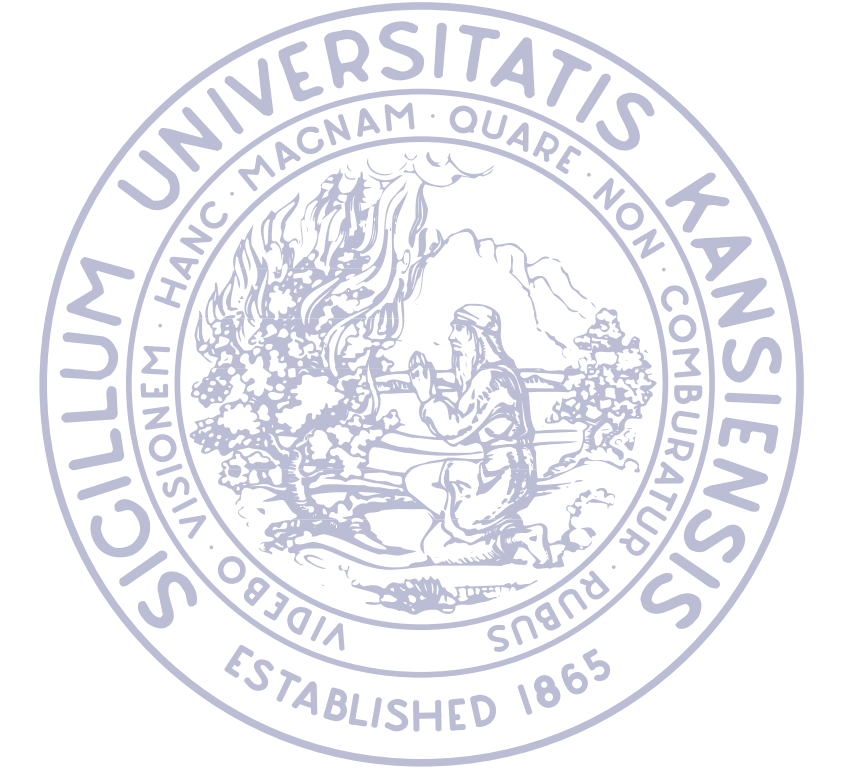


# The Relationship between Neighborhood Density and Age-of-Acquisition



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## Introduction

- Word-forms may be organized in memory by phonological similarity
  - *Neighborhood density*: The number of words that are phonologically similar to a given word
  - *Operational definition*: All the words differing by a one phoneme substitution, deletion, or addition
  - e.g., ‘kit’ – ‘pit,’ ‘cat,’ ‘kid,’ ‘it,’ ‘skit’
- Dense neighborhoods facilitate word learning in controlled conditions (Storkel, 2001; Storkel & Rogers, 2000)

## Purpose

- To examine the effect of neighborhood density on word learning in naturalistic samples

## Naturalistic Samples

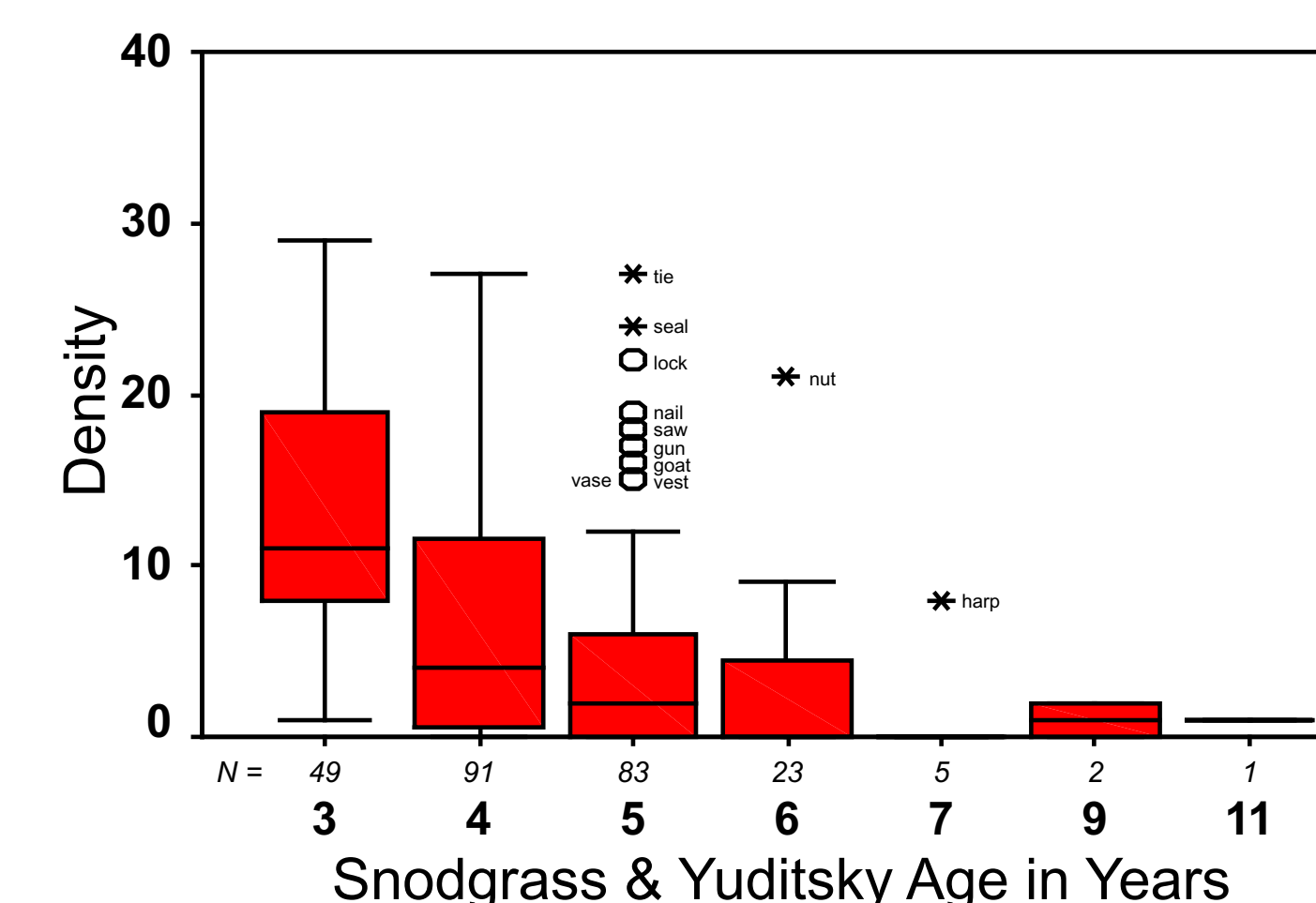
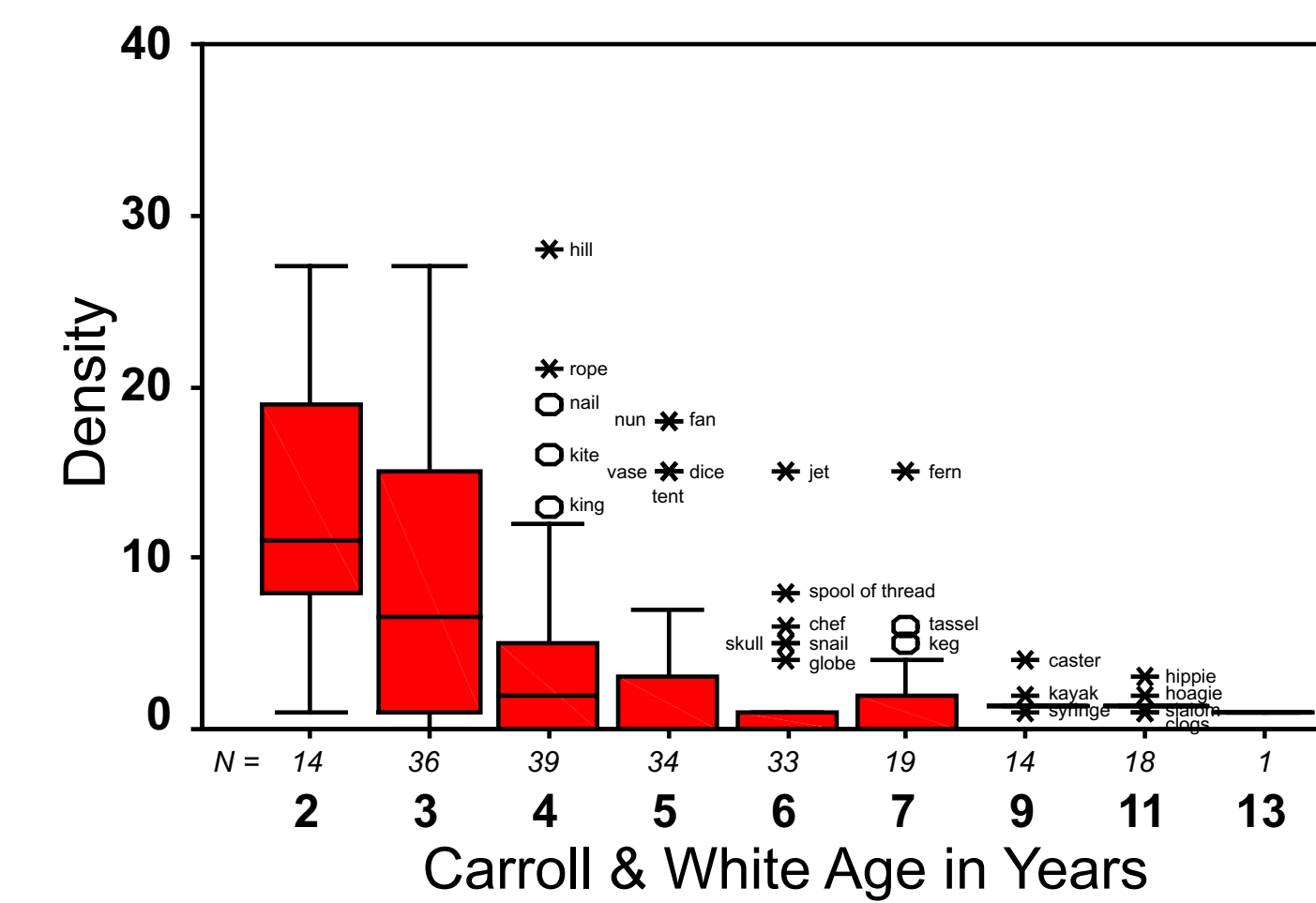
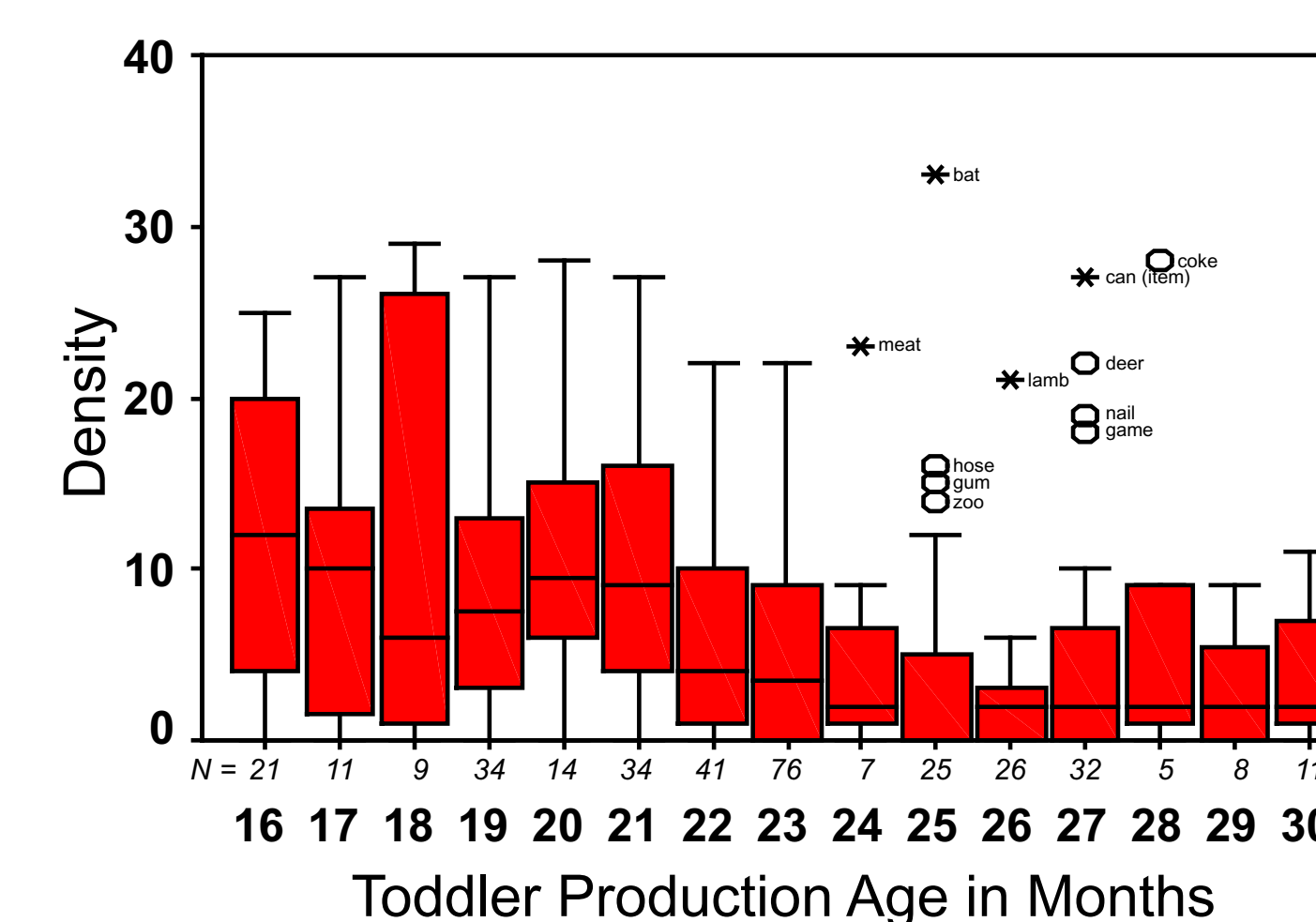
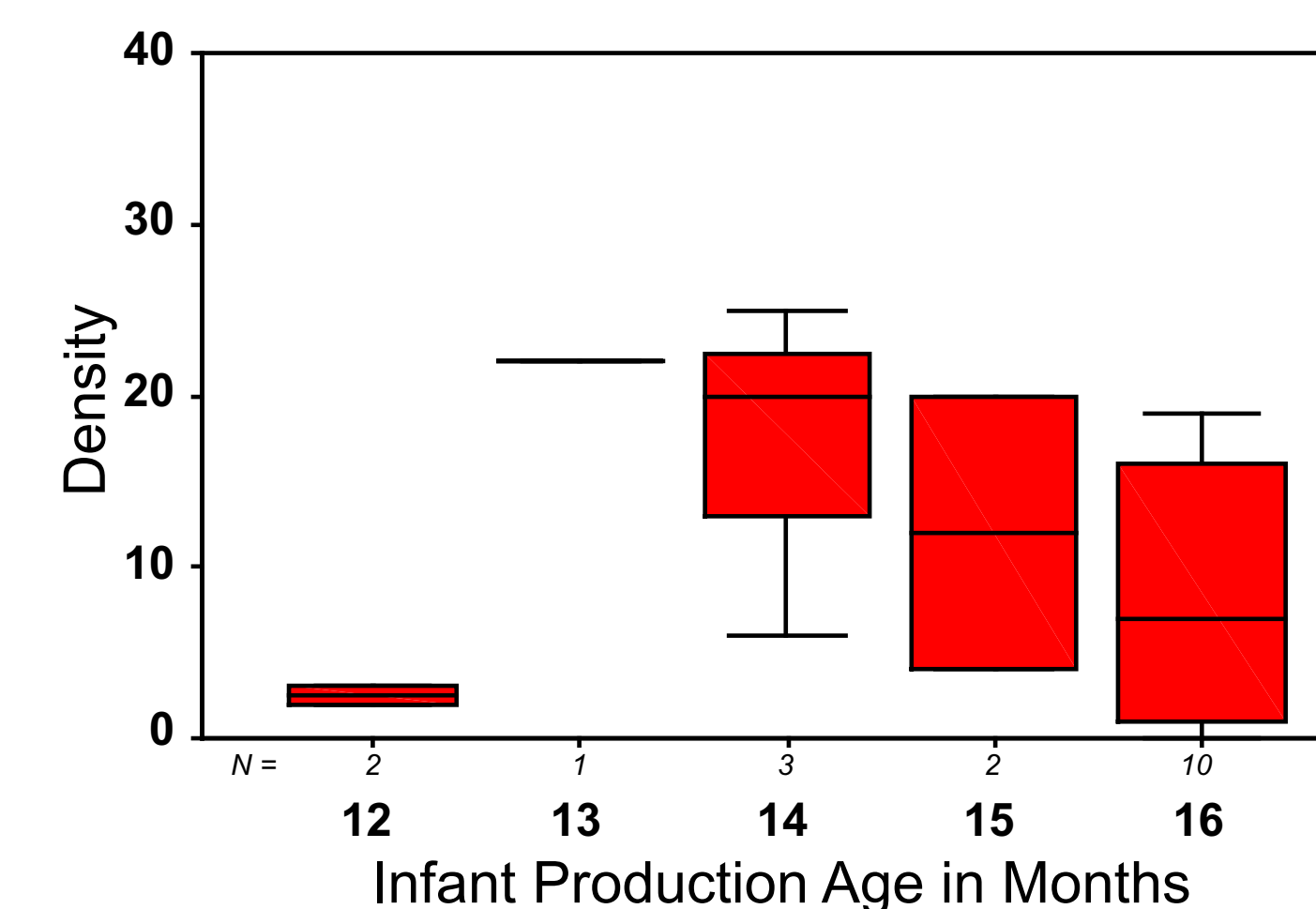
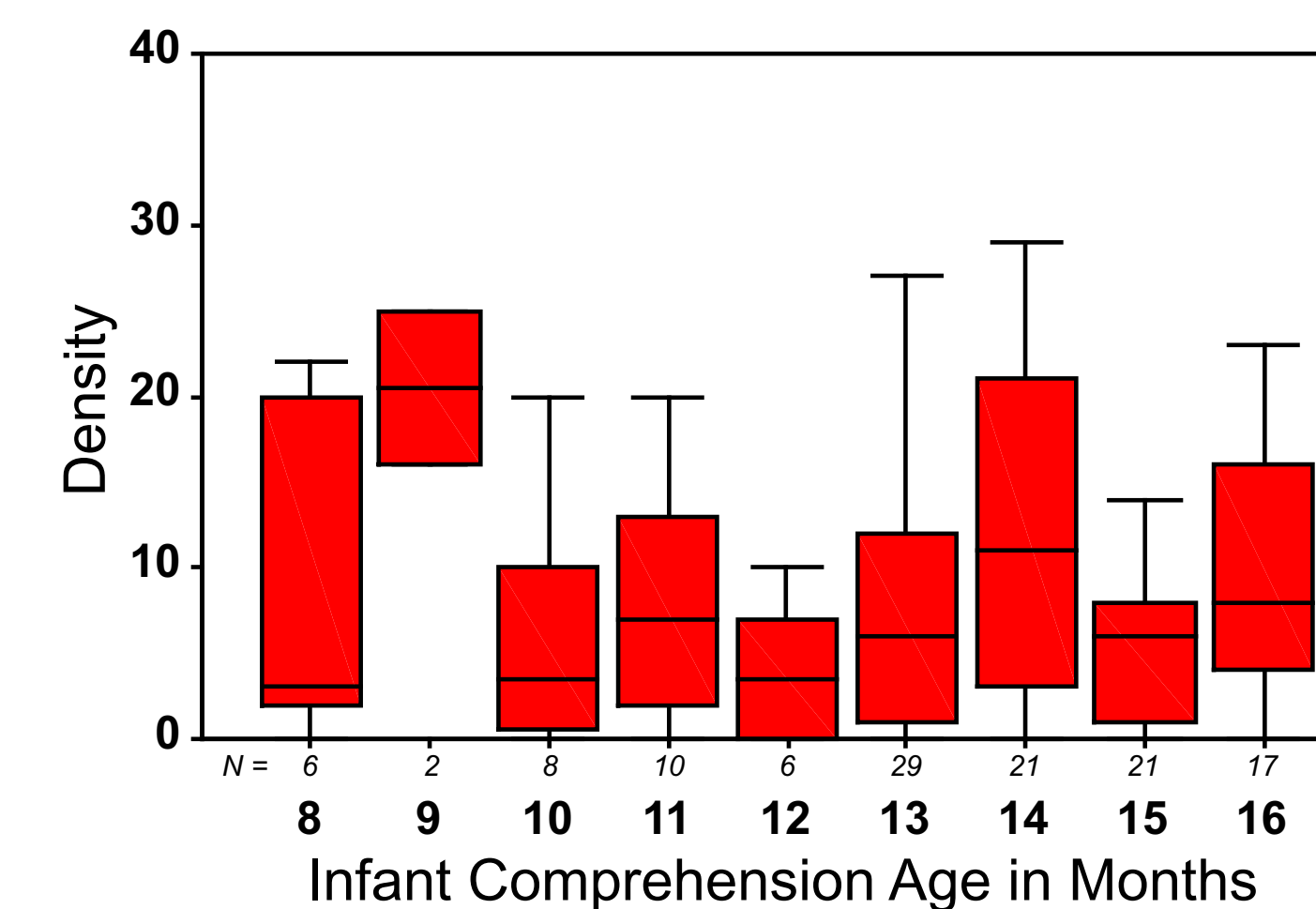
- MacArthur Communicative Development Inventory for Infants (Dale & Fenson, 1996)
  - 8-16 month old children
  - Comprehension & Production
  - N = 246 nouns
- MacArthur Communicative Development Inventory for Toddlers (Dale & Fenson, 1996)
  - 16-30 month old children
  - Production
  - N = 380 nouns
- Carroll & White (1973) Age-of-Acquisition Ratings
  - 9-point rating scale, 2 years to 13+ years
  - Age when word was first learned
  - N = 220 nouns
- Snodgrass & Yuditsky (1996) Age-of-Acquisition Ratings
  - N = 250 nouns

## Linear Regression Analysis

- Independent Variables
  - Word length in segments
  - Word frequency (Kucera & Francis, 1967)
  - Neighborhood density (Luce & Pisoni, 1998)
- Dependent Variable
  - Age-of-acquisition (AoA):
    - Age when 50% of children reportedly comprehended or produced a given word
    - AoA Rating

## Results

- Infant Comprehension (Red = significant)
  - $0.3120 \text{ Length} - 0.0018 \text{ Frequency} + 0.0257 \text{ Density} + 12.071$
- Infant Production
  - $0.2438 \text{ Length} + 0.0001 \text{ Frequency} - 0.0261 \text{ Density} + 15.26$
- Toddler Production
  - $0.4070 \text{ Length} - 0.0001 \text{ Frequency} - 0.0954 \text{ Density} + 21.60$
- Carroll & White AoA
  - $0.2360 \text{ Length} - 0.0086 \text{ Frequency} - 0.0587 \text{ Density} + 3.516$
- Snodgrass & Yuditsky AoA
  - $0.0662 \text{ Length} - 0.0039 \text{ Frequency} - 0.0320 \text{ Density} + 3.961$



## Conclusions

- Early acquired words tended to have many neighbors; late acquired words tended to have few neighbors
  - Only significant for toddlers and older children, not infants
- Infant word learning may be driven by factors other than word form
- Infants may have difficulty distinguishing phonetically similar words, leading to sparse neighborhoods
- Development of dense neighborhoods may have consequences for acquisition of other language skills (e.g., phonological awareness)

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