CANTONESE
2-year-old females

2) Individual Means
• Children generally produce most of the vowels of their native language correctly by age 2, based on transcription analysis.
  (obstruent and one of the vowels /i, a, u/, the three common vowels across the four languages)

Adult males: Word repetition task
• However, a few studies (e.g., Davis & MacNeilage, 1990) suggest that the picture is considerably more complicated.

English
for /u/ in Cantonese to a high of 96% for /i/ in Greek.

5-year-old males

ACOUSTIC ANALYSIS

= This is due, at least in part, to their smaller vocal tracts.

2. Statistical results of interest
• Significant main effect of age
• Significant age by language interaction

DISCUSSION

1. Observations:
• Children’s productions are more variable than adults.
• Children’s vowel spaces are larger than those of adults.
  - This is due, at least in part, to their smaller vocal tracts.
  - Exception: Cantonese 2-year-olds

2. Statistical results of interest
• Significant main effect of age.
• Significant age by language interaction

FUTURE DIRECTIONS
• Normalize formant frequencies to account for difference in vocal tract length
• Include incorrect vowel productions
• Examine perception of children’s vowel productions across languages

ACKNOWLEDGMENTS
• This research was supported by NICHD grant #5R01HD062512 and NSF grant #0729140 to Jan Edwards and a Fulbright Fellowship to Hyunju Chung
• Thanks to Mary Beckman, Junyoung Kang, Marion Fossum, Azrinna Sytia, Sarah Schlaufinger and Tim Albin-Kelin for their contributions to this study.
• Special thanks to the children who participated and the parents who gave their consent.

CONCLUSION: 1) Cross-linguistic Differences

1. Observations:
• Cross-linguistic differences in vowel space were observed for both adults and children.
• Vowel spaces of 5-year-olds closely resembled those of adults for each language.

2. Statistical results of interest
• Two four-way ANOVAs were performed.
  - Independent variables: vowel, language, age, sex
  - Dependent variables: F1, F2
  - Significant main effect of language
  - Significant vowel by language interaction

CONCLUSION: 2) Developmental Pattern

1. Observations:
• Children’s productions are more variable than adults.
• Children’s vowel spaces are larger than those of adults.
  - This is due, at least in part, to their smaller vocal tracts.
  - Exception: Cantonese 2-year-olds

2. Statistical results of interest
• Significant main effect of age.
• Significant age by language interaction

HYPOTHESES
1. There will be cross-linguistic differences in the location of shared vowels in the overall vowel space (e.g. Bradlow, 1993; Rvachew et al., 2006).
2. These cross-linguistic differences will increase with age.

PARTICIPANTS

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Figure 1. F1 plotted against F2. Data for males in blue and for females in red

Figure 2. Mean F1 plotted against mean F2 for each language and age group

Figure 3. Mean F1 plotted against mean F2 for 2-year-olds and 5-year-olds

Figure 4. Mean F1 plotted against mean F2 for adults

Figure 5. Mean F1 plotted against mean F2 for 5-year-olds and 2-year-olds

Figure 6. Scatter Plots: Adult

Figure 7. Scatter Plots: Child

Cross-linguistic Acquisition of Vowels: English, Korean, Greek, and Cantonese

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