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Sentential Context Improves Bilingual Infants' Use of Phonetic Detail in Novel Words

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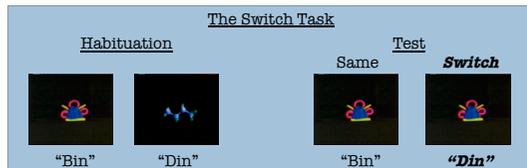


Infants' Phonetic Perception

- Monolingual infants refine phonetic perception to native language categories by 12 months (Werker & Tees, 1984), accurately discriminating relevant sounds in their language (e.g., /b/ from /d/).
- The picture is not as clear for bilingual infants.
 - Spanish-Catalan bilinguals take longer to refine vowel categories (12 months) than monolinguals (8 months) (Bosch & Sebastián-Gallés, 2003, in press).
 - French-English bilingual infants refine consonant categories at the same age (12 months) as monolinguals (Burns, et al., 2007; Sundara, Polka & Molnar, 2008).

Applying Phonetic Perception to Word Learning

- We test infants' ability to use phonetic perception in word learning via the Switch task, a word-object associative learning task.



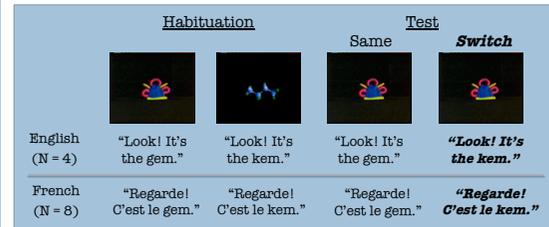
- If infants successfully use phonetic perception skills, they should be surprised by the switch in the similar-sounding words at test.
- Despite having refined phonetic perception by 12 months, infants appear to have difficulty applying these skills to early word learning.
 - Both monolingual and bilingual infants confuse similar-sounding novel words in the task at 14 months, looking equivalently at the 'same and 'switch' trials.
 - Monolingual infants do not reliably succeed in disambiguating the minimal pair until 17 months. Bilinguals do not succeed until 20 months (Fennell, Byers-Heinlein & Werker, 2007).
 - Bilinguals' difficulty cannot be attributed to word-learning problems.
 - Bilinguals produce their first word at the same age as monolinguals and have similar vocabulary sizes in infancy (e.g., Pearson & Fernandez, 1994).
 - Bilinguals learn dissimilar-sounding words in the Switch task at the same age as monolinguals (Byers-Heinlein, Fennell & Werker, in prep).

Why are Bilinguals Having Difficulty?

- Bilinguals' difficulties may be due to larger phonological inventories.
 - May take longer to establish the appropriate categories for word learning (similar to possible delays in phonetic development).
 - Bilinguals also need to activate and represent the appropriate categories for the specific language being learned.
- Another possibility, related to the point above, is that bilinguals could be disadvantaged compared to monolinguals in the Switch task.
 - By presenting monosyllabic words consisting of common phonemes, the bilingual cannot easily determine which of their two languages they are hearing.
 - This adds a level of difficulty to the task (language determination) that monolinguals do not experience.

Exploring the Possibilities: The Current Study

- We hypothesized that bilingual infants could use their phonetic perception skills if we clarified the language context.
- Thus, we presented the novel words in the Switch task in sentence frames, which explicitly indicated to which language the to-be-learned words belonged (French or English; counterbalanced across infants).



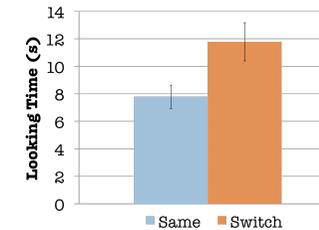
Stimuli

- Seven different naming phrases were recorded in each language.
- The two novel words were spliced into both the English and French sentences (e.g., the "kem"s in the English sentences are acoustically identical to the "kem"s in the French sentences).
- The novel words consist of phonemes present in both Canadian French and Canadian English.

Participants

- Twelve English-French bilinguals (6 female) of 17 months (mean = 17.1 mos.; range: 16.1 - 18.1 mos.).
- At least 25-75% exposure to each language (means = 43% English, 57% French).
- Exposed to both languages from birth.

Results



- 11 out of 12 babies looked longer to the 'switch'.
- Ran a 2 (test trial: same vs. switch) by 2 (sentence: English vs. French) mixed ANOVA
 - Main effect of test trial: $F(1, 10) = 7.93, p = .02$
 - No main effect of sentence language or interaction.

Discussion

- When language context is clear, bilinguals can use their phonetic perception skills in word learning at the same age as monolinguals.
- Bilinguals' larger phonological inventories do not appear to be impacting their abilities. Rather, task demands (i.e., language uncertainty) interfered with their skills in the original study (see also Mattock, Polka, Rvachew & Khrem, in press).
- An alternate, but not necessarily mutually exclusive, explanation for our results is that the bilinguals are using referential cues in this study.
- Fennell and Waxman (submitted; Fennell, 2006) showed that naming phrases facilitate use of phonetic detail in 14-month-old monolingual infants.
 - Monolinguals were aided by referential cues: the syntax and familiarity of the phrases indicate the label goes with the object.
 - Future research can address this by providing non-referential cues to language type (e.g., string of French words prior to test without objects on the screen).

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