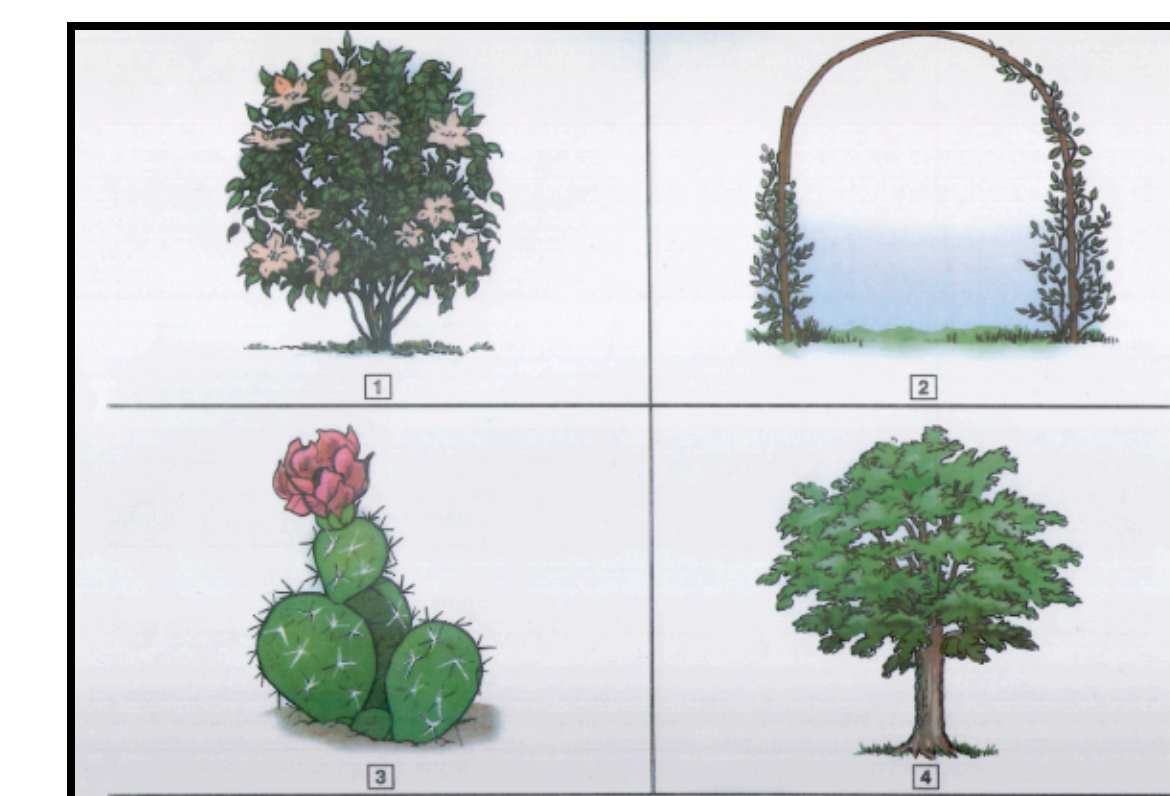
**WPPSI-III Block Design:** "Put your blocks just like mine."

### Numeracy Assessment



**Test of Early Mathematics - 3:** "which side has more?"

### Vocabulary Assessment



**Peabody Picture Vocabulary Test:** "Point to cactus."

## Discussion and Future Work

- We recently concluded data collection and are now in the process of transcribing and coding children's and teacher's speech samples.
- Individual differences were found in children's scores on the spatial assessment battery, numeracy assessment, and vocabulary assessment with girls outperforming boys on all measures.
- In the future, we will look at factors that may account for individual differences in scores as well as the unexpected sex differences (e.g. socioeconomic status, parent education level, and primary language spoken).
- We will also explore the effect of teacher's spatial language on children's production of spatial language and spatial task performance.

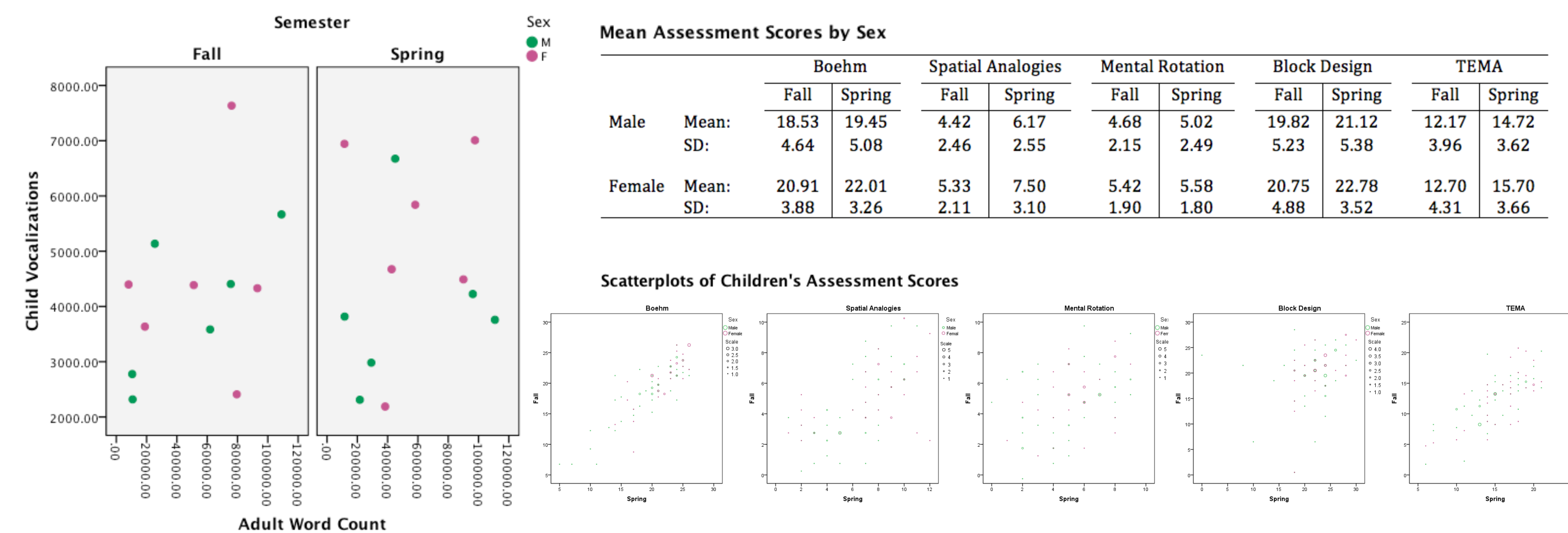
## References

- Levine, S. C., Huttenlocher, J., Taylor, A., & Langrock, A. (1999). Early sex differences in spatial skill. *Developmental Psychology, 35*(4), 940-949.
- Pruden, S.M., Levine, S.C., & Huttenlocher, J. (2011). Children's spatial thinking: Does talk about the spatial world matter? *Developmental Science, 14*, 1417-1430.
- Pruden, S.M., & Levine, S.C. (2012, June). Sex differences in children's spatial language production: Does parent input matter? Paper presented at biennial meeting of the International Society on Infant Studies, Minneapolis, MN

## Procedures

- 90 children (52 boys; 38 girls) and 14 prekindergarten educators wore a LENA DLP for first two hours of school day during both Fall and Spring semesters.
- Teacher and children's speech will be transcribed and coded to assess the use of language about spatial features and properties of object (e.g. shape, size, and location).

## Preliminary Results



## Acknowledgements

This research was supported by a generous grant from **The Ware Foundation** ([www.warefoundation.org](http://www.warefoundation.org)) to the Project on Language and Spatial Development.

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