

The changing influence of form-meaning mappings during vocabulary development

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Background

Human language is normally considered to be a system that uses **arbitrary** forms to represent meanings, for example the word 'apple' has no clear relationship to its meaning of a specific type of fruit

There are however, small pockets of language which do demonstrate a more systematic relationship between form and meaning, often referred to as iconicity or **sound symbolism**. Think about **onomatopoeic words** such as 'meow'.

It has been suggested that such **sound symbolism can be advantageous** for learning form-meaning mappings (Maurer et al, 2006). However, this advantage may only be observable for **categorical learning and not individual word learning**. This is shown in Monaghan et al's (2012) study where participants were aided by sound symbolism in distinguishing between rounded/spiky shape categories, but not when the learning was at the individual word level (see fig.1).

Sound symbolism has been suggested to be more beneficial for learning in **small vocabularies** where mappings can be easily distinguished between. Unlike **large vocabularies**, which are considered to use arbitrariness more effectively to provide the user with a more efficient, effective and comprehensible system for communicating a much larger set of meanings (Gasser, 2004).

Hypotheses

- ❓ Learning will differ between categorical and individual word distinctions (Experiment 1)
- ❓ Sound symbolism will be beneficial for learning individual words in a small vocabulary (Experiment 2)
- ❓ Arbitrariness will be beneficial for individual word learning in a larger vocabulary size (Experiment 2)

Methodology

Participants learned pairings between novel words and shapes. **Learning was implicit**, as for each trial participants saw two shapes and heard a word which consistently occurred with one shape. Over time, participants could learn the reliable pairings.

Novel words contained either **plosives** (e.g., p, t) or **continuants** (e.g., l, m), which are conventionally related to different shapes. Shapes were from two categories: **rounded or spiky**.

Two different types of trial: **Categorical** - shapes from the same category
Individual word - shapes from different categories

Three different vocabulary sizes - **Small** (8 mappings)
Medium (12 mappings)
Large (16 mappings)

Experiment 1

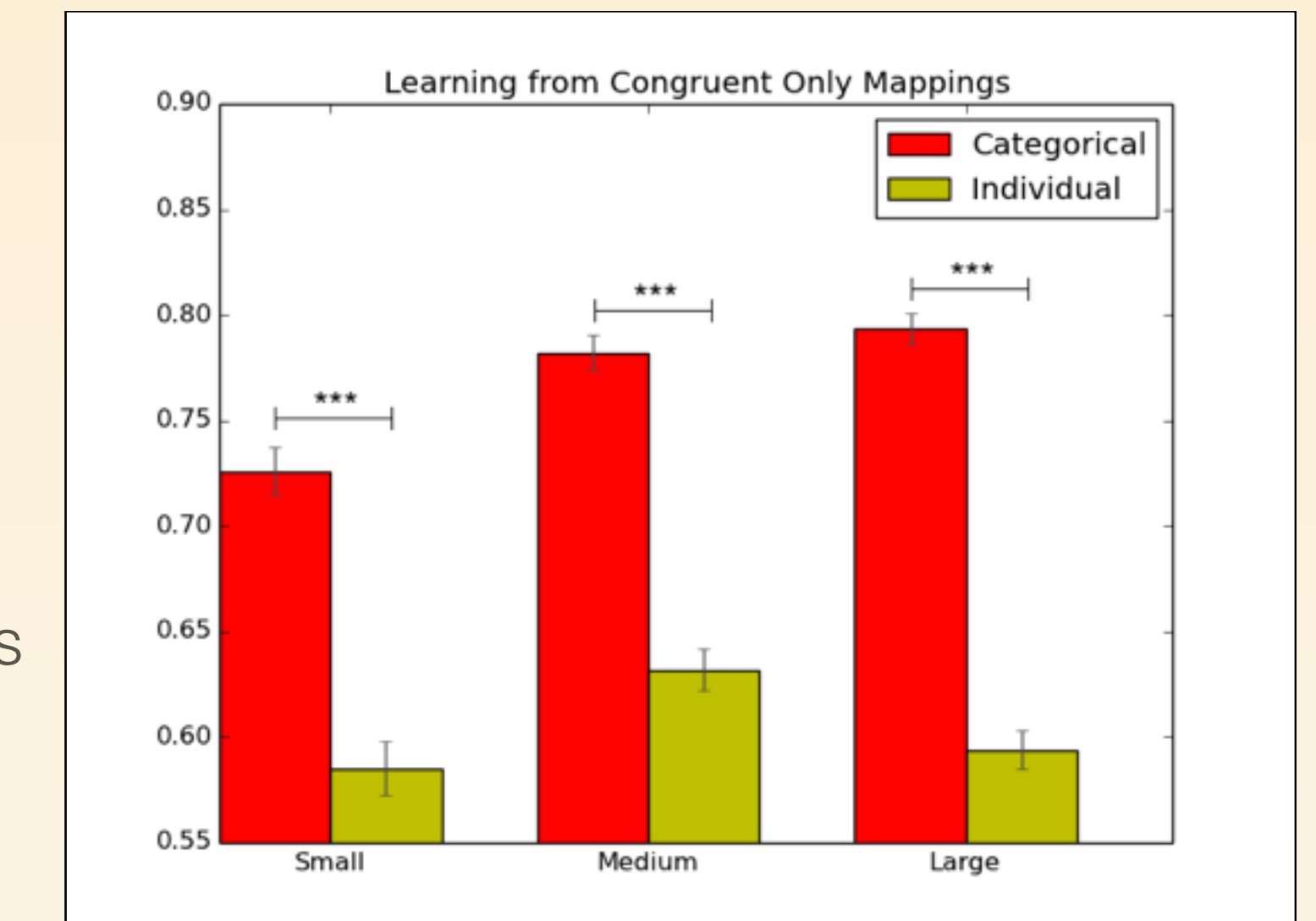
All sounds mapped on to shapes that were considered congruently matched. i.e. sounds with plosive consonants were paired with spiky shapes.



Analysis was based on performance in categorical and individual word learning trials.

Results

- Categorical learning was significantly higher than individual word learning
- As the vocabulary size increases, performance in categorical trials also increases

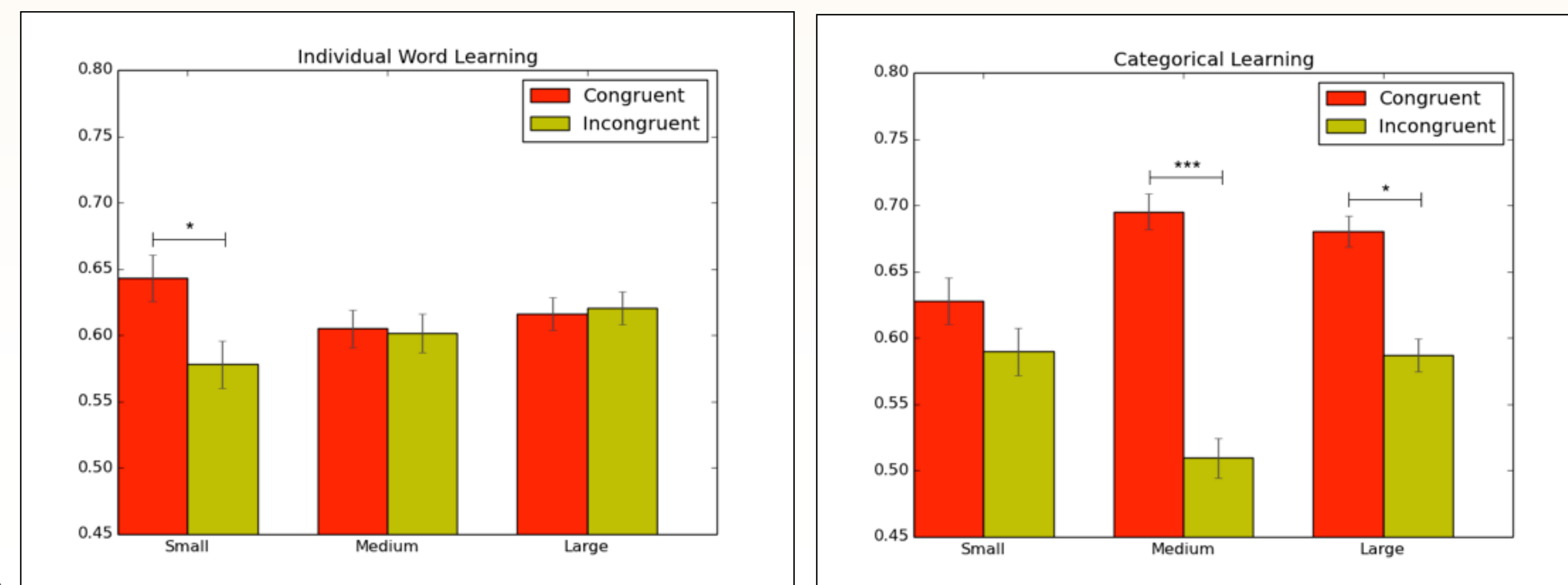


Experiment 2

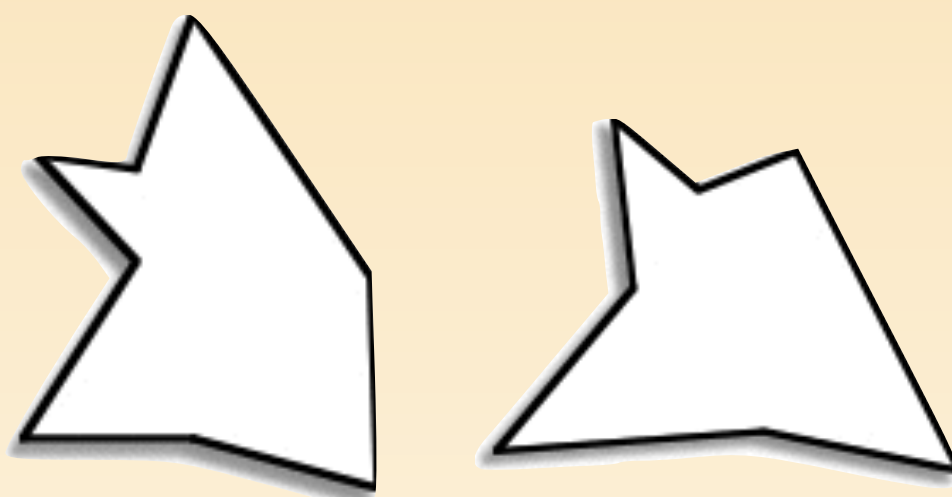
Half the sounds were mapped congruently, the other half were mapped incongruently, where the sound would map to a shape that it is not conventionally related to e.g. "bik" with a rounded shape. Analysis was based on congruency and categorical or individual trial type.

Results

- Performance was significantly higher in the congruent condition for individual word learning, not for the other vocabulary sizes.
- Performance was significantly higher in the congruent condition for categorical learning of medium and large vocabulary sizes, but not for the small vocabulary size



Individual word learning



Categorical word learning

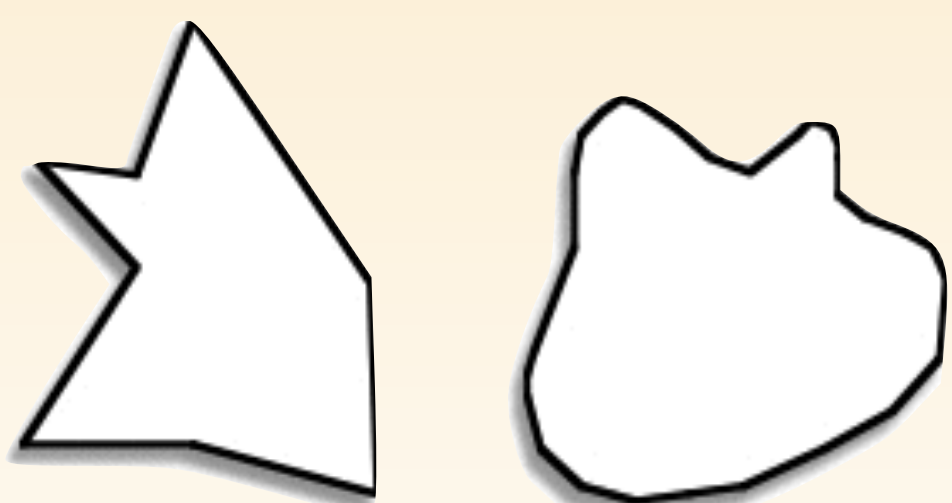


Fig. 1 Distinction between categorical and individual word learning. Categorical demonstrates a distinction between two different types of shapes. Individual distinguishes between shapes within the same category.

Conclusions

- ✓ Categorical learning is more effective than individual word learning.
- ✓ Congruent mappings are more beneficial for the small vocabulary size in individual word learning.
- ✓ Incongruent mappings are more beneficial for larger size vocabularies in individual word learning.

This may provide insights into how the **structure of language changes** as the vocabulary we acquire expands.

It suggests that if a **child has a small vocabulary**, then they could be utilising sound symbolic mappings more effectively. Then as they acquire more and more words, arbitrary mappings become more effective for learning, in experiment 2 this is shown through the incongruent mappings representing an arbitrary system.

This is consistent with recent research that suggests **early acquired words** show more sound symbolic properties, in contrast to later acquired words which are typically more arbitrary (Monaghan et al, 2014).

It may even offer insights into the **origins of human language**, which may have been typically small in vocabulary size, therefore suggesting that the forms used may have been sound symbolic.

