

The effect of common versus uncommon speech substitutions on the recognition and processing of words

Breanna I. Krueger, Holly L. Storkel, Jacquelyn Vorndran, Laura Neenan
University of Kansas, Speech-Language-Hearing: Sciences & Disorders

Introduction

- Children learn new words as a result of social interactions
- They are able to successfully accommodate and integrate phonetic variability in the speech signal such as dialectal and accent differences.
- **Do children identify words containing misarticulations phonetic variants of real words or as phonemic differences that yield an interpretation of a novel word?**
- **Does the commonality of the phonemic substitution influence real object identification?**

Participants

	Study 1	Study 2
N	15	14
Mean Age	4.5 yrs.	4.6 yrs.
Peabody Picture Vocabulary Test-4	124.6	117.2
Goldman-Fristoe Test of Articulation-2	113.7	114.6

Canonical Word	Common Substitute	Uncommon Substitute	Unrelated Nonword
chick	shick	fick	trep
leaf	weaf	year	roosh

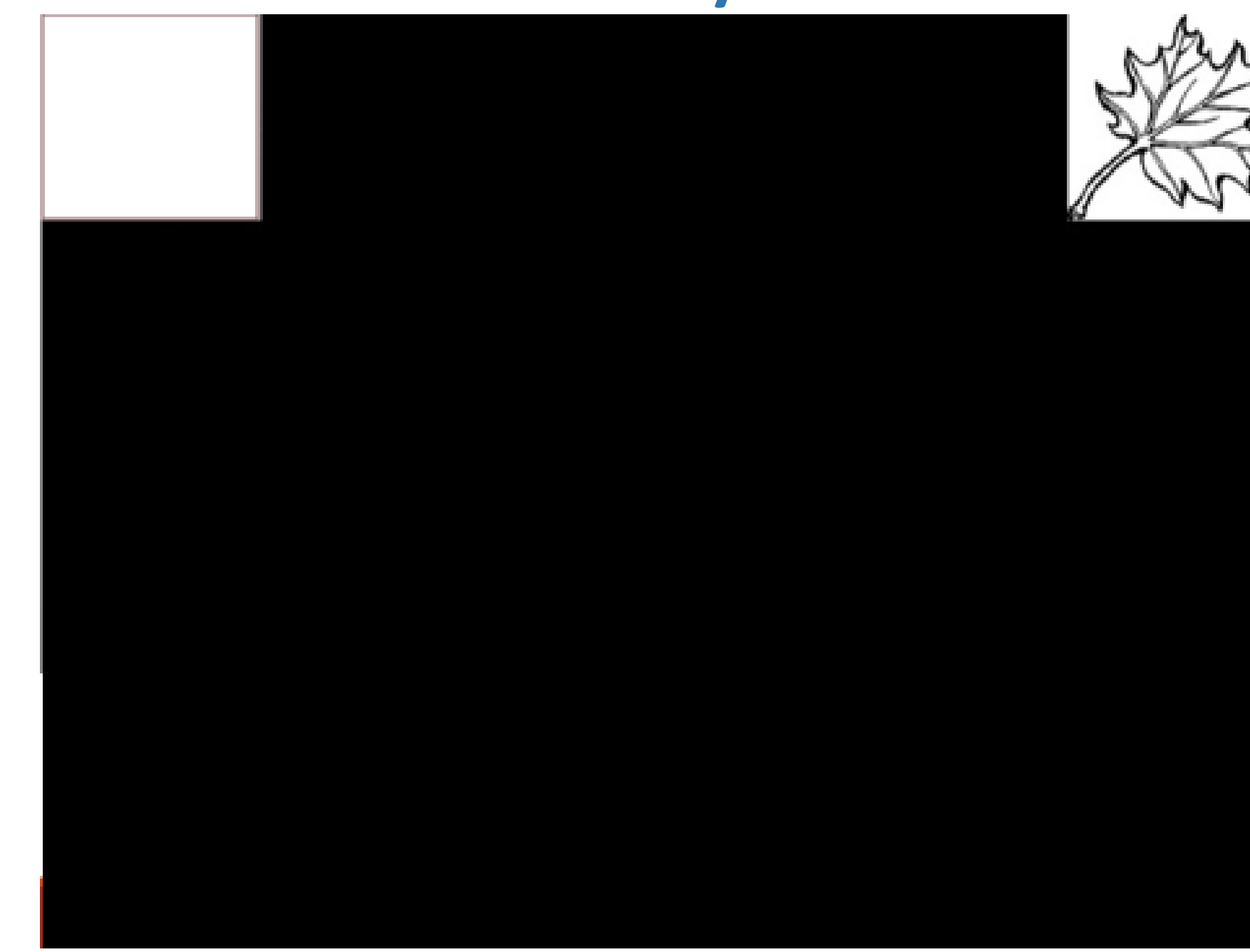


Methods

Study 1

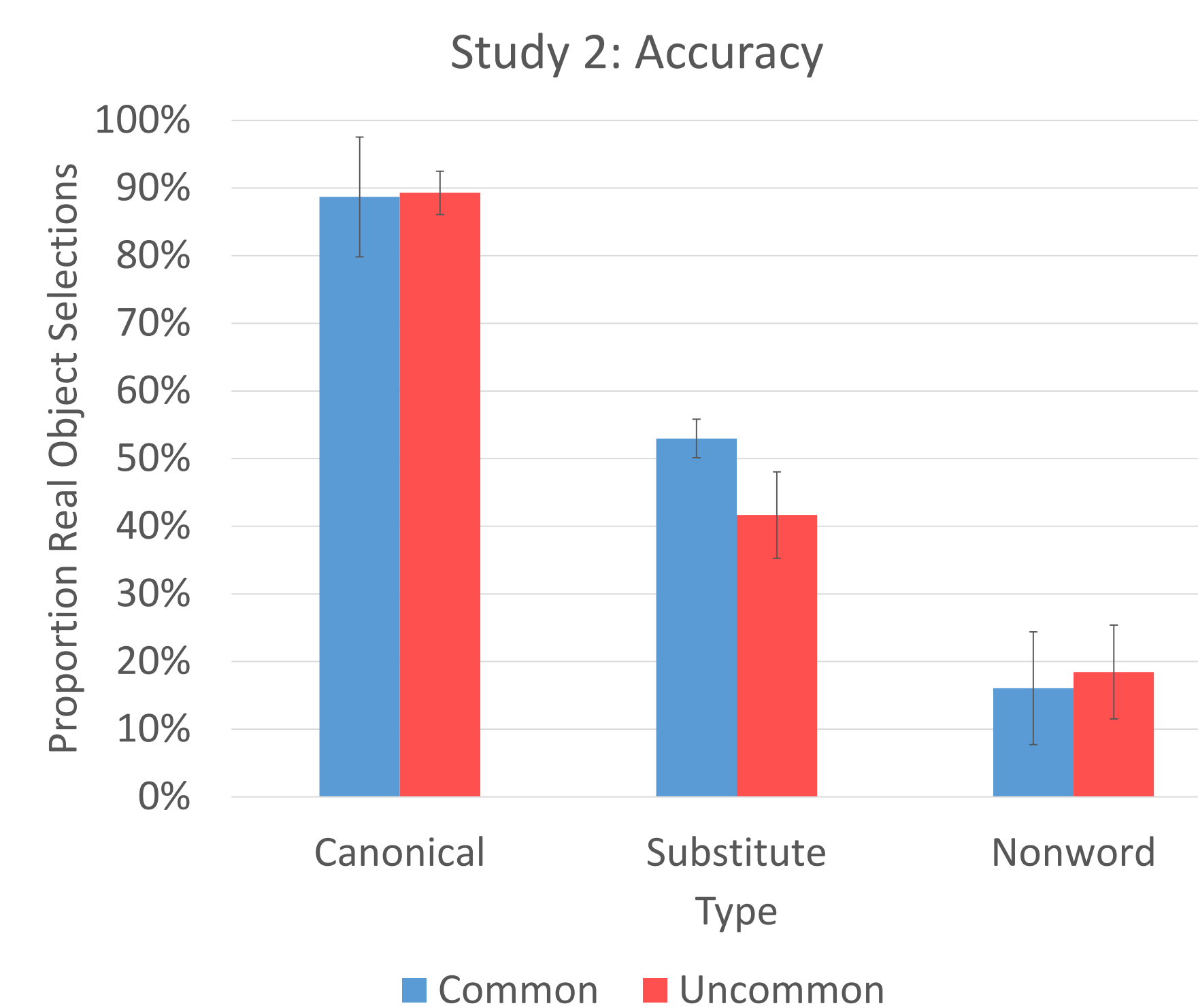
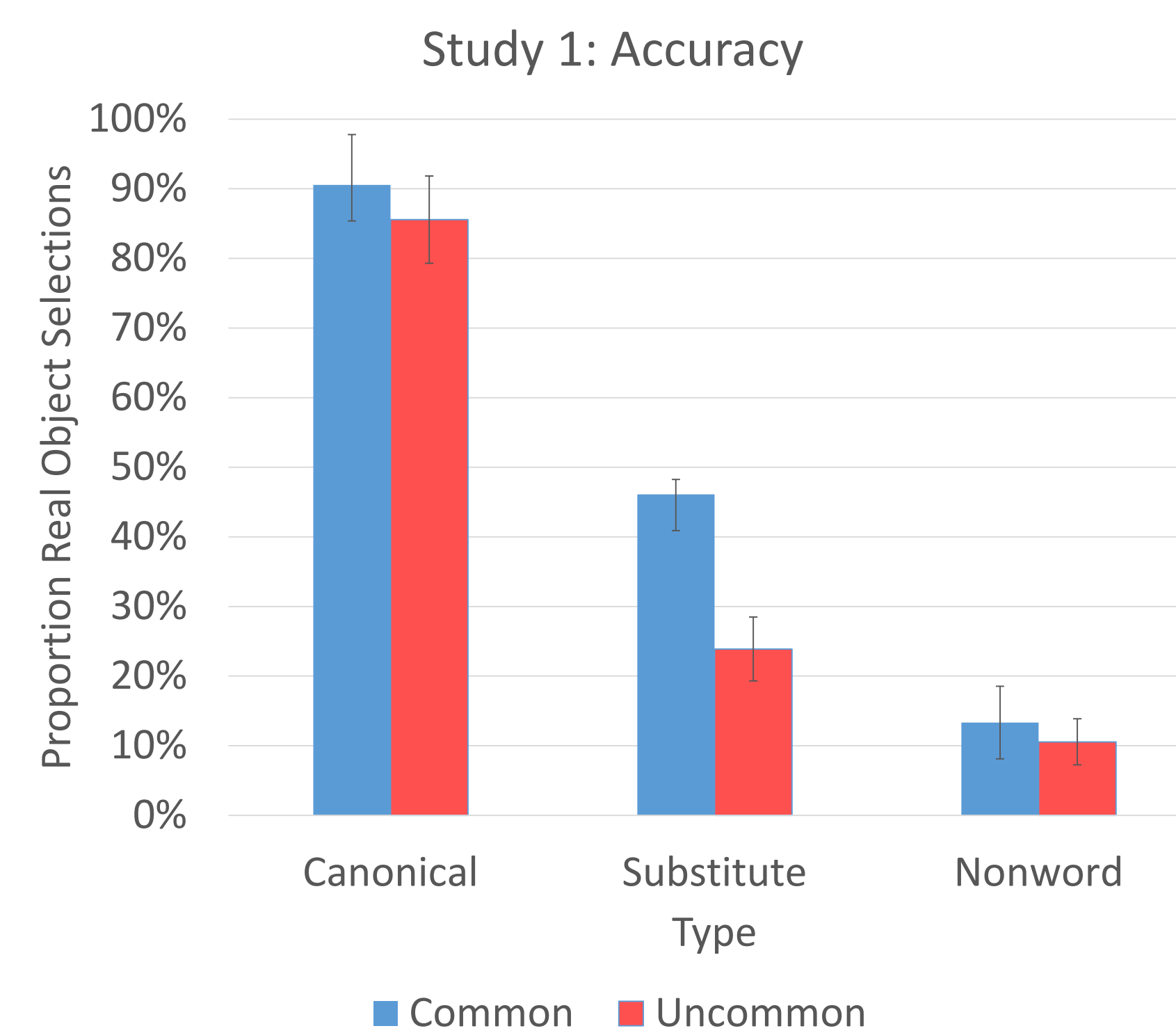


Study 2



- Study 1: Subjects were instructed to click on the picture that matches the word they heard, allowing them to associate the word they heard with a novel object. To identify the word as “something new.”
- Study 2: Subjects were trained to understand that if the target object was not present, the desired object was “hidden” beneath the blank, giving them the opportunity to say the word they heard is “something else.”

Results



- 3 Word Similarity(Canonical vs. Substitute vs. Nonword) x 2 Substitute Type (Common vs. Uncommon) repeated measures ANOVA
- Planned post hoc: paired samples t-test
- **Study 1:** Significant main effect of type (common over uncommon) [F(1,14)=16.842, $p = .001$]. Significant main effect of similarity (target, common, nonword) [F(1,14)=134.554, $p < 0.000$]. Significant interaction [F=4.811, $p = .019$] Planned comparisons revealed a significant difference between common and uncommon substitution conditions
- **Study 2:** Significant main effect of type (common vs. uncommon) [F(1,13)=50.476, $p < .001$]. Significant interaction typicality*similarity [F(1,13)5.925, $p = .019$]. Planned t-tests revealed a significant difference between common and uncommon

Discussion

- Preschoolers identify canonical productions as real objects. For unrelated nonwords, preschoolers identify those productions as novel things or as “something else.”
- In substitution conditions, preschoolers are more flexible in their interpretation of the words.
- The present findings suggest that there is an effect of experience with specific substitution types.
- Common substitutes yield higher real object selections than uncommon substitutes.
- These results reflect identification in the absence of context and feedback.
- It is likely that providing semantic context, or positive and negative feedback for substitution conditions would result in less uncertainty in identification.

References

- Creel, S. C. (2012). Phonological similarity and mutual exclusivity: on-line recognition of atypical pronunciations in 3–5-year-olds. *Developmental Science*, 15(5), 697-713.
- Freeman, J. B., & Ambady, N. (2010). MouseTracker: Software for studying real-time mental processing using a computer mouse-tracking method. *Behavior Research Methods*, 42(1), 226-241.
- Gelman, S. A., Croft, W., Fu, P., Clausner, T., & Gottfried, G. (1998). Why is a pomegranate an apple? The role of shape, taxonomic relatedness, and prior lexical knowledge in children's overextensions of apple and dog. *Journal of Child language*, 25(02), 267-291.
- Smit, A. B., Hand, L., Freilinger, J. J., Bernthal, J. E., & Bird, A. (1990). The Iowa articulation norms project and its Nebraska replication. *Journal of Speech and Hearing Disorders*, 55(779-798).

