

The changing influence of sound-symbolism during vocabulary development

James Brand, Padraic Monaghan, Peter Walker

j.brand@lancaster.ac.uk



Overview



Sound symbolism

- Arbitrariness in language
- Iconicity in language
- Benefits and limitations



Experimental Investigations

- Iconic language
- Mixed language
- Arbitrary language



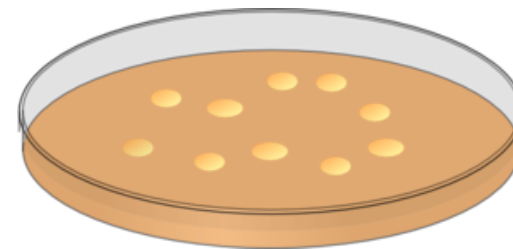
Conclusions

The arbitrariness of the sign

- de Saussure's (1916) view – language is arbitrary
- There is no systematic relationship between a word and its meaning
- Hockett's (1960) Design features of language



Whale
Valas



Microorganism
Mikro-organismi

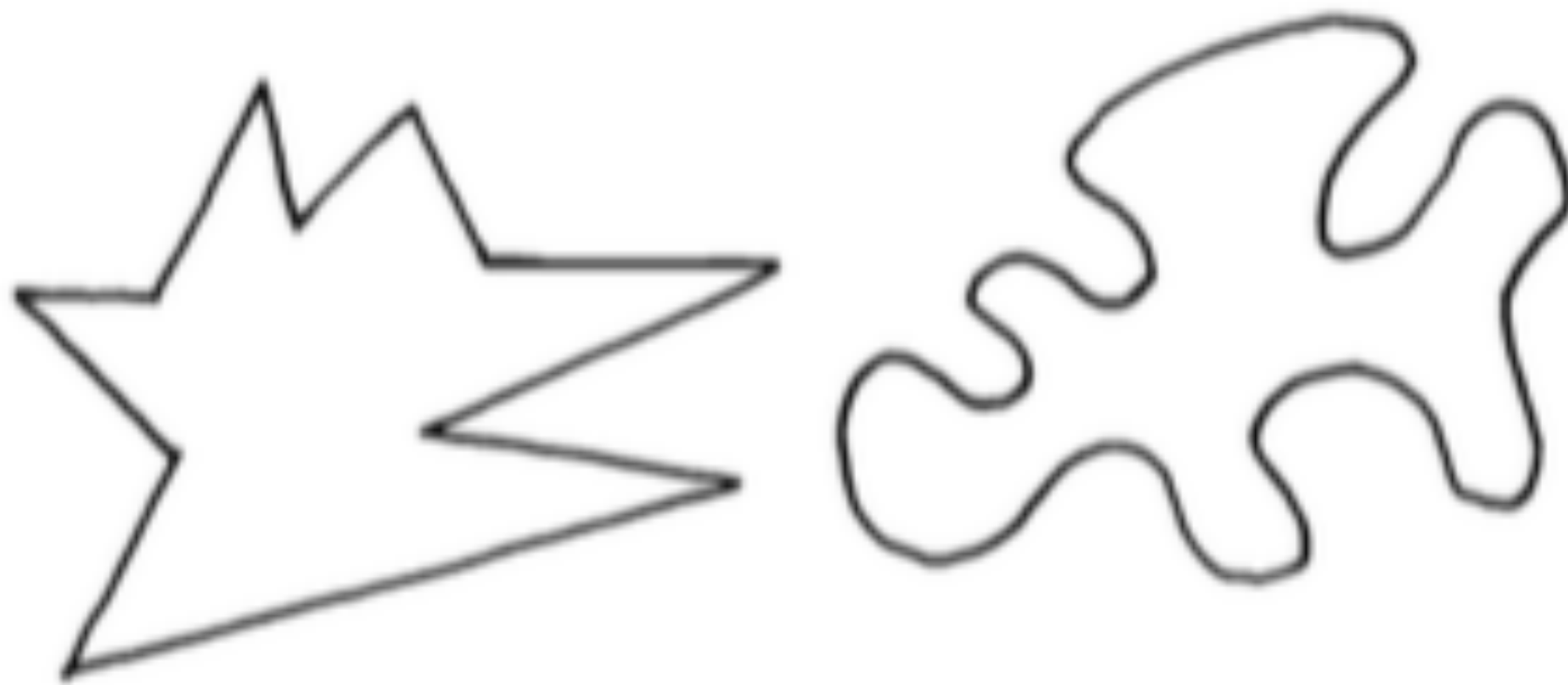
Difficulties with arbitrariness

- Arbitrariness appears to be difficult to learn
- No clues as to what a word's intended meaning is
- Quine's (1960) 'gavagai' problem
- Questions raised relating to child language acquisition

Evidence of non-arbitrary mappings

- Some words are not so arbitrary
- Iconicity – when form has a link to meaning
- Examples
 - Phonaesthemes e.g. “sneeze”, “snout”, “sniff” (Bergen, 2004)
 - Onomatopoeia e.g. “moo” (Gomi, 1989)
 - Mimetics e.g. Japanese “Kirikiri” means ‘sparkle’ (Kita, 1997)
 - Sign language examples (Perniss et al, 2010)
 - Bouba/Kiki effect (Köhler, 1929, Nielsen and Rendall, 2011)

Evidence of non-arbitrary mappings



Can iconicity help learners?

- Maurer et al (2006) – 2.5 year olds sensitive to bouba/kiki
- Imai et al (2008) – 2 to 3 year old children sensitive to sound symbolic verbs
- Kantartzis et al (2009) – 2 to 3 year old children sensitive to cross-linguistic sound symbolic verbs
- Kovic et al (2010) and many other studies – Adult learners show congruency effect for rounded/spiky distinction

Can iconicity help learners?

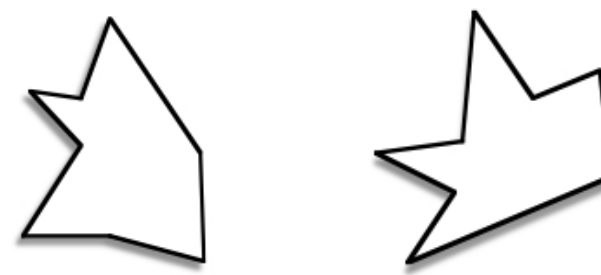
- Does iconicity really help learn words?

- Monaghan et al (2012)

Iconicity helps in categorical learning, but not in individual word learning



Categorical



Individual

Can iconicity help learners?

- Why might this be?
 - Gasser (2004), Monaghan et al (2011)

Arbitrariness helps, it allows for greater communicative expression and is more efficient for signal space

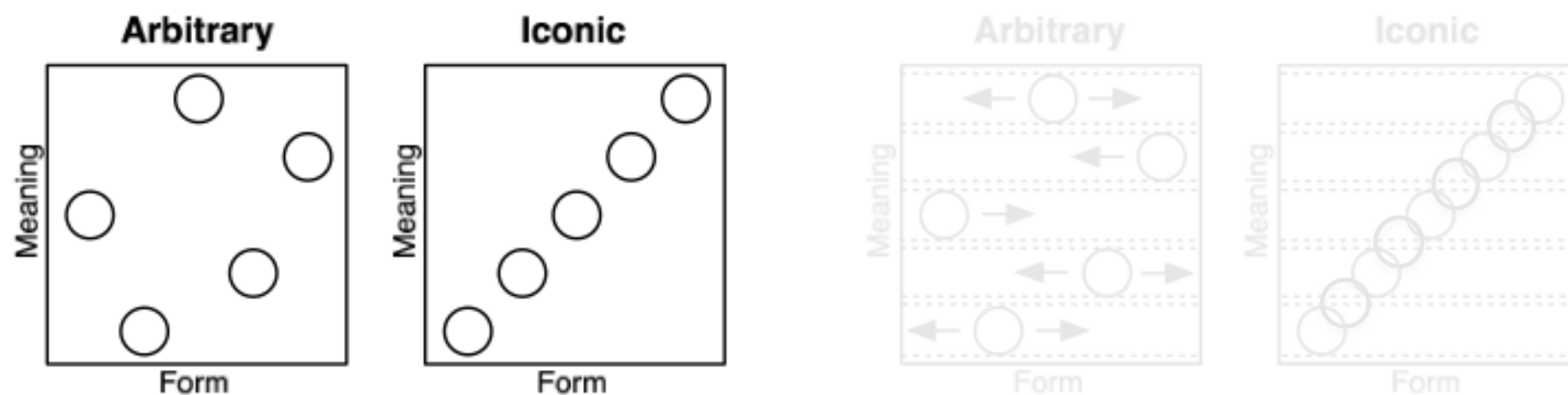
Can iconicity help learners?

- When does iconicity help?

- Gasser (2004)

Small vocabularies are well suited to iconic word learning

Large vocabularies are better suited to arbitrary word learning



Can iconicity help learners?

- Monaghan et al (2014)



Phonological space



Semantic space

Hypotheses

- Categorical learning will be more effective than individual word learning
- Iconicity will aid category learning more as the vocabulary size gets larger
- Iconicity will aid individual word learning in a small vocabulary
- Arbitrariness will be more advantageous in a larger vocabulary for individual word learning

Materials

- Stimuli (Adapted from Monaghan et al, 2012)
- Visual

Spiky



Rounded



Materials

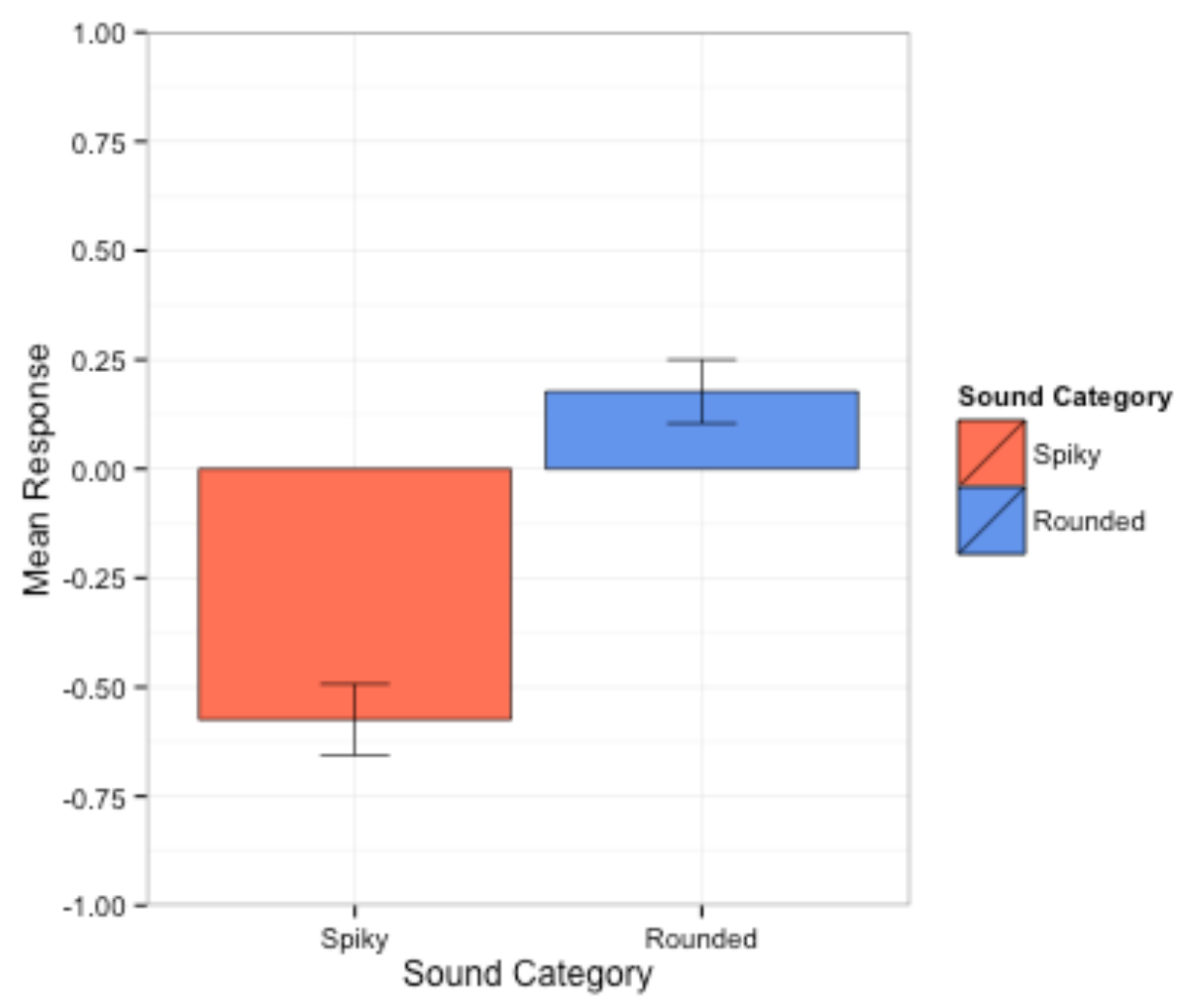
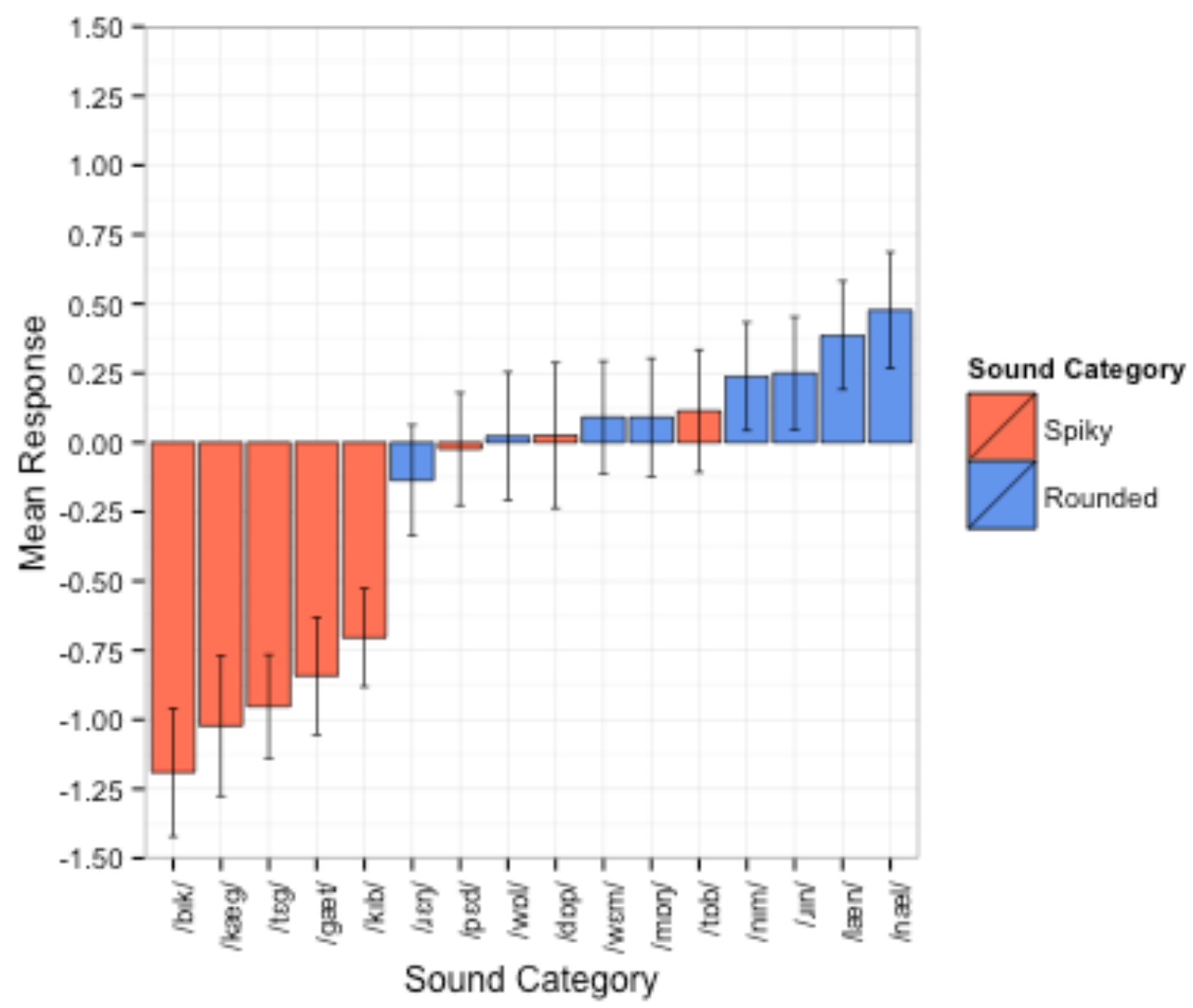
- Auditory
 - Monosyllabic, nonwords, CVC structure
 - Plosives (/k/, /g/, /t/, /d/, /p/, /b/) for spiky sounds
 - Continuants (/m/, /n/, /ŋ/, /l/, /ɹ/, /w/) for rounded sounds
 - Vowels (æ/, /ɛ/, /ɪ/, /ʊ/) selected for all sounds

Materials

- 22 participants given questionnaire
- Asked to rate strength of association for sounds to shapes
- Likert scale varying from very strong to no association

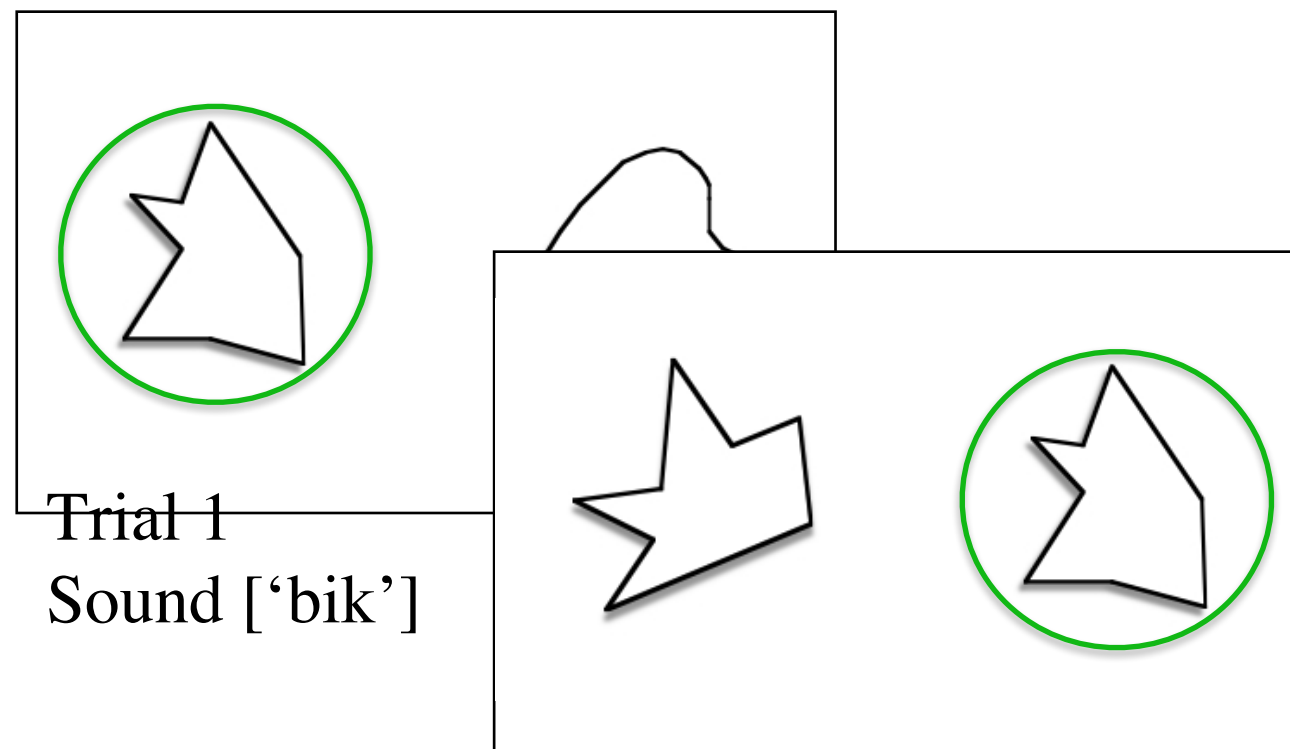


Materials



Materials

- Cross-situational learning paradigm (see Smith and Yu, 2008)
- Implicit learning with no feedback given

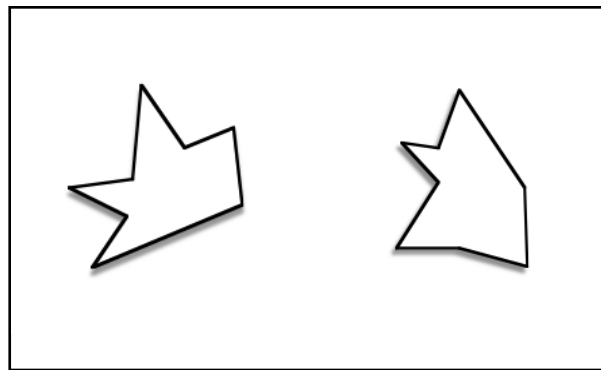


Methods

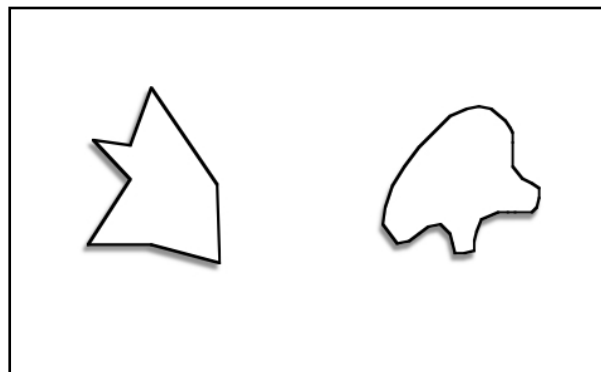
- 3 different vocabulary sizes
 - Small (8 sound-meaning pairings)
 - Medium (12 sound-meaning pairings)
 - Large (16 sound-meaning pairings)

Methods

- Learning distinctions
 - Same (Individual word learning)



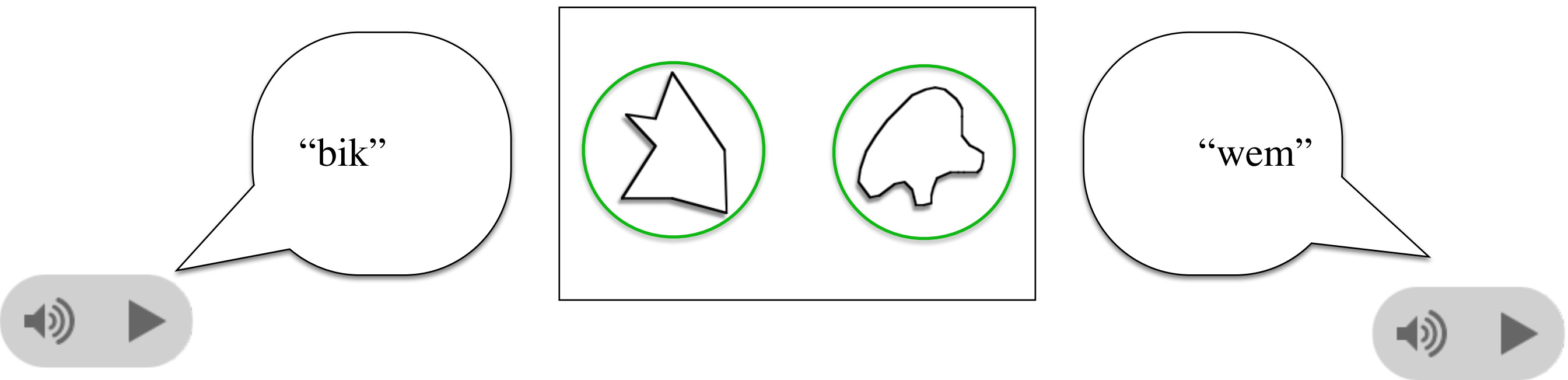
- Different (Categorical learning)



Experiment 1

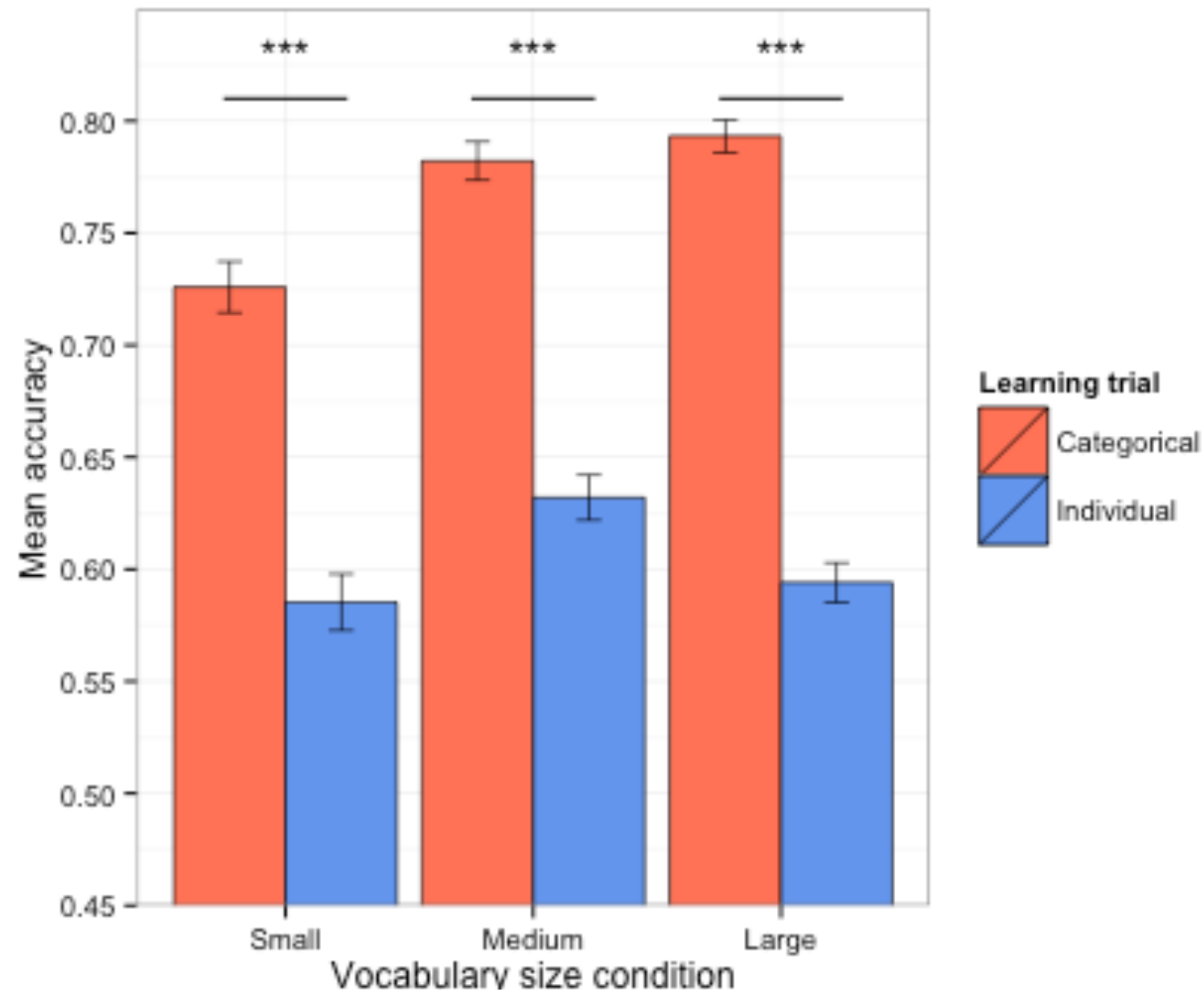
Iconic only mappings

- Participants are exposed only to mappings that are considered iconic



Experiment 1

Iconic only mappings

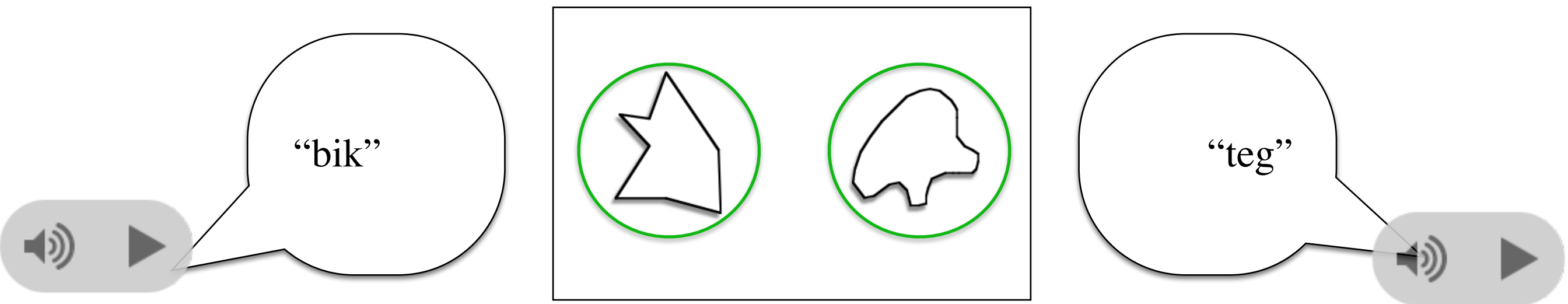


- Categorical learning always outperforms individual word learning
- Advantage is significantly higher in larger vocabulary size

Experiment 2

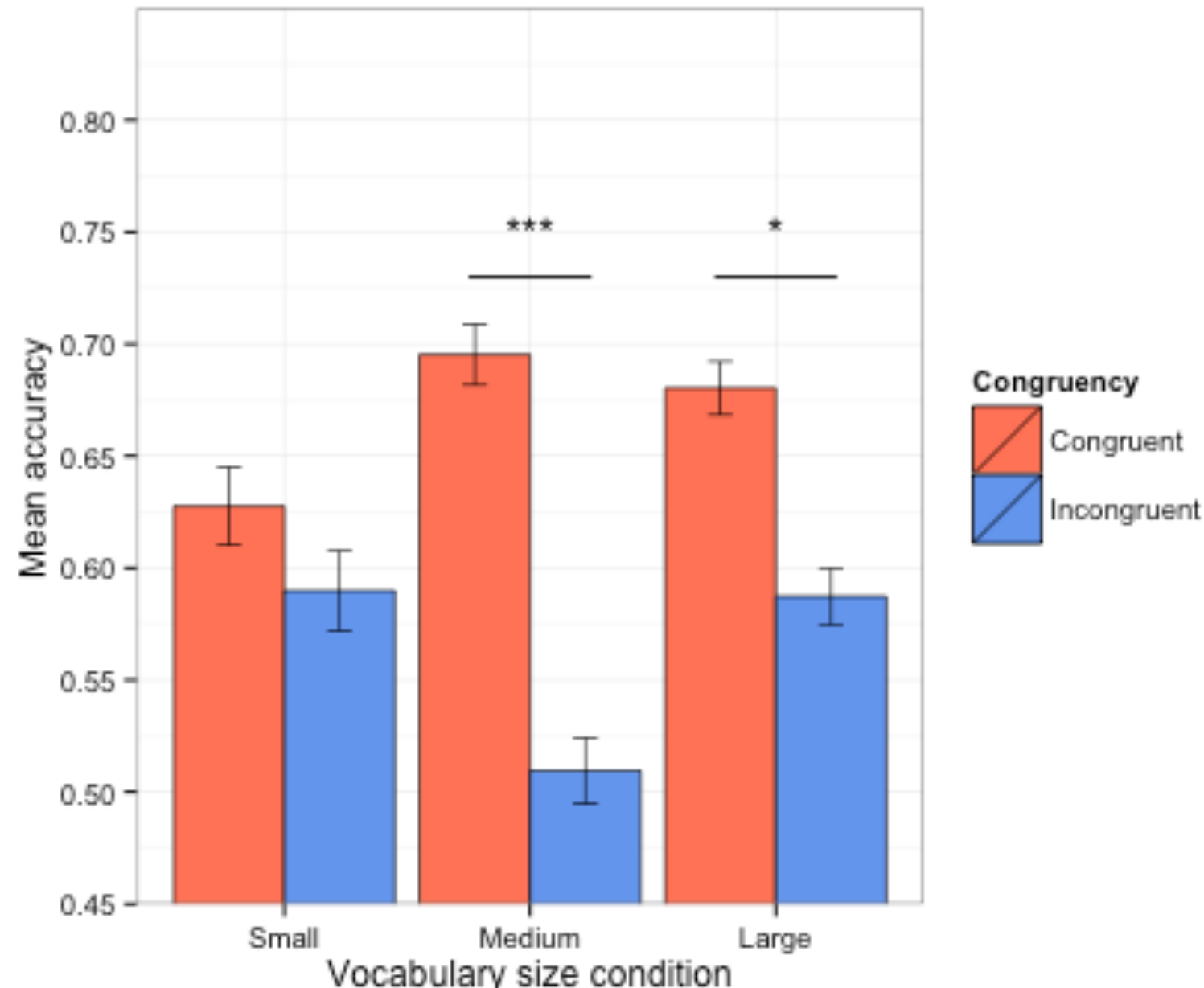
Congruent and incongruent mappings

- Participants are exposed to congruently iconic mappings for half the trials
- Incongruent mappings are presented for the other half of trials



Experiment 2

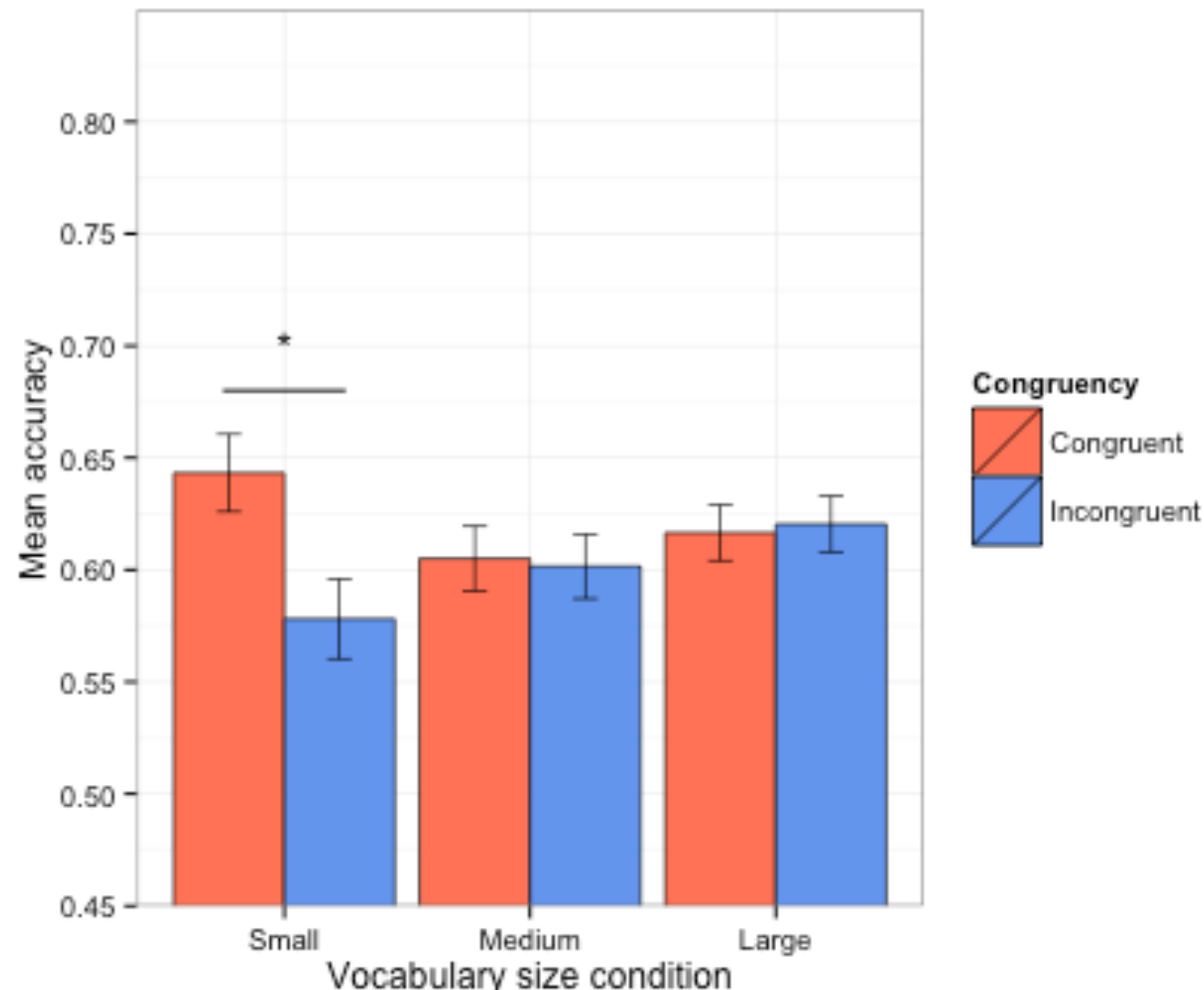
Congruent and incongruent mappings



- Categorical learning is only advantageous for larger vocabulary sizes when comparing congruent and incongruent mappings
- There is no difference between congruent and incongruent mappings for the small vocabulary size

Experiment 2

Congruent and incongruent mappings

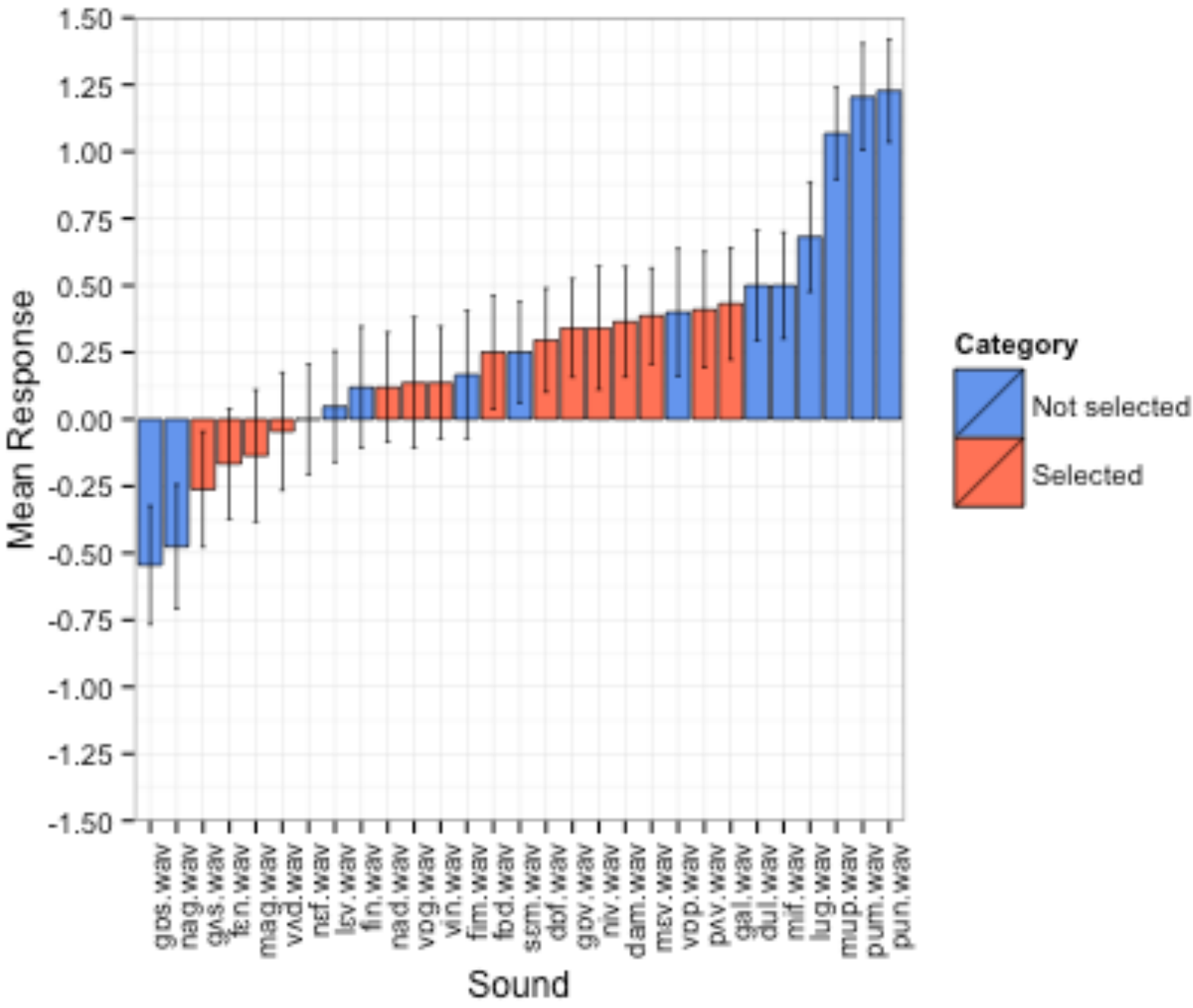


- Congruent mappings are advantageous for individual word learning
- There is no significant difference for congruent and incongruent mappings in the larger vocabularies

Arbitrary only mappings

- Instead of incongruent mappings, where there may be some systematicity, create an arbitrary language
- Sounds were created from new set of consonants and vowels
- Plosives (/g/, /d/, /p/), continuants (/m/, /n/, /l/) and fricatives (/f/, /v/, /s/)
- Front (/i/, /ε/), back (/ɒ/, /ʌ/), open (/a/) and close (/u/)
- Questionnaire data provided 16 of the most neutral sounds

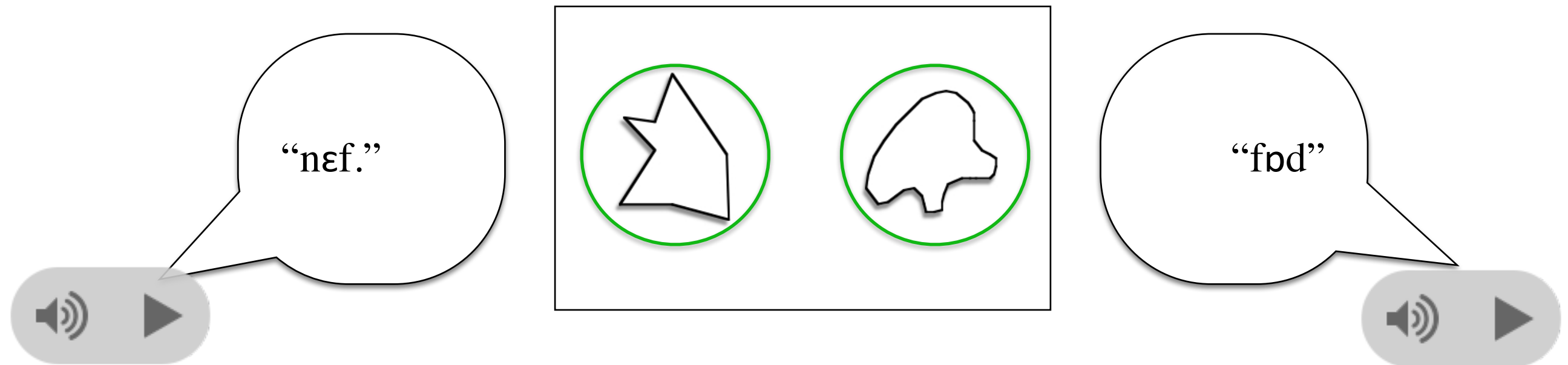
Arbitrary only mappings



Experiment 3

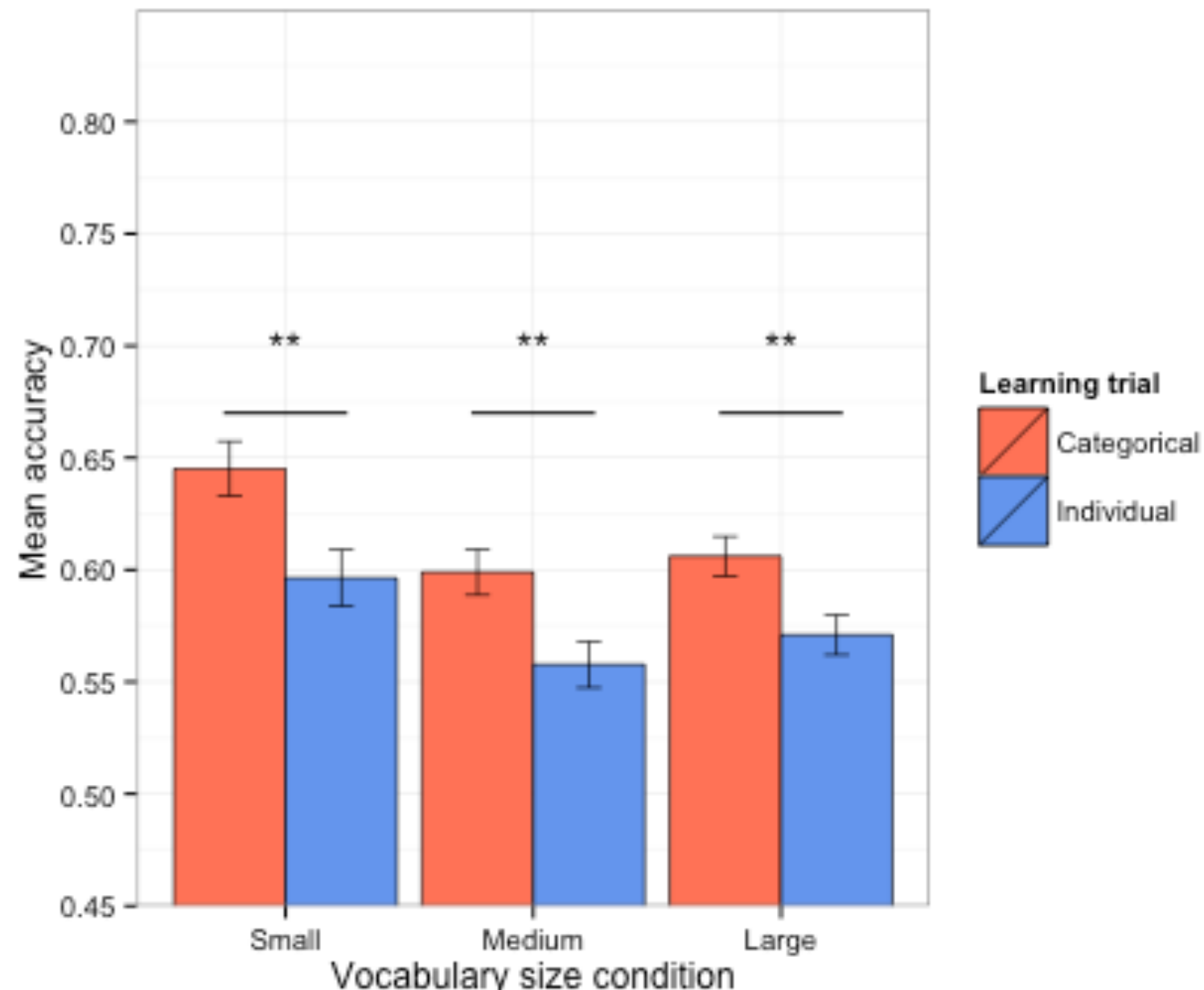
Arbitrary only mappings

- Participants are exposed to arbitrary mappings



Experiment 3

Arbitrary only mappings



- Categorical learning always outperforms individual word learning
- Advantage is significantly higher in smaller vocabulary size

Summary

- Iconicity can be beneficial for word learning but only in smaller vocabularies
- As a vocabulary develops, arbitrary relationships become more beneficial for the learner
- This may represent the way a child's language will develop and change, making use of form-meaning mappings in different ways

Thank you!

j.brand@lancaster.ac.uk

