



Hearing Four-month-olds' Perception of Handshapes in American Sign Language: No Experience Required

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Stephanie Baker*, Jennifer Sootsman†, Roberta Michnick Golinkoff† and Laura-Ann Petitto*

*Departments of Psychological & Brain Sciences and Education, Dartmouth College, New Hampshire

†Department of Education, University of Delaware

INTRODUCTION



How do young babies discover the linguistic units of their native language from the constantly varying stream of input around them?

BACKGROUND

Babies begin life with the capacity to discriminate phonetic units in all of the world's languages, even those to which they have never been exposed^{1, 2}. By 14-months, babies have an *increased* sensitivity to their native language contrasts but a *decreased* sensitivity to language contrasts to which they were not exposed^{3, 4, 5}.

Why this is so has been among the most controversial and perplexing puzzles in all of child language

HYPOTHESES

Linguistic Babies find salient select contrasting features in the input (phonetic units) and tacitly compare them on the basis of their category membership from the start

Sound (Auditory) Babies perceive contrasting acoustic features in the input and differentiate them on the basis of their surface acoustic properties that, over time, assume linguistic status and processing

Novel Approach

Hearing (speech-exposed) babies' discrimination of phonetic units in a soundless language, American Sign Language (ASL)

Why?

All previous research has used spoken language and sound to test spoken language and sound, thereby rendering it impossible to determine which of these is most central for language processing

QUESTIONS

What is the nature of the mechanisms underlying early phonetic processing in infants?

What is most key, the presence of surface acoustic or linguistic patterns?

PREDICTIONS

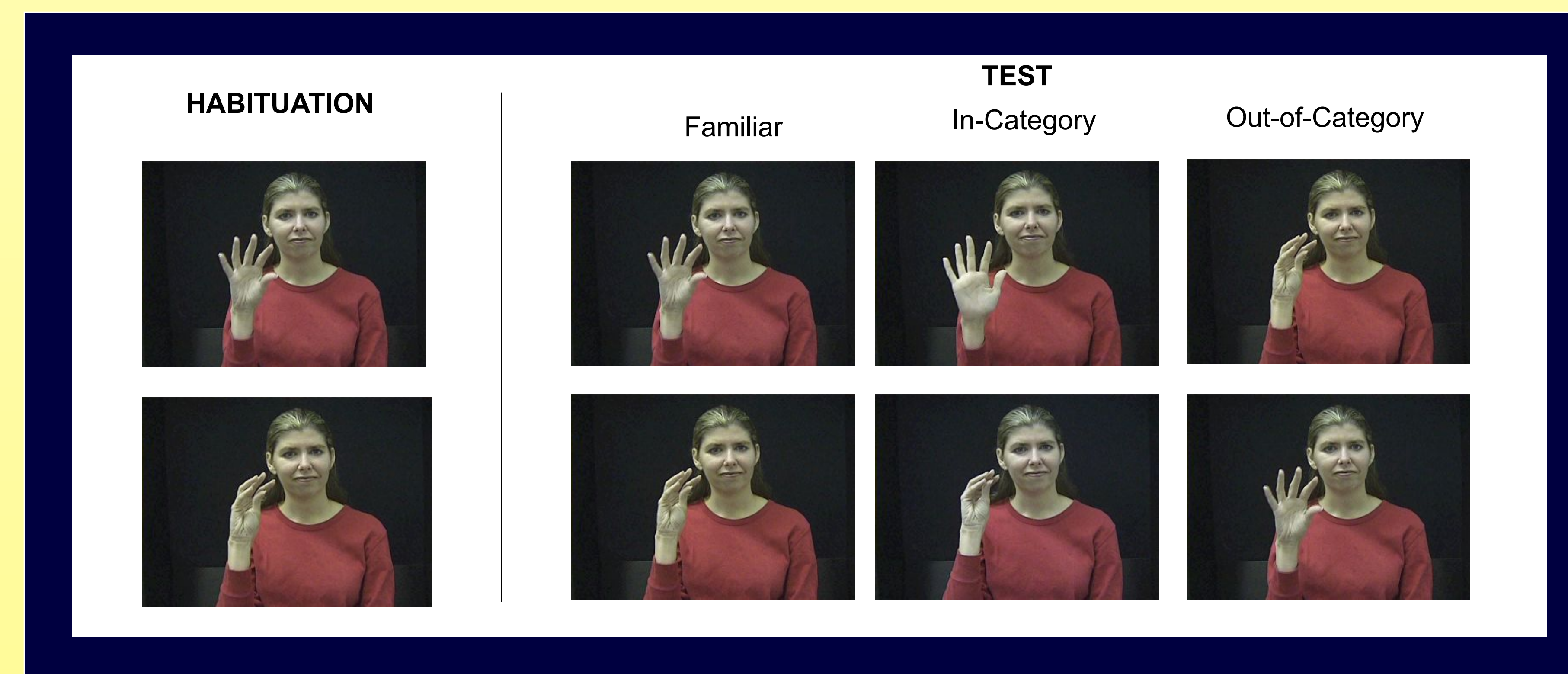
Linguistic Young hearing babies should be able to treat soundless handshapes like any other linguistic (spoken) phonetic unit and exhibit the classic profiles for the categorization of speech sounds^{6, 7}

Hearing 4 month-olds will discriminate ASL handshape exemplars on the basis of category membership

Hearing 14 month-olds will not discriminate ASL handshape exemplars on the basis of category membership

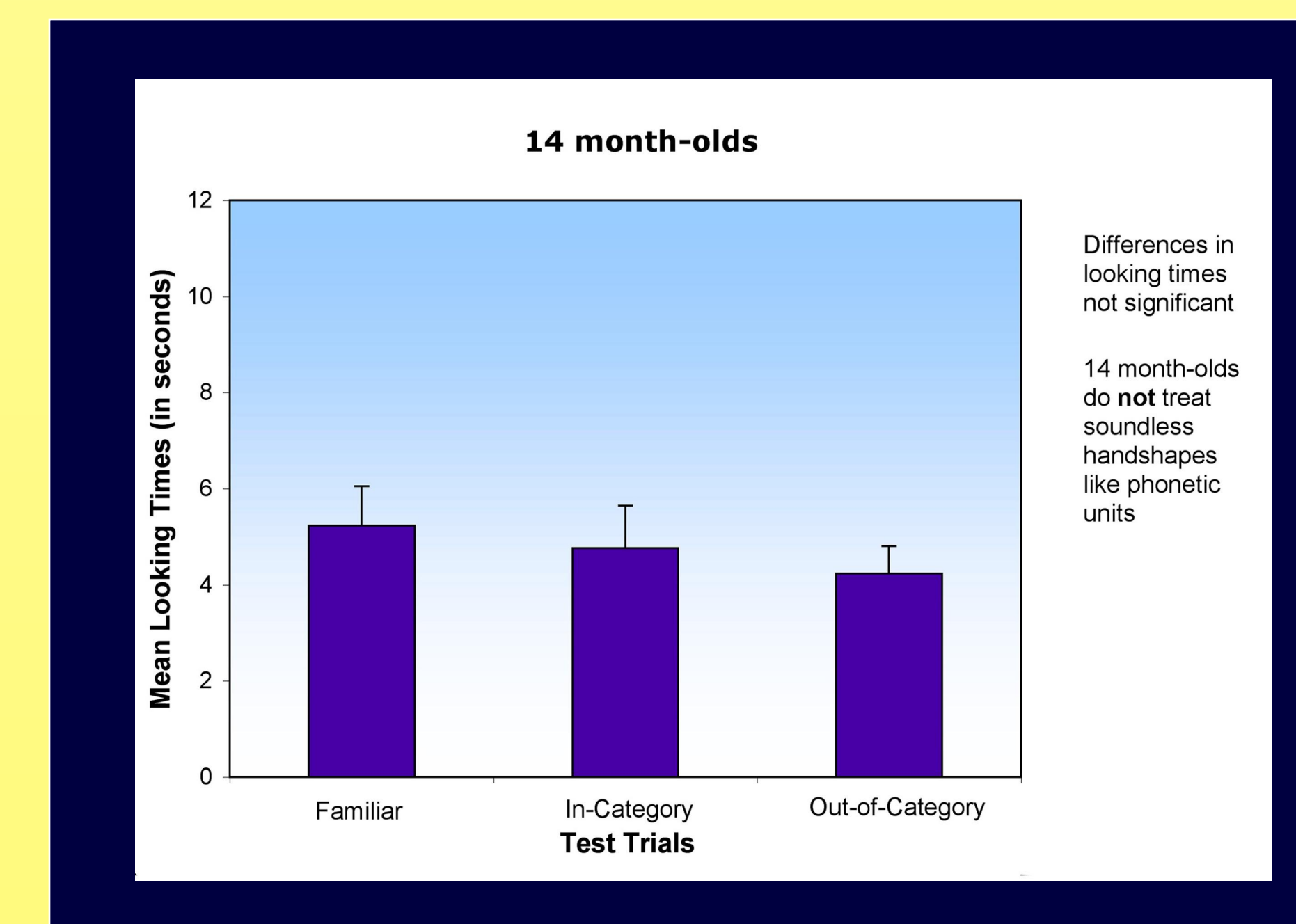
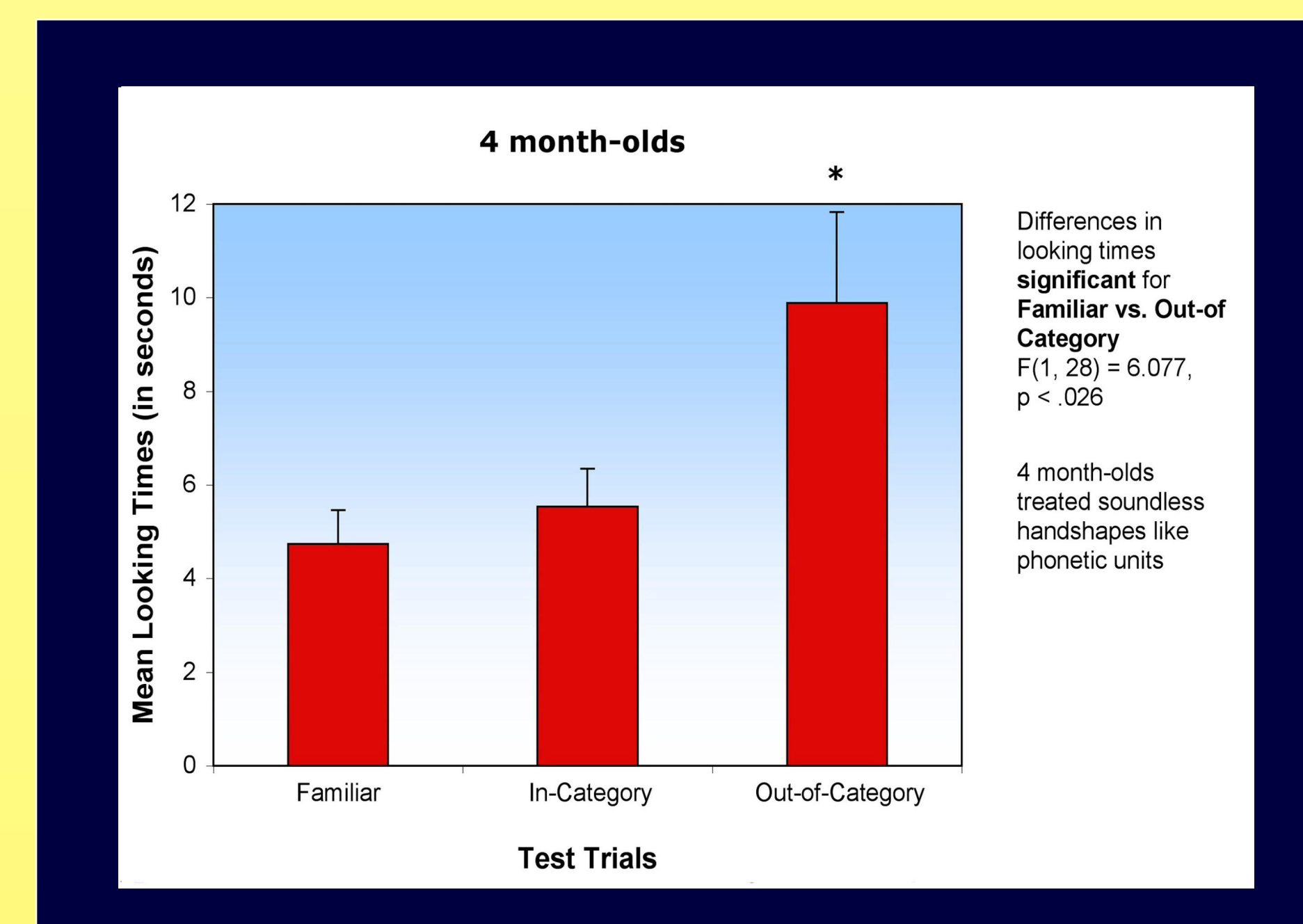
Sound Neither group of hearing babies will discriminate ASL handshape exemplars on the basis of category membership

PROCEDURE



RESULTS

The findings fit the classic pattern: babies begin life with the ability to discriminate all the phonetic units to which they could have been exposed--a capacity that becomes attenuated over time



PARTICIPANTS

Hearing monolinguals (spoken English)
4-month-olds 14-month-olds
N = 16 N = 16
Mean Age = 4.03 Mean Age = 14.02

CONCLUSIONS

Babies find salient select contrasting features in the input (phonetic units) and tacitly compare them on the basis of their category membership from the start

The human drive to detect and discern phonetic units—and to categorize them—is so robust it transcends sound can occur without experience

Phonetic categories cannot be entirely induced from auditory experience or by performing distributional analyses of the surface auditory stream

The key brain-based *mechanisms* detect specific patterns, with specific temporal duration and maximal contrast⁸, associated with select aspects of natural language structure (phonetic and syllabic units)⁹ independent of modality¹⁰

Upon these mechanisms rests the essence of early language *processing*: detecting, discriminating and categorizing the specific *patterns* unique to natural language

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CORRESPONDING AUTHOR
Dr. Stephanie Baker at sbaker@dartmouth.edu
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