Phonetic repertoires of 12-month-old monolingual Arabic and English infants

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Introduction

- Infants tend to follow a common pattern of speech development in the first year of life which includes the universal occurrence of certain speech sounds, e.g., central vowels, nasals, stops, and glides.
- The cross-linguistic similarity of the phonetic repertoire during the first 18 months of life is considered to be the result of biological influences, i.e., the maturation of the vocal tract and oral motor control.
- Recent research on babbling shows that ambient language input also influences the acoustic and phonetic characteristics of infant speech.
- The magnitude of ambient language influences in the vocalizations during infancy still needs further investigation. This paper presents the preliminary findings from a program of research that investigates the role of household language input on the characteristics of infants’ speech output.

Purpose of study

- The aim of this study is to describe and compare the phonetic repertoire of 12-month-old Arabic-learning infants and English-learning infants.

Hypothesis

- Cross-linguistic differences in the proportions of some phonetic categories will be observed.

Method

Participants

- Arabic-learning infants (n=5) raised in Saudi Arabia, and English-learning infants (n=5) raised in Western Canada with the mean age of 12 months.
- All infants were born at term and were reported to be healthy and developing normally and were found upon assessment to have normal hearing.

Procedure

- Each syllable was phonetically transcribed and coded according to the infraphonological categories [3]; for example, canonical syllable (i.e., speech-like).
- Each syllable was acoustically analyzed to identify the infraphonological categories.
- Only consonants that were produced in canonical syllables and marginal syllables with normal phonation were selected to describe the phonetic repertoire for each infant.
- Consonants were grouped according to manner and place of production.

Results

- Chi-square analyses were used to compare proportions of productions in each phonetic category across language groups.
- With respect to manner of articulation: Significant between group differences were observed over all (χ2= 35.654; df= 4; p=.000). Stops were preferred over the other categories for both language groups. English babies produced comparatively more fricatives (χ2= 24.498; df= 1; p=.000) while Arabic babies produced comparatively more glides (χ2= 16.407; df= 1; p=.000).

Discussion

- Our findings of similar phonetic categories and predominant labials, coronals, and stops in the phonetic repertoires of both language groups support the presence of universal patterns in babbling.
- However, cross-linguistic differences in the proportions of phonetic categories show evidence for the presence of linguistic environmental influences on babble due to language-specific exposure.
- Arabic and English are phonologically and phonetically distinct.
- The preliminary findings of cross-linguistic differences in the consonantal repertoire of 12-month-old infants are consistent with our recent findings [4] of cross-linguistic differences in the consonantal repertoire of 8-month-old Arabic and English infants.
- Fricatives, glottals and dorsals were produced more by English infants while glides, nasals and coronals were produced more by Arabic infants.

Significance of research

- This research highlights the importance of encouraging parents to provide infants with rich-linguistic input even before they are capable of producing meaningful speech.
- The nature of the speech inputs and the infant’s ability to access and to process these inputs are significant for normal speech development. Different biological and social factors (e.g., hearing impairment and lack of child-mother interaction) may affect the quality of infant’s experience with ambient language and contribute to individual differences in speech and language development.
- The role of enhanced input during early development in preventing or treating speech and language disorders is worthy of further research attention.

Conclusion

- Changes in infant vocalizations are the result of complex interaction of different factors including biological constraints and ambient language input.

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