Individual Differences in Children's Comprehension of Spatial Terms: Using LENA to Examine Influence of Parent Spatial Language

Rosalie Odean, Carla Abad, and Shannon M. Pruden

Florida International University

Background

- Our knowledge of how children learn language has grown enormously in recent decades, however, most research has focused on how children learn nouns (e.g. Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Pruden, Hirsh-Pasek, Golinkoff, & Hennon, 2006).
- Links between language input and vocabulary have been shown in numerous studies (e.g. Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Hart & Risley, 1995).
- Hurtado, Marchman, and Fernald (2008) found a relation between word processing speed and maternal input in monolingual Spanish speaking children.
- Pruden, Levine, and Huttenlocher (2011) found that spatial language input children receive between age one and four is correlated with their spatial ability at age four.
- The current study explores the relationship between maternal language input, and spatial language processing speeds in bilingual three year olds.

Objectives

The proposed study has three specific aims:

1. To characterize the relation between quantity of spatial language the child's hears and the child's lexical processing speed of a familiar spatial word;

2.To investigate the extent to which variability in the child's lexical processing speed of a spatial word predicts the child's spatial receptive vocabulary size and;

3.To examine whether quantity of spatial language children hear from their caregiver mediates the relation between children's lexical processing speed of a spatial word and the child's spatial receptive vocabulary size.

Participants

40 three year old children and their parents will participate in a two part study, including a home visit, and two lab visits.

Home Visit

- The home visit will be recorded with a LENA device.
- The Home visit will be split into two periods of thirty minutes each.
- The first period will be naturalistic typical daily activities.
- During the second period the experimenter will introduce three spatial toys:
  - A megabloks set (Figure 1),
  - A shape sorter (Figure 2)
  - A puzzle (Figure 2).

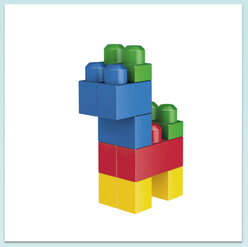

Figure 1.
Megabloks.

Figure 2.
Shape sorter.

Figure 3.
24-piece puzzle.

Intermodal Preferential Looking Paradigm

- Children will be tested using the IPLP in both English (lab visit 1) and Spanish (lab visit 2).
- While the images will be the same in both languages, the orders of the images, and the target image for questions, will be counterbalanced.
- In addition, which language children are tested in first will be counterbalanced. Adapted from *The Test of Relational Concepts*, children will see 14 digitized, colored line drawings arranged in pairs on a split-screen (Figure 4).
- While viewing these two images simultaneously, children will hear a female speaker ask for the target spatial word.
- A Tobii X60 eyetracker will record children's gaze to each stimuli.

Analysis

- We seek to identify which children are more efficient at processing spatial terms.
- Children's visual attention to each image will be coded from the onset of the target word

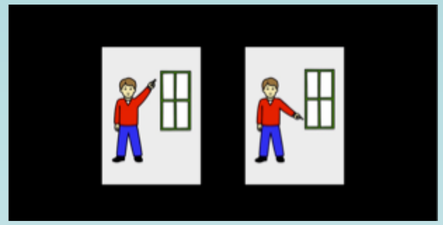

Figure 4. "Can you find the boy pointing to the *bottom* of the window?"

- Eye gaze from the IPLP will be coded for the total time looking to target (TLT) and total time to switch to target (TST), if the child was looking anywhere else on the screen at the onset of the spatial term.
- Home visits will be transcribed and coded for spatial tokens and utterances
- Regressions will be run to establish if children who hear or use more spatial language are more efficient processors of spatial terms

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For additional information about this research, please contact: Rosalie Odean, rodea001@fiu.edu

References

Hart, B., & Risley, T. R. (1995). Meaningful differences in the everyday experience of young American children. Brookes Publishing Company, Inc., PO Box 10614, Baltimore, MD 21285-0624.

Hurtado, N., Marchman, V. A., & Fernald, A. (2008). Does input influence uptake? Links between maternal talk, processing speed and vocabulary size in Spanish-learning children. *Developmental science, 11*(6), F31-F39.

Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. Developmental psychology, 27(2), 236.

Pruden, S. M., Hirsh-Pasek, K., Golinkoff, R. M., & Hennon, E. A. (2006). The Birth of Words: Ten-Month-Olds Learn Words Through Perceptual Salience. Child development, 77(2), 266-280.

Pruden, S. M., Levine, S. C., & Huttenlocher, J. (2011). Children's spatial thinking: does talk about the spatial world matter?. Developmental Science, 14(6), 1417-1430.