Examining the Impact of Early Educator Language on Pre-K Children's Spatial Thinking Using the LENA Software

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Background

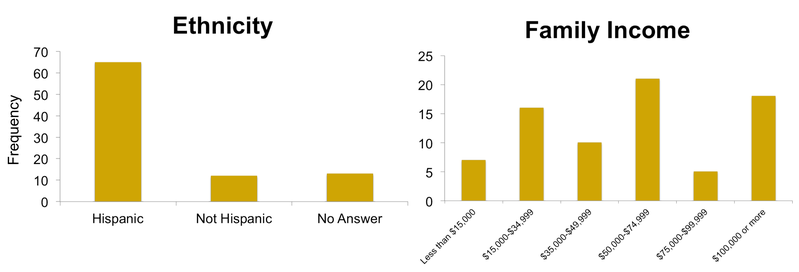
- Children who hear more spatial language (i.e., big, little, tall, short, triangle, rectangle, curvy, corner) from their parents produce more spatial language and have better spatial skills (Pruden, Levine, & Huttenlocher, 2011).
- Children's own production of spatial terms may be particularly important for later spatial thinking and future entry into STEM (Science, Technology, Engineering & Mathematics) fields.
- Children spend a large part of their day with caregivers other than their parents. The current study explores the role of educators' spatial language use on pre-kindergarteners' spatial language and spatial skills.

Objectives

- Are there individual differences in preschool educators' spatial and numeracy language use in pre-k classrooms?
- Do preschool educators' use spatial and numeracy language in math and science curricula?
- How does preschool educators' spatial and numeracy language use relate to child spatial and numeracy skill and growth?

Participants

- 14 pre-kindergarten educators from 7 Miami-Dade County preschools.
- 91 pre-kindergarten children (4- to 5-year-olds) from these 14 preschool classrooms (*M* = 6.5 children per teacher; *Range* = 1-15).



Materials

Numeracy Assessment:
- Test of Early Mathematics – Version 3 (Figure 1)

Spatial Assessment Battery:
- Children's Mental Transformation Task (Figure 2)
- Spatial Analogies Task (Figure 3)
- WPPSI-III Block Design Subtest (Figure 4)
- Boehm Test of Early Concepts – Version 3 (Figure 5)

Vocabulary Assessment:
- Peabody Picture Vocabulary Test

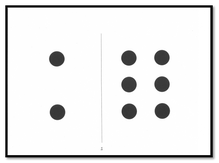


Figure 1: Which side has more?

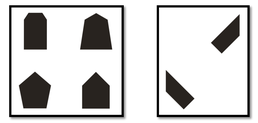


Figure 2: Look at these pieces. Now look at these shapes. If you put these pieces together, they will make one of these shapes. Point to the shape the pieces make.

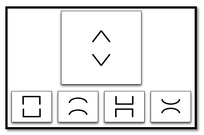


Figure 3: Which one of these pictures "goes best" with the target picture?

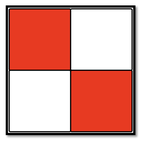


Figure 4: Put your blocks just like mine.

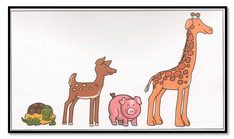


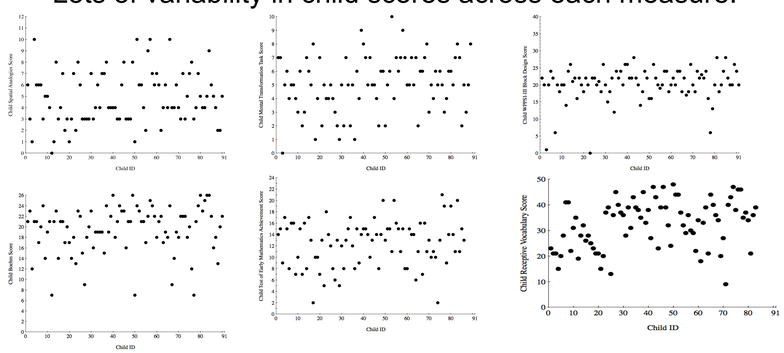
Figure 5: Point to the tallest animal.

Procedures

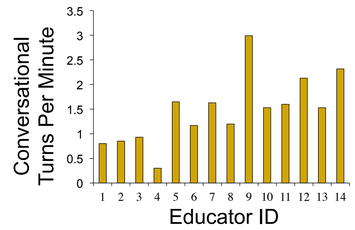
- Children received a vocabulary, numeracy, and spatial assessment battery during Fall and Spring semesters.
- Educators wore a LENA DLP for two hours during Fall and Spring semester.
- At each timepoint language during free play (~30 min), circle time (~30 min), math curriculum (~30 min) and science curriculum (~30 min) were recorded.

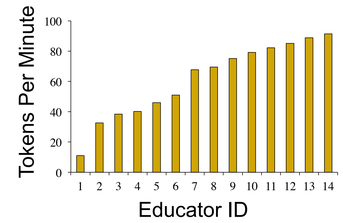
Preliminary Results

Lots of variability in child scores across each measure!

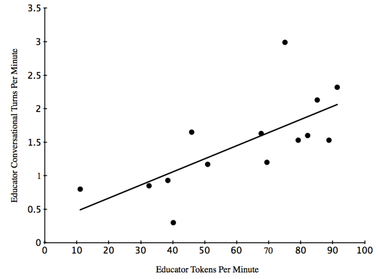


There is variability in educator conversational turns (*M* = 1.47; *Range* = 0.03 – 2.99) and overall tokens (*M* = 61.30; *Range* = 11.08 – 91.42) per minute.





Educators who use a lot of words per minute are also more likely to use a higher number of conversational turns (r = .70, p < .01).



Conclusion

- Individual differences were found in children's scores in each measure of numeracy, spatial, and vocabulary ability.
- Differences in language use in the classrooms, as seen in our LENA data, imply that children across classrooms have access to language of different quality and quantity.
- Going forward, we plan to compare children's scores from the Fall to their scores in the Spring according to the quantity and quality of spatial language heard in the classroom.
- We also will transcribe educator language use and code for talk about space (e.g., shapes, sizes, spatial features, location/direction terms) and number.

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For more information please visit **http://plsd.fiu.edu** or contact us at **plsd@fiu.edu**.

References

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.