Predicting Speech Errors in Young Children

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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*…<u>back</u>"
- Semantic Error
  - "Uh huh, the *green* top….the <u>yellow</u> top."
- Mixed Error
  - "That *hit* me…I mean <u>hurt</u> 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

Phonological Representations

- Phonotactic Probability (Vitevitch & Luce, 1999)
  - Characteristic of individual sounds
  - Likelihood of occurrence of a sound sequence (Common vs. Rare)
  - Adult Word Recognition & Production (Vitevitch & Luce, 1999)
    - Common > Rare
  - Normal Language Development (Storkel, 2001, 2003)
    - Common > Rare

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
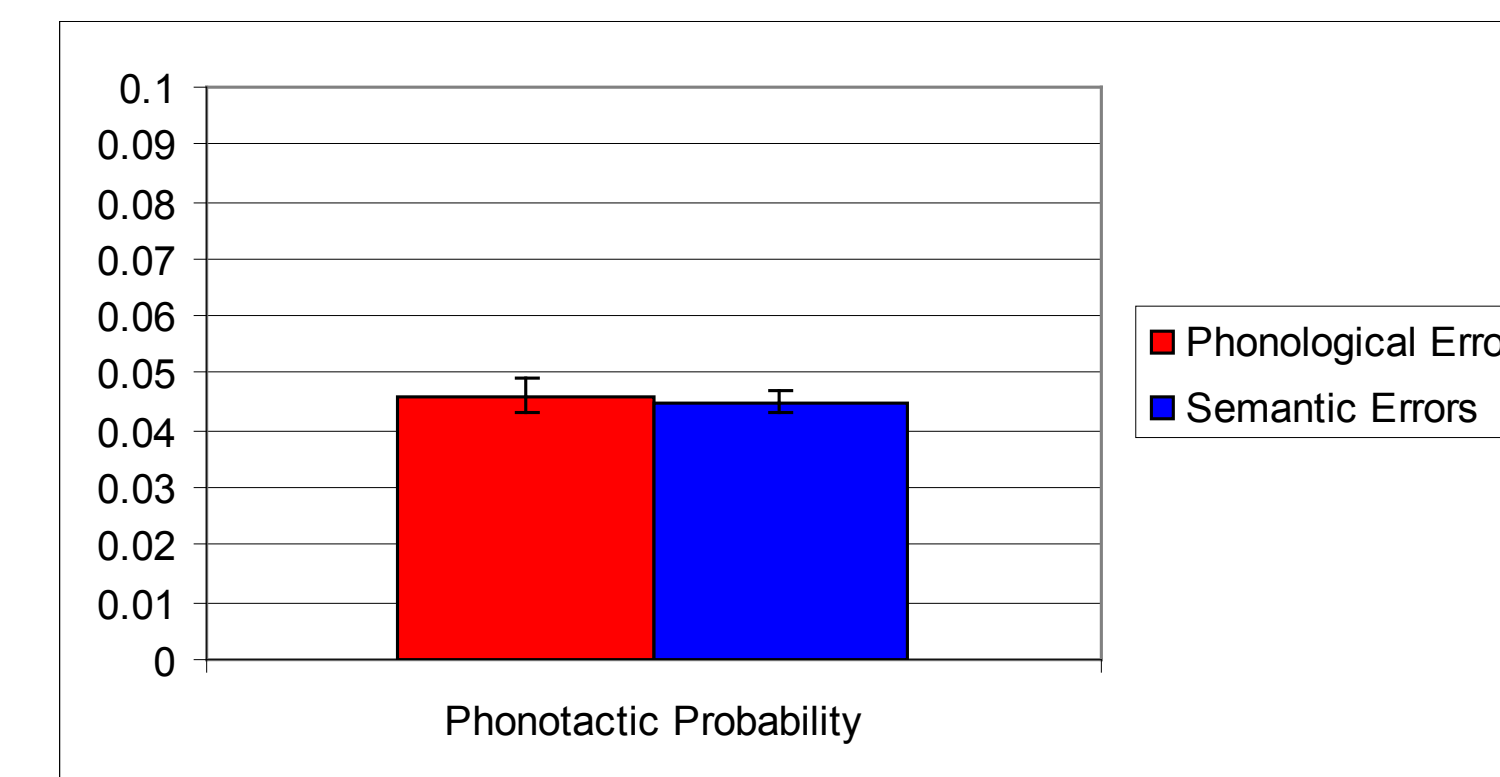
Variables

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

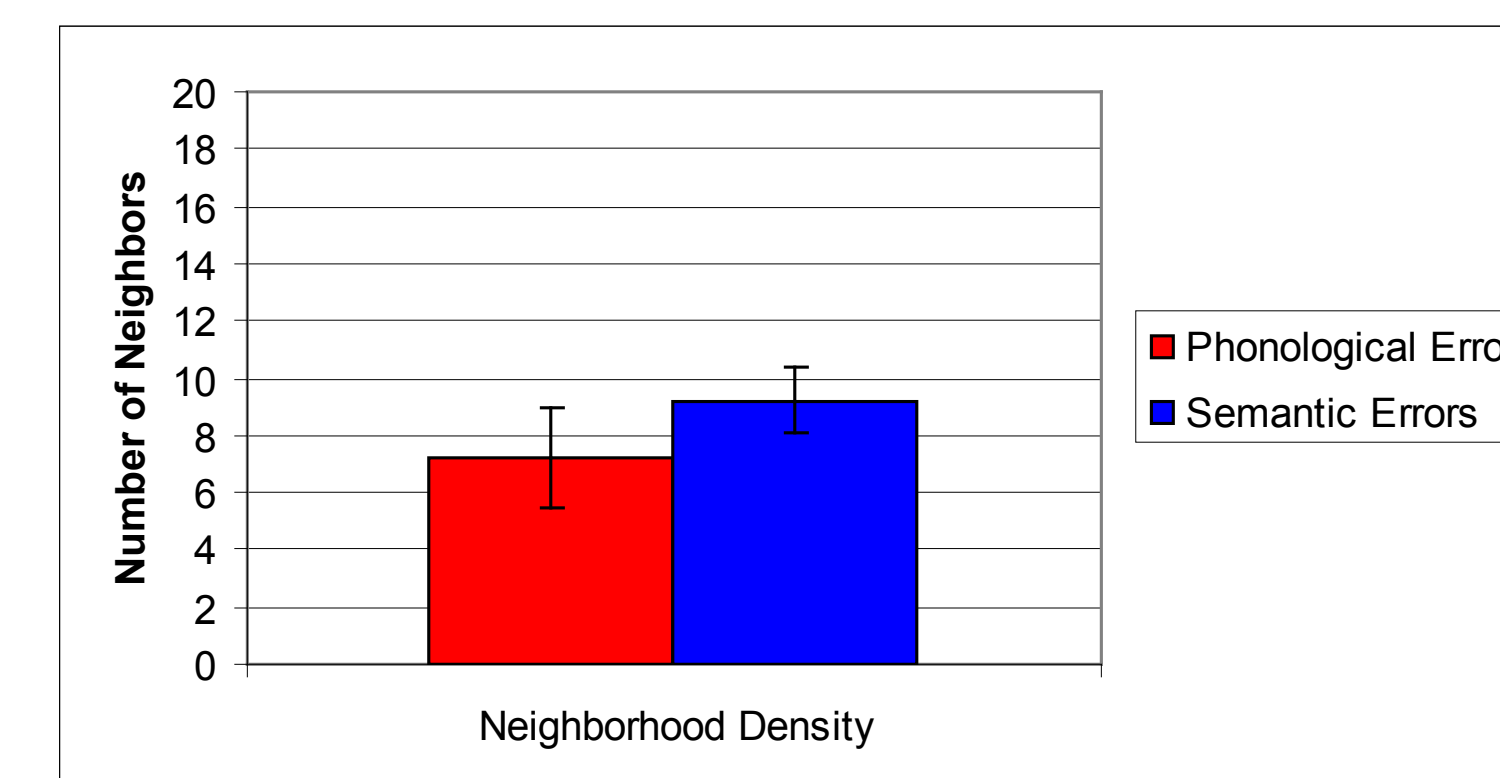## Syntactic Category Representation
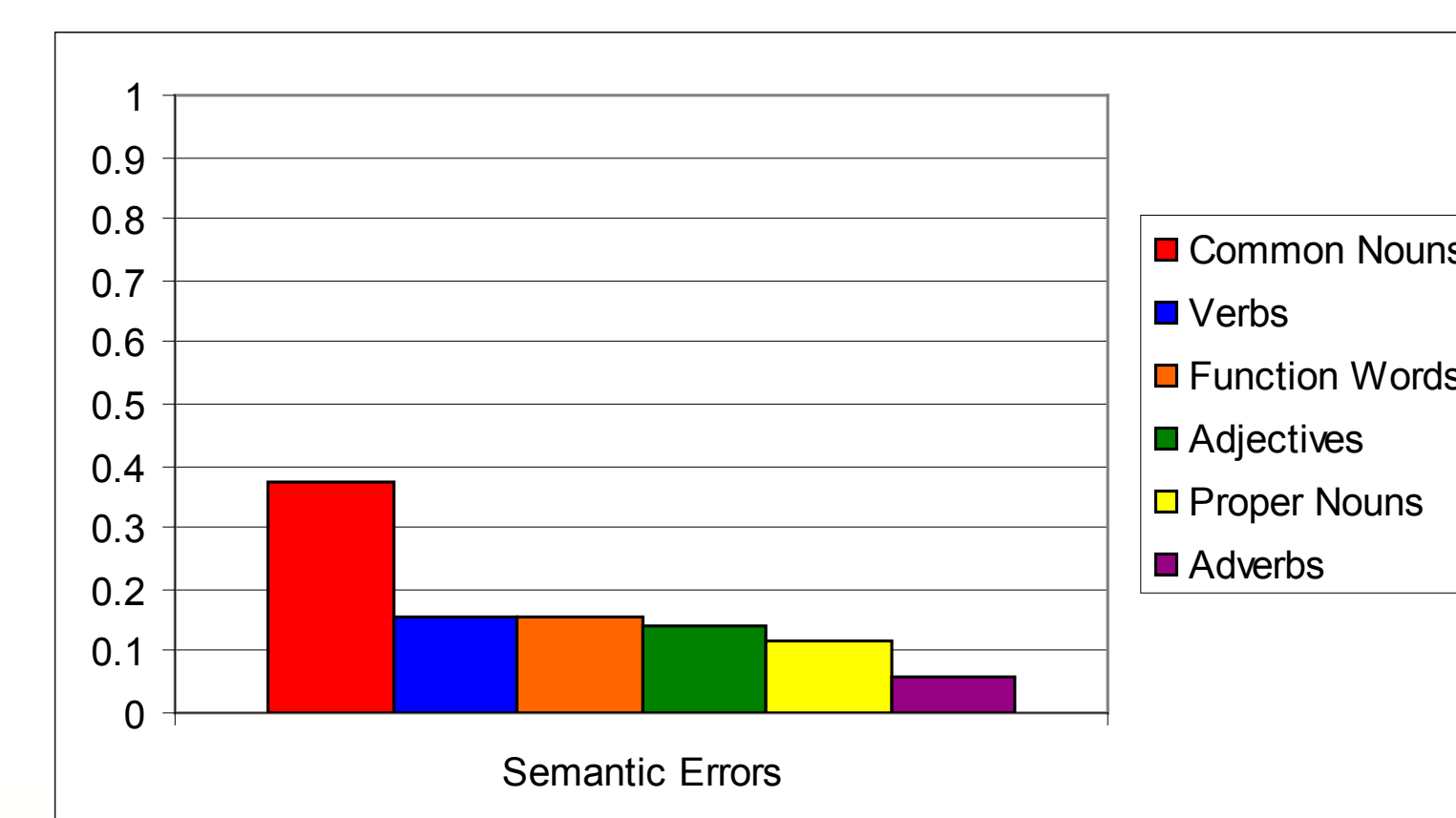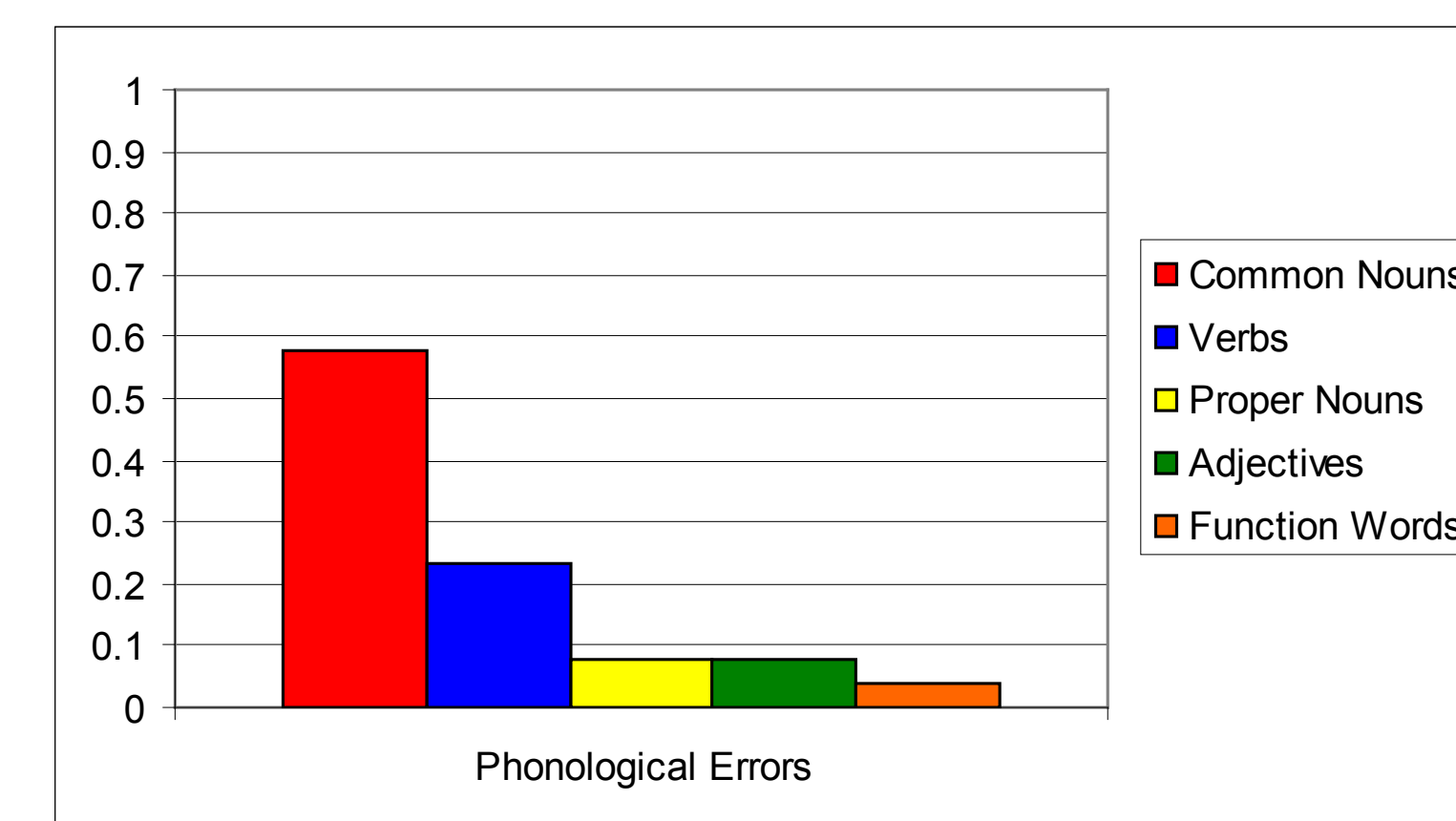
- Phonological errors occur primarily on common nouns & verbs
- Semantic errors occur primarily on common nouns

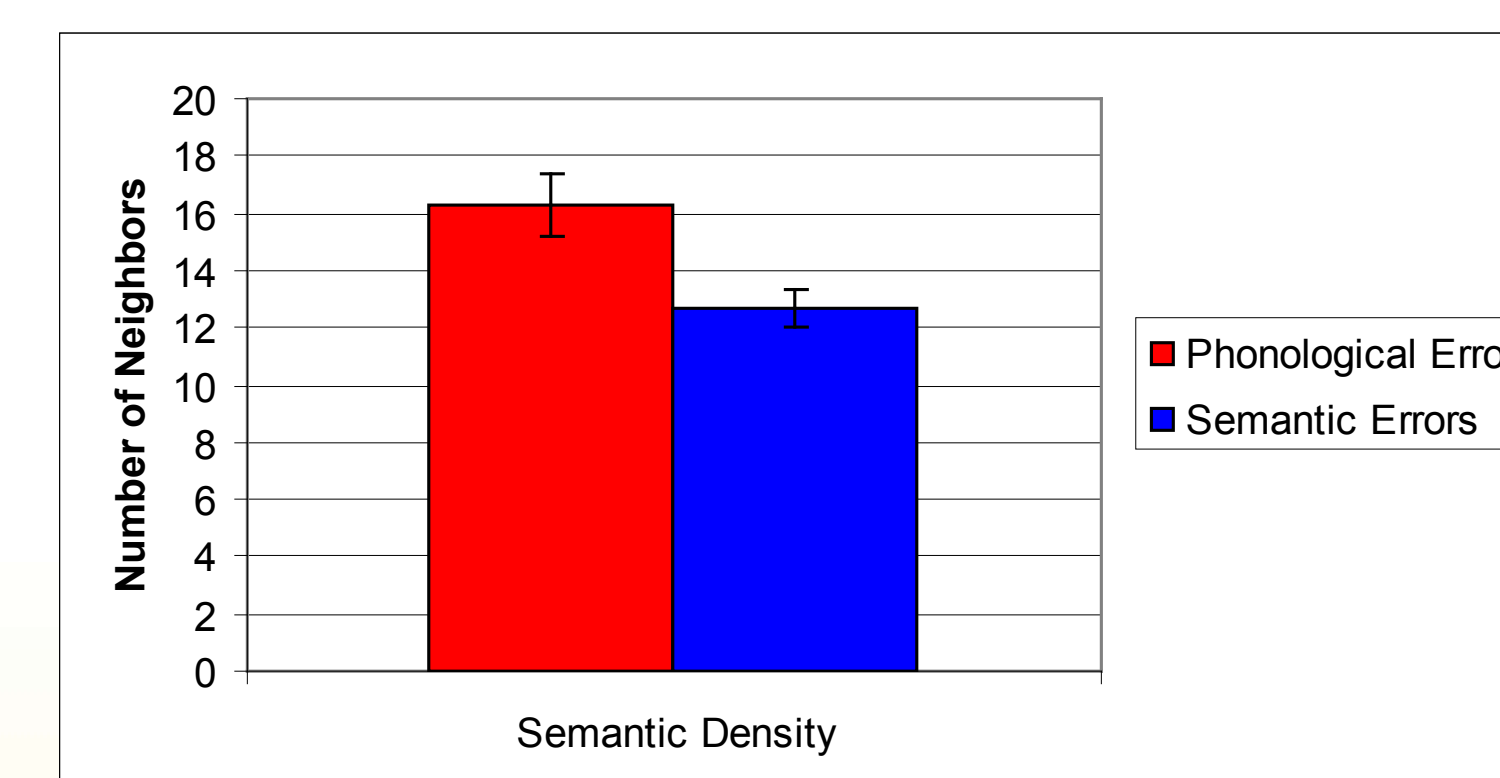## Phonotactic Probability

- 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
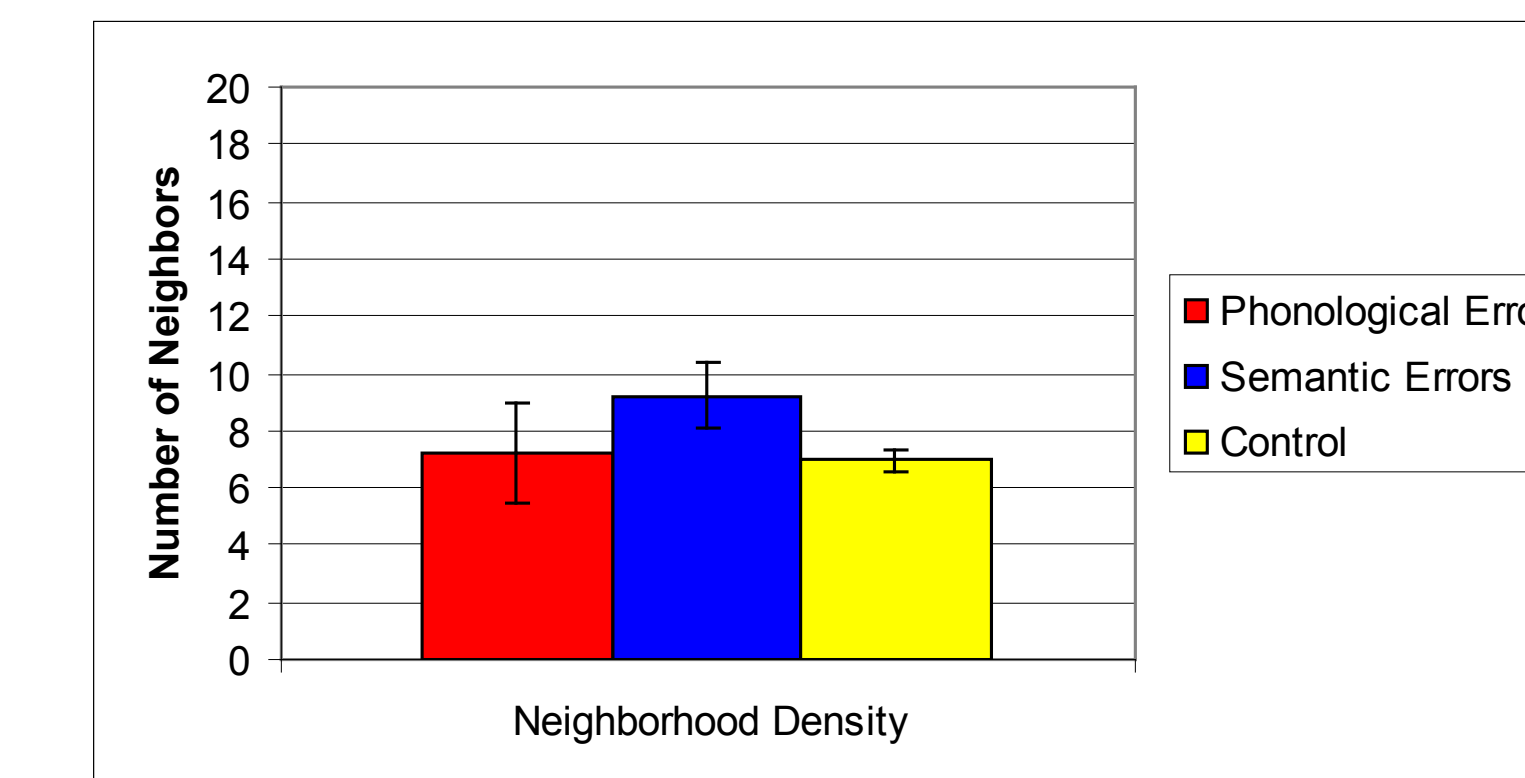   - Consistent with Vitevitch (1997) and German & Newman (2004)

Semantic Density

- Differentiates phonological versus semantic errors
  - Words with a phonological error had more neighbors than words with a semantic error
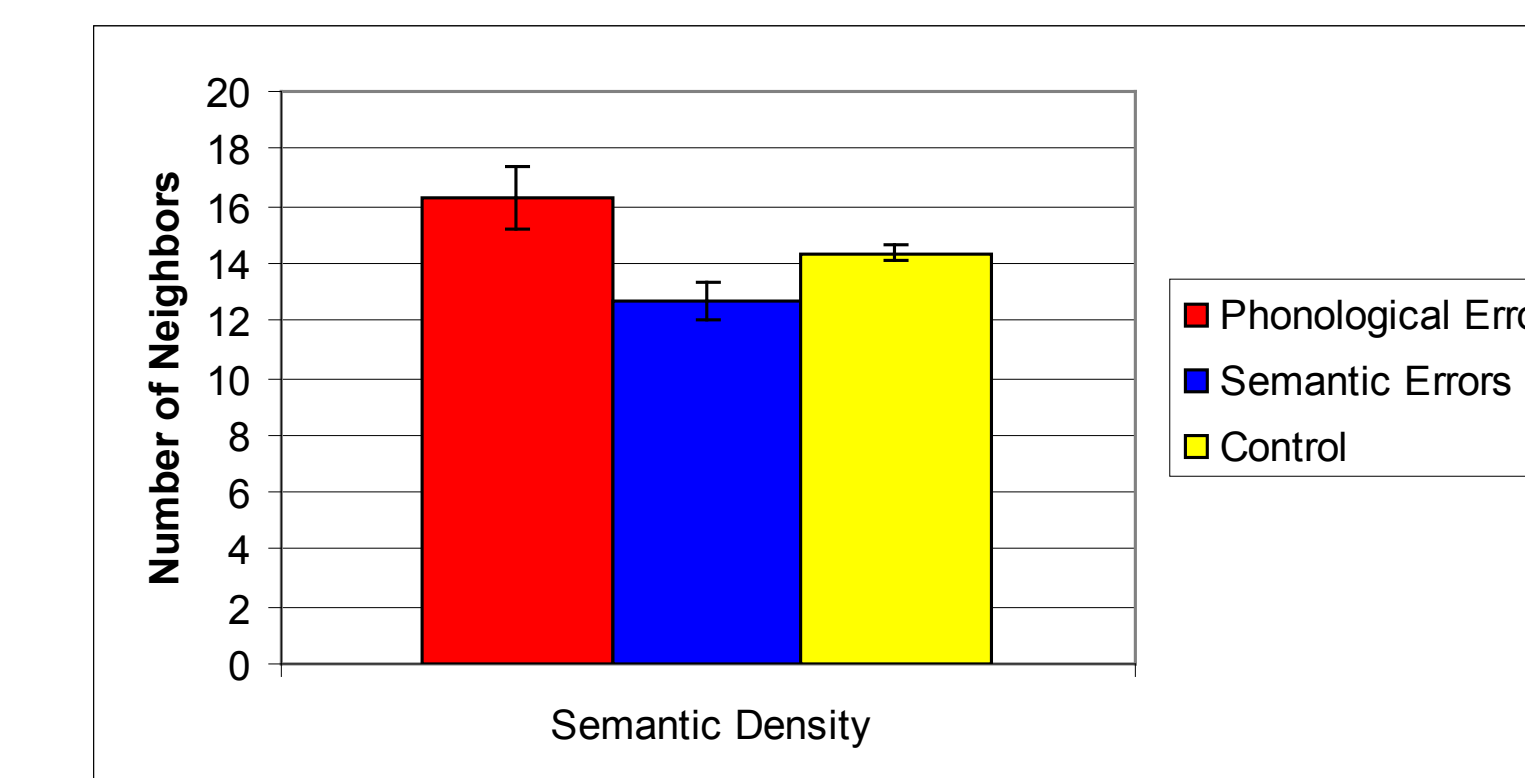
Target Words vs. Control Words

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

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