Are Word-Final Sounds Perceptually Salient for Infants?

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Abstract

Using the HPP, this study extended Jusczyk and Aslin (1995) by familiarizing 7.5-month-olds with nonwords (e.g., [beyp]) and then presenting test passages containing words that differ from the nonwords in their final consonant (e.g., 'bike', [beyk]) along with new unfamiliar words. The infants did not false alarm to the test passages containing the similar sounding words. Our results suggest that infants have detailed phonetic representations of familiar sound patterns.

Introduction

A critical task for young children acquiring their native language is building a vocabulary that allows them to refer to objects in their environment. In order to develop this vocabulary, young children must first be able to isolate individual words from the continuous stream of speech that they hear. A recent series of experiments by Jusczyk and Aslin (1995) suggests that the ability to segment individual words from fluent speech may emerge as early as 7.5 months of age. For example, infants, familiarized with the words 'bike' and 'feet', listened longer to passages containing these words than to passages containing new unfamiliar words such as 'cup' and 'dog' (see Figure 1). This finding suggests that 7.5-month-old infants are able to form representations of sound patterns with relatively minimal exposure. However, the question remained as to how detailed these representations were.

Jusczyk and Aslin (1995) explored this issue in a second experiment. They familiarized 7.5-month-olds with nonwords such as [geyk] and [zit] and then presented the infants with four passages containing the real words: 'cup', 'dog', 'bike', and 'feet'. These nonwords differ from the real words in their initial consonants. In this case, they did not find a significant difference between the infants' responses to the passages containing words similar to the nonwords heard during familiarization (e.g., [geyk] repetitions and 'bike' passage) and the passages containing new words (see Figure 2).

These results suggest that the initial consonant of a familiar sound pattern is very salient for infants. Jusczyk, Goodman, and Bauman (1999) provide further support for the perceptual salience of initial consonants. They found that 9-month-old infants preferred listening to isolated word lists that shared the same first consonant as compared to unmatched lists. In addition, Newport, Gleitman, and Gleitman (1977) hypothesized that a possible learning strategy for the child is to "listen to familiar beginnings (p. 138)".

Given that infants are more focused on the beginnings rather than on the ends of words, it is possible that they may not detect changes to the endings of targets in the word detection paradigm. However, it is also possible that for infants to segment the speech stream into isolated words they need to identify the end of a word as well. Results from Saffran, Newport, and Aslin (in press) show that adults learning the "words" of a nonsense language appear to learn the ends

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* Poster presented at the Fifth Conference on Laboratory Phonology
at Northwestern University, Evanston, Illinois July 1996.

of words first. Slobin's (1973) operating principle, "pay attention to the ends of words (p. 412)", also stresses the importance of language learners focusing on word final sounds.

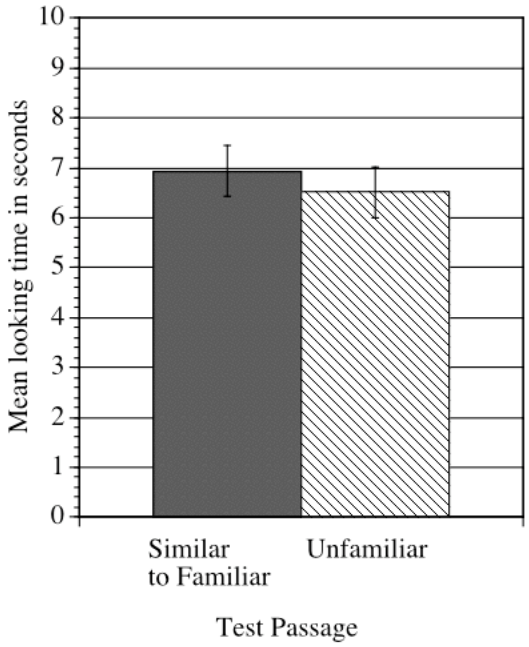

Figure 1. Study 3 mean looking times (error bars = SE), Jusczyk & Aslin (1995).

The present experiment extends Jusczyk and Aslin (1995) by including nonwords, such as [beyp] and [fik], that differ from the real words 'bike' and 'feet' in their final consonant. Infants are first familiarized with repetitions of the nonsense words and then listen to the test passages containing the similar sounding words or new unfamiliar words. If the infants have detailed representations of the familiarized nonwords, then they should not false alarm to the similar sounding words in the test passages.

Stimuli

We constructed the target nonwords by changing the place of articulation of the final consonant in the original target words used by Jusczyk & Aslin (1995). The original target words were 'cup', 'dog', 'bike', and 'feet'. Our manipulation yielded the target nonwords used in the present experiment: [kut], [dɕb], [beyp], and [fik].

The test passages in the present experiment were the same passages used by Jusczyk & Aslin (1995). The position of the target word in the sentences varied such that the target word was spoken in the beginning of two sentences, in the middle of two sentences, and at the end of two sentences. Each target word was preceded by one of six words that were used in all four sets of passages. *(e.g., <u>bike</u> passage :His bike had big black wheels. The girl rode her big bike. Her bike could go very fast. The bell on the bike was really loud. The boy had a new red bike. Your bike always stays in the garage.)*

The same female talker (native speaker of American English) who had recorded the test passages also recorded the isolated nonwords that the infants would listen to in the familiarization phase. For each target nonword, the talker repeated the item with some variation fifteen times in a row, in a lively voice.

Participants

We tested twenty-four infants (10 females, 14 males) approximately 7.5 months of age (mean age: 231 days, range: 213-244 days). All infants were from monolingual English-speaking homes. An additional twelve infants failed to complete the entire testing session.

Design & Procedure

We presented the familiarization nonwords and test passages to the infants using a modified version of the Headturn Preference Procedure (Kemler Nelson, et al., 1995, see Figure 3). Twelve infants listened to repetitions of [kut] and [dɕb] during familiarization. Another group of twelve infants listened to repetitions of [beyp] and [fik]. After familiarization, we tested both groups on four blocks of the test passages. Each block consisted of four trials, one for each of the four passages.

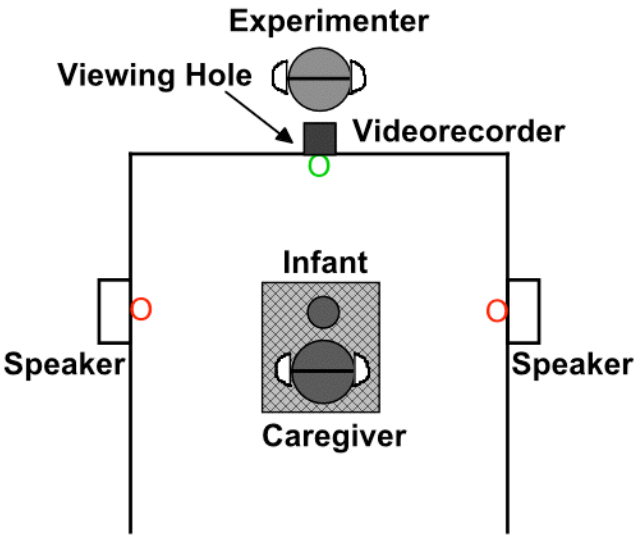

Figure 2. Headturn Preference Procedure

Results and Discussion

The infants did not listen significantly longer to the passages containing the words similar to the familiarized nonwords, $t(23) = 1.34$, $p = 0.19$ (see Figure 3). An interesting pattern emerges when we compare this result with that of Jusczyk and Aslin (1995, Experiment 1) as shown in Figure 1. When 7.5-month-old infants were familiarized with repetitions of a word they listened longer to passages containing that word than to passages containing new unfamiliar words. However, as our study shows, when the passages contain a word that differs in a single

phonetic feature from a familiar sound pattern, infants will show no preference for the passages containing the similiar sounding word. These results suggest that infants are able to discriminate sound patterns that minimally differ in their final phoneme.

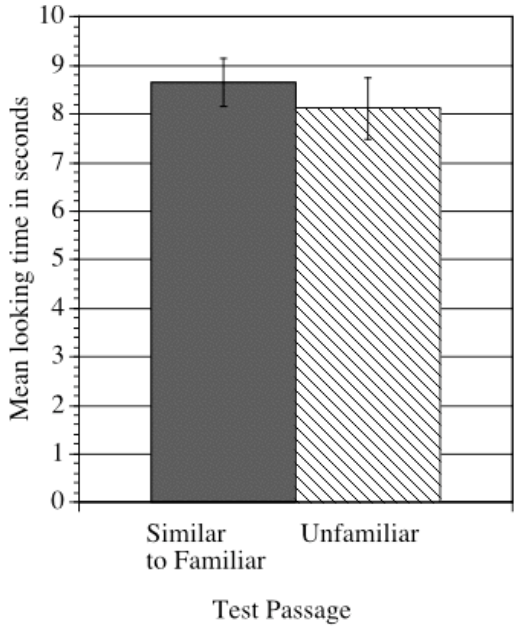

Figure 3. Mean looking times for passages containing words similar to familiarized nonwords and for passages containing unfamiliar words (error bars = SE).

Conclusions

These results support Jusczyk and Aslin's (1995) finding that 7.5-month-old infants do not false alarm to passages containing words similar to a familiar sound pattern. The infants in Jusczyk and Aslin (1995, Experiment 1) do not appear to be responding to the passages based on some overall salient property of the words such as the vowel. Instead, they appear to be encoding a rather detailed representation of the familiarized items.

A detailed representation would allow the language learner to avoid confusing highly similar words stored in the lexicon. For example, an infant named Pete would find it useful to discriminate the initial consonant of the sound pattern [pit] from that of the sound pattern [fit]. This detailed representation would be helpful in the early stages of word learning to reduce possible errors in matching the appropriate sound patterns to objects or actions.

References

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