



# Predicting Speech Errors in Young Children

Jill R. Hoover<sup>1</sup>, M.A. & Holly L. Storkel<sup>2</sup>, Ph.D.  
<sup>1</sup>Child Language Doctoral Program    <sup>2</sup>Department of Speech-Language-Hearing  
University of Kansas



## Speech Errors

- One-time error in speech production and/or planning
- Occur on structures already acquired by children
- Lexical Error
  - Substitution of meaningful lexical items
- Phonological Error
  - “Daddy, please rub my *black...back*”
- Semantic Error
  - “Uh huh, the *green* top....the *yellow* top.”
- Mixed Error
  - “That *hit* me...I mean *hurt* me.”

## Importance of Studying Speech Errors

- Window into normal language production
  - Phonological Representations
    - Individual phonemes and sequences of phonemes
  - Lexical Representations
    - Whole word form as integrated sound sequence
  - Semantic Representations
    - Meaningful information about a referent

## Lexical Representations

- Neighborhood Density (Luce & Pisoni, 1998)
  - Characteristic of whole word form
  - The number of similar sounding words (Dense vs. Sparse)
  - Adult & Child Word Recognition (Garlock, Walley, & Metsala, 2001; Vitevitch & Luce, 1999)
    - Sparse > Dense
  - Adult & Child Speech Production (Garlock et al., 2001; Vitevitch, 2002)
    - Dense > Sparse
- Normal Language Development (Storkel, 2004)
  - Dense > Sparse
- Adult & Child Speech Errors (German & Newman, 2004; Vitevitch, 1997)
  - Target words have fewer neighbors than substitutes and words in the lexicon

## Semantic Representations

- Semantic Density (Nelson, McEvoy, & Shreiber, 1998)
  - Characteristic of the meaning of a word
  - The number of meaningfully related words (Dense vs. Sparse)
  - Adult Word Recognition (Armbruster & Vitevitch, 2003)
    - Dense > Sparse

## Questions

**Do phonotactic probability, neighborhood density, & semantic density predict speech errors in young children?**

**Do these characteristics exhibit different effects across phonological versus semantic errors in young children?**

## Speech Error Corpus (Jaeger, 2005)

- Diary study of three children (1;7 – 5;11)
- Group of 57 “other” children (1;10-5;11)
- Analyzed a subset of lexical errors from a larger corpus (N = 96)

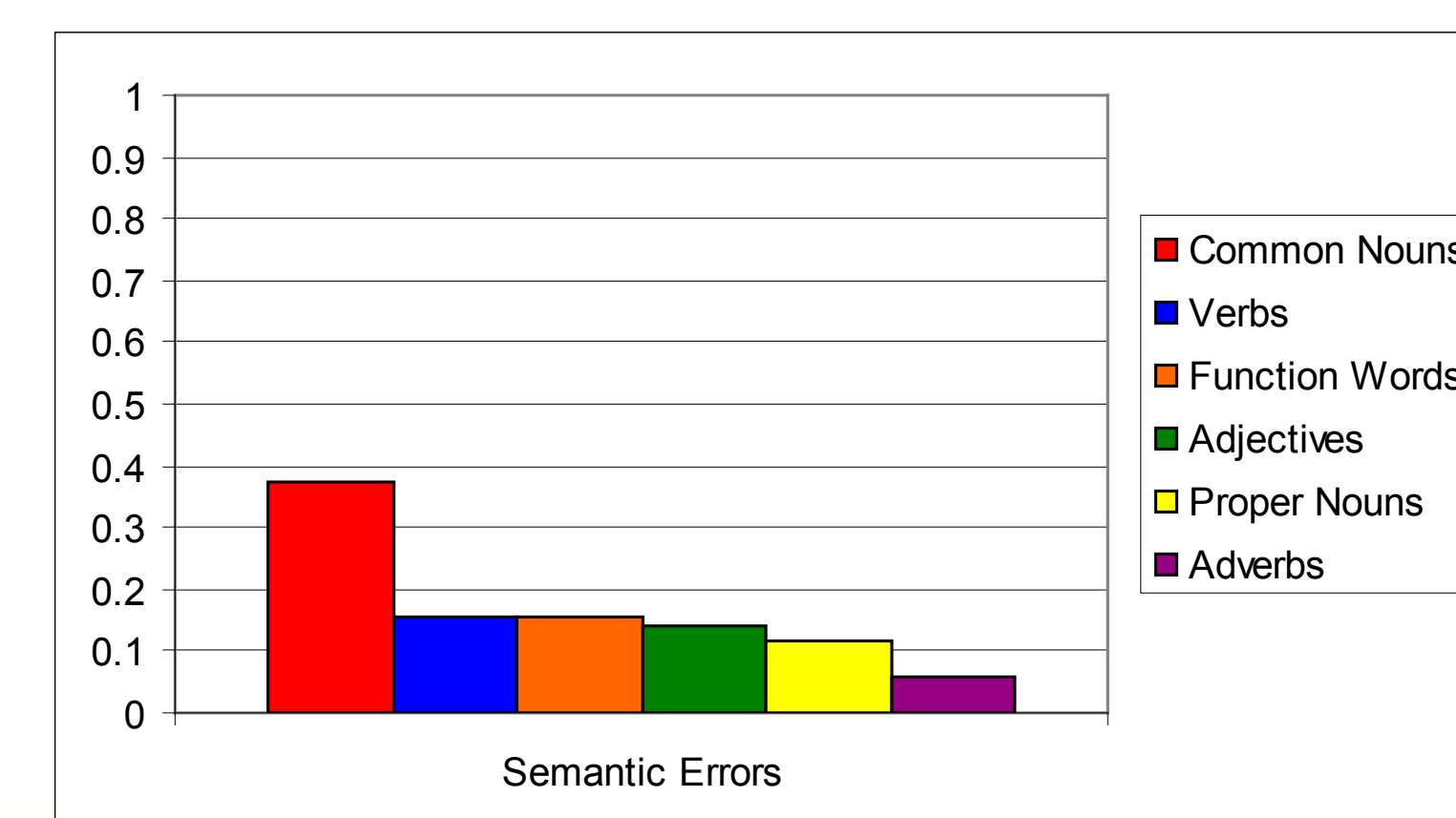
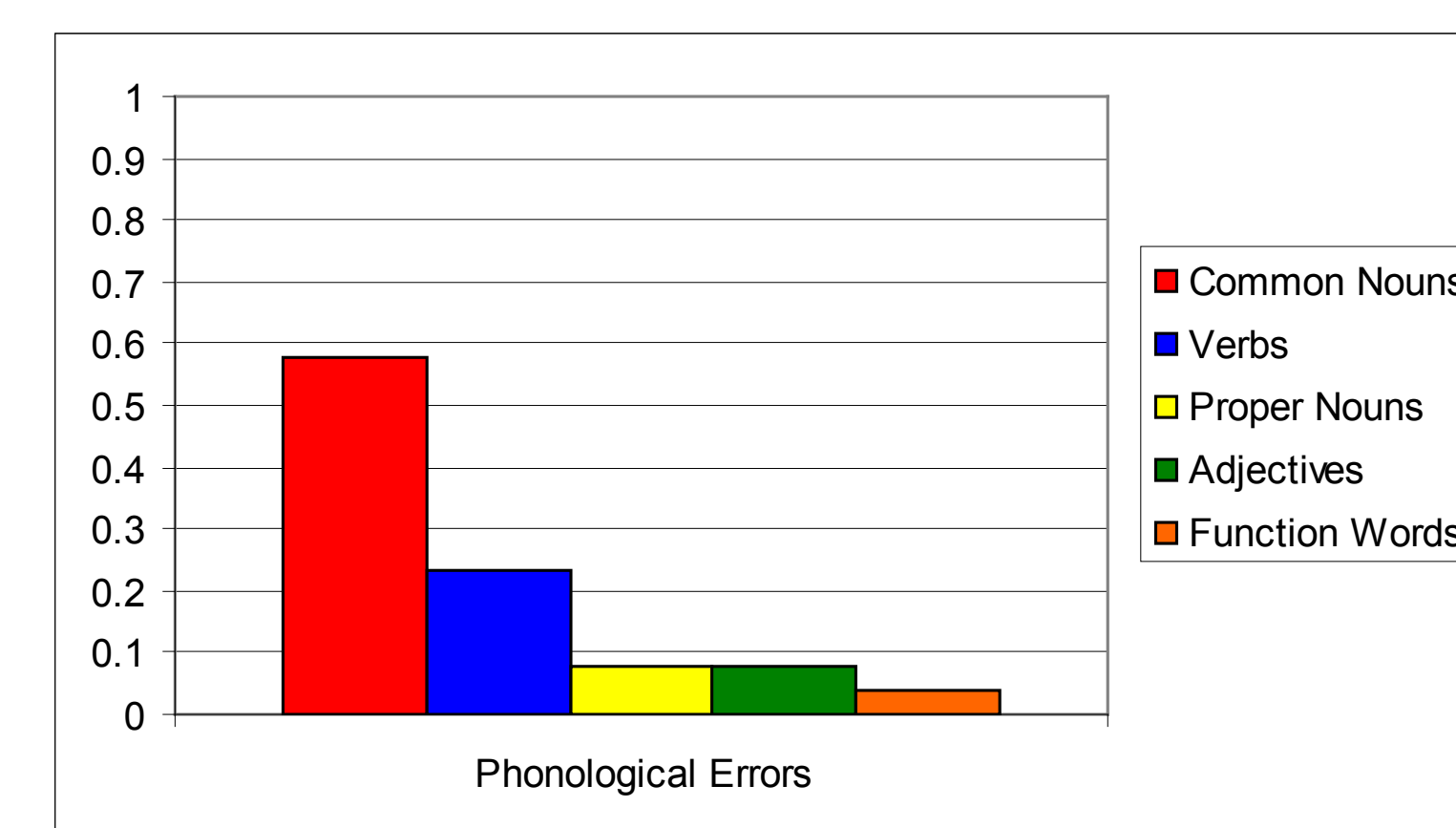
## Current Study

- Lexical Paradigmatic Errors (N=154)
  - Phonological Errors (N=26)
  - Semantic Errors (N=70)
  - Mixed Errors (N=58)
- Examined **target** words across children/ages

## Variables

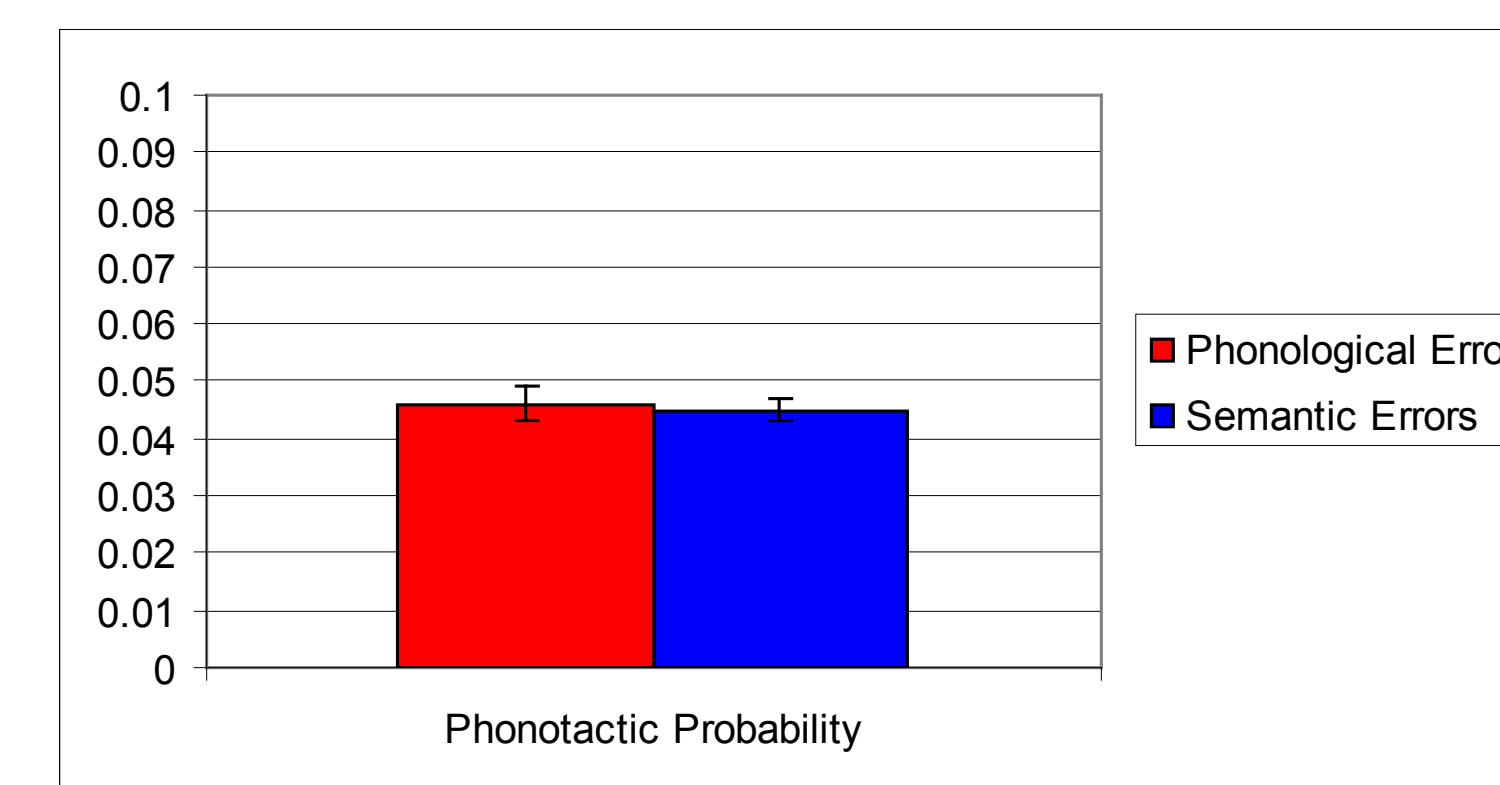
- Phonotactic Probability (Vitevitch & Luce, 2004)
- Neighborhood Density (Vitevitch & Luce, 2004)
- Semantic Density (Nelson, et al., 1998)

## Syntactic Category Representation



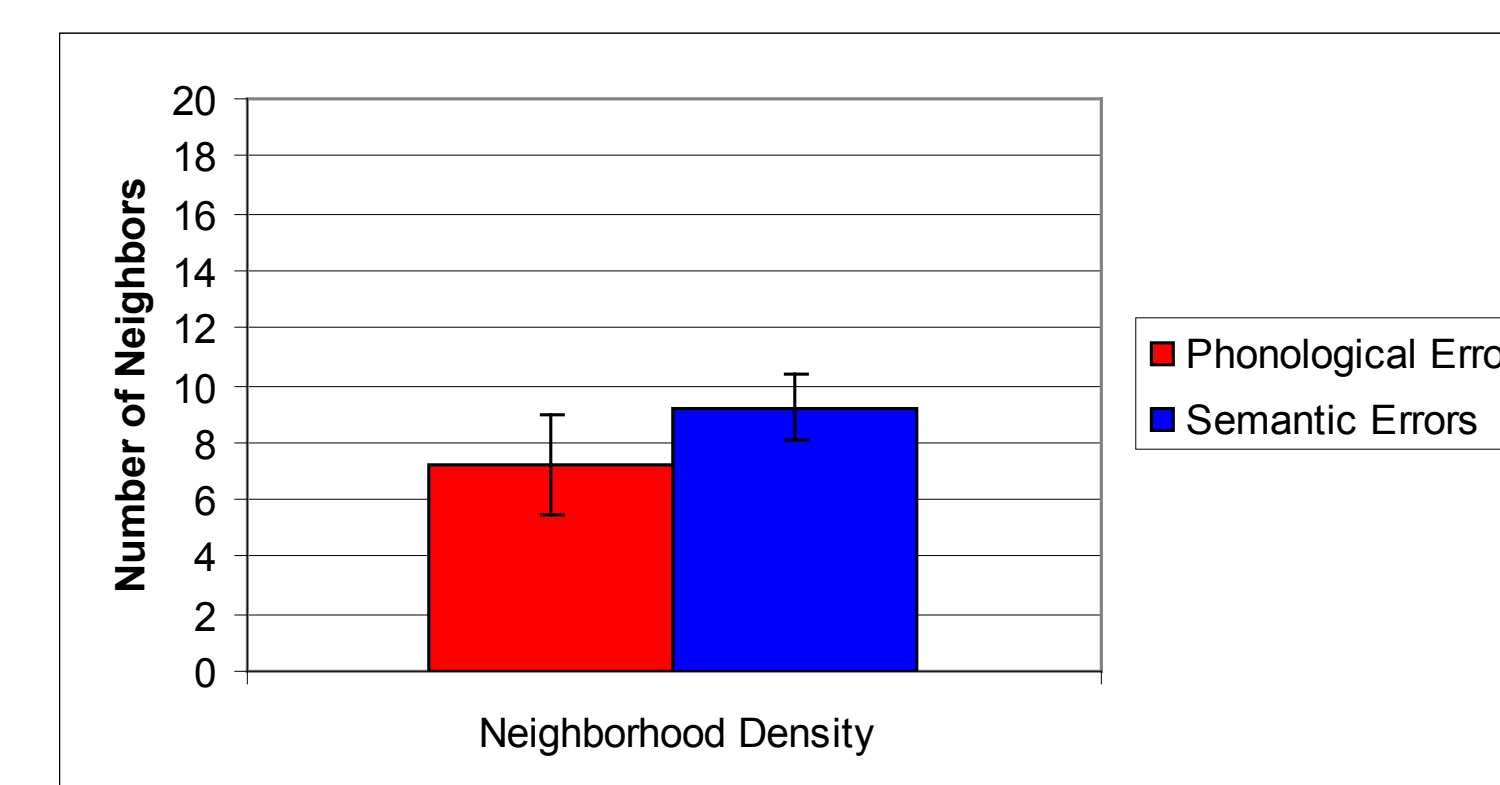
- Phonological errors occur primarily on common nouns & verbs
- Semantic errors occur primarily on common nouns

## Phonotactic Probability



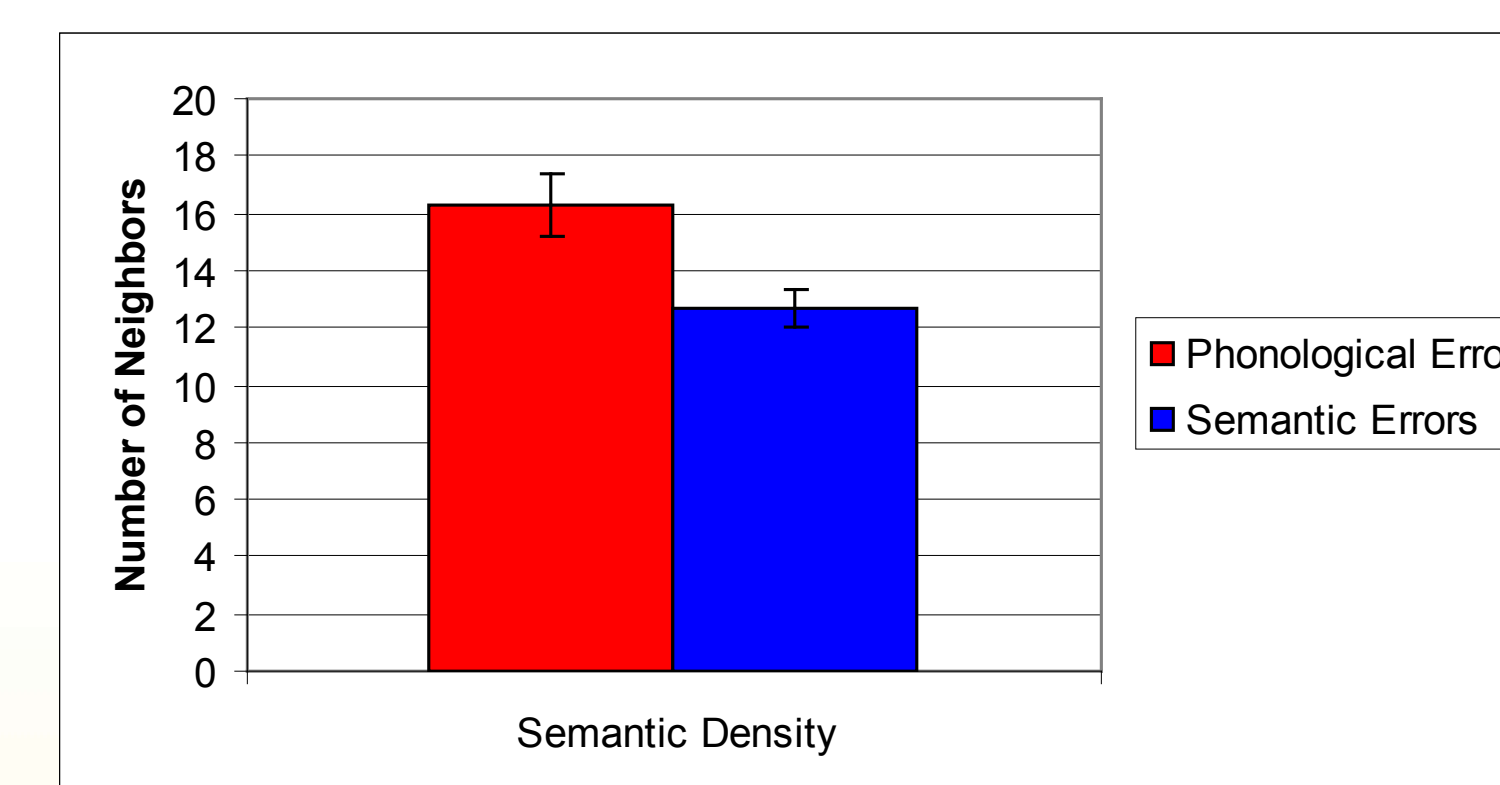
- Limited or no effect in differentiating phonological versus semantic errors in young children

## Neighborhood Density



- Differentiates phonological versus semantic errors in young children
  - Words with a phonological error had fewer neighbors than words with a semantic error
    - Consistent with Vitevitch (1997) and German & Newman (2004)

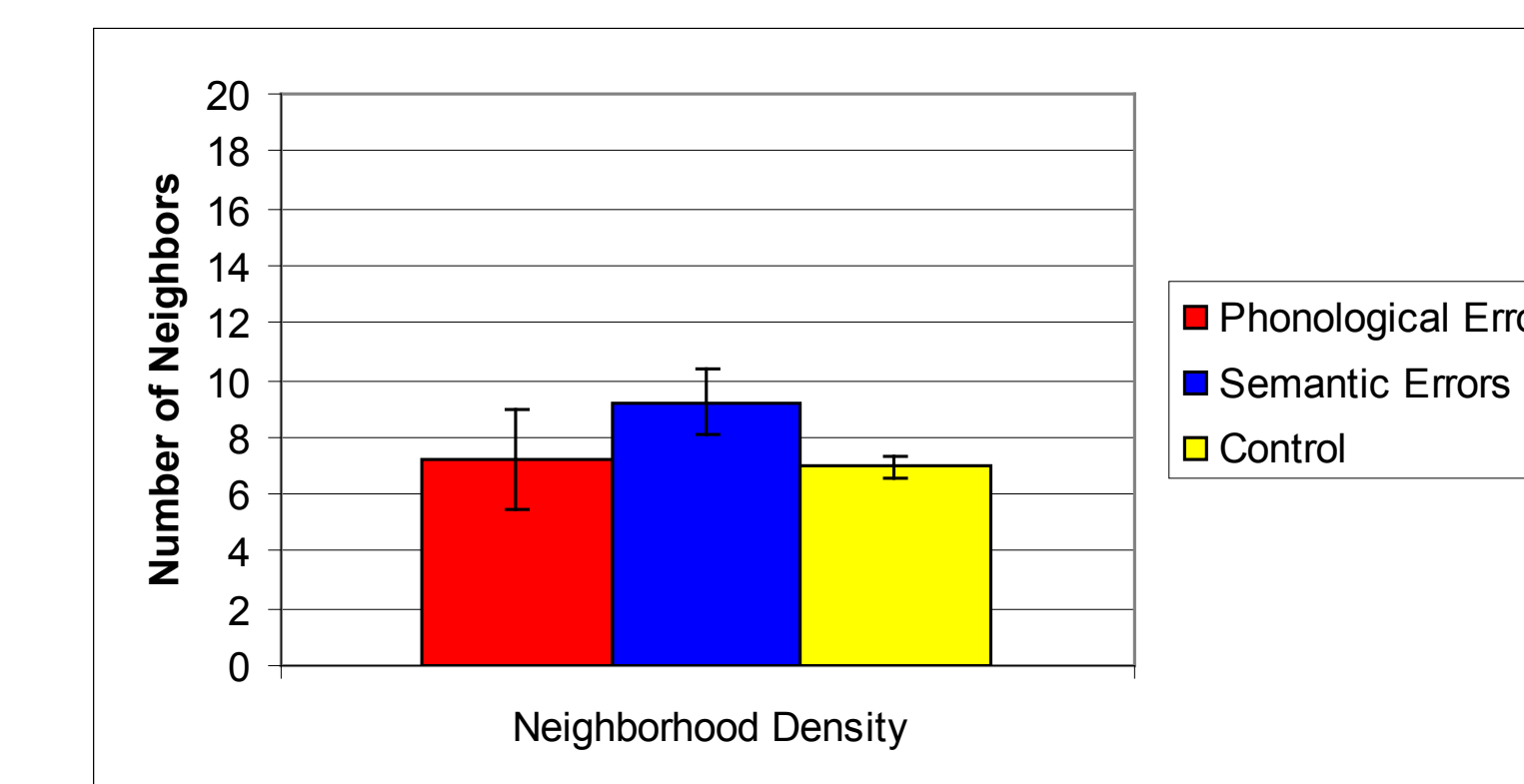
## Semantic Density



- Differentiates phonological versus semantic errors
  - Words with a phonological error had more neighbors than words with a semantic error

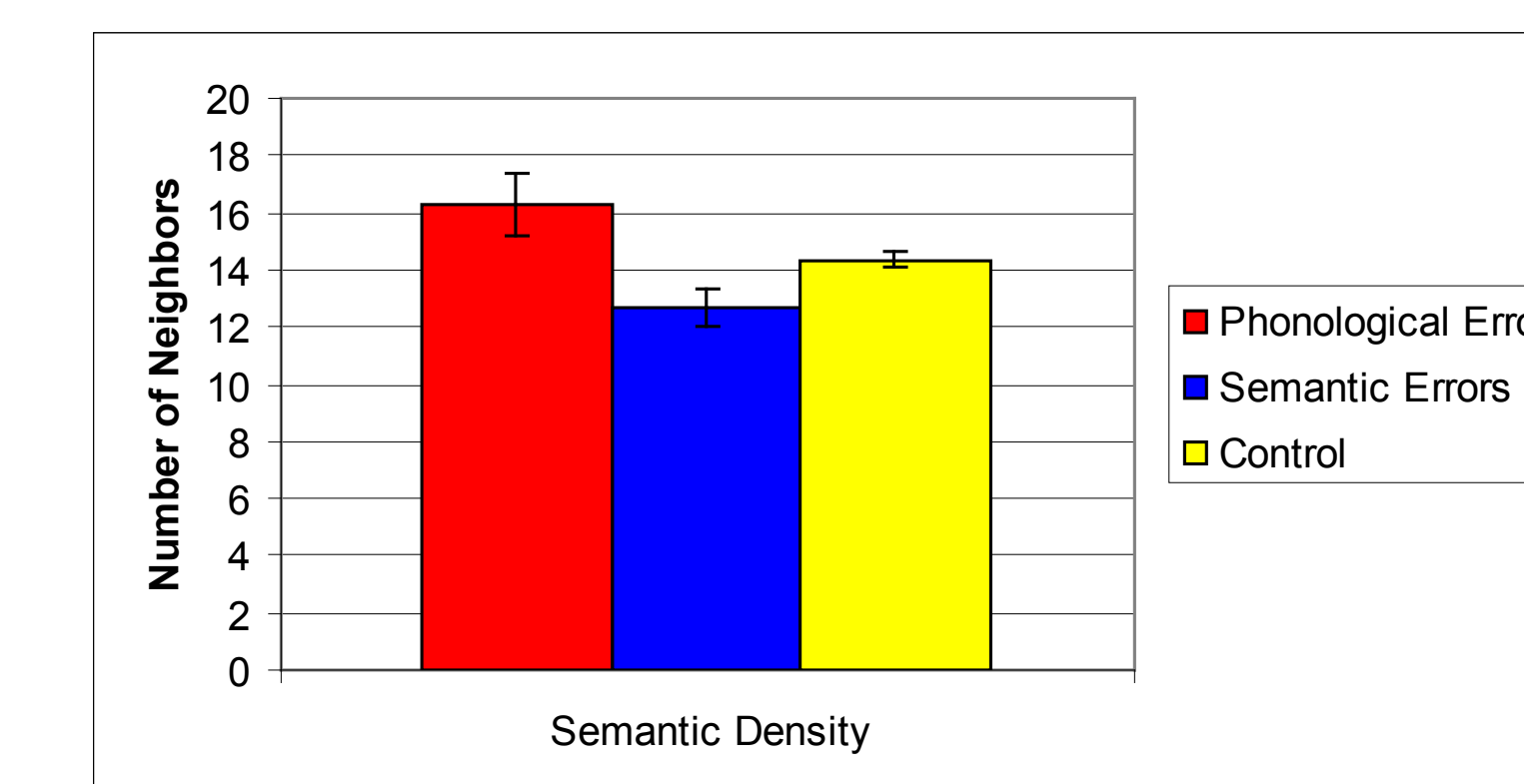
## Target Words vs. Control Words

### Neighborhood Density



- Words with a phonological error have a similar number of neighbors as control words
  - Inconsistent with Vitevitch (1997)

### Semantic Density



- Words with a semantic error have fewer neighbors than control words

## Summary

- **Phonotactic Probability:**
  - Processing of nonwords versus real word recall (Vitevitch & Luce, 1999)
  - Inconclusive evidence for the phonological representation as the source of error(s)
- **Neighborhood Density:**
  - Weak lexical representation of words with phonological errors
  - Evidence for the lexical representation as the source of phonological errors
- **Semantic Density:**
  - Weak semantic representation of words with semantic errors
  - Evidence for semantic representation as the source of semantic errors
  - Support for semantic density as an additional predictor of speech errors in young children

## Future Directions

- Compare targets and substitutes to a random selection of words from a child lexicon
- Fit a structural equation model to the data
- Analyze additional errors in the corpus
- Analyze errors at individual ages
- Calculate phonotactic probability, neighborhood density, & semantic density using a child lexicon

## References

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**Project Contributors:**  
Dr. Michael Vitevitch, Allison Wade, and Courtney Winn

**Contact:**  
[www.ku.edu/~wrldrng/](http://www.ku.edu/~wrldrng/)  
[jrhoover@ku.edu](mailto:jrhoover@ku.edu)  
[hstorkel@ku.edu](mailto:hstorkel@ku.edu)