Variation in pitch scaling in English of young simultaneous bilinguals in Singapore

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Language acquisition by bilingual children in multilingual, multidialectal contexts like Singapore is exceptionally complex. Variable outcomes can be attributed to cross-linguistic influence (CLI), but are also influenced by differences in their language experience. Children may be dominant in different languages, and while parents may all be native speakers of their local variety, accent features may vary due to differences in their language backgrounds and cultural affiliations[1]. Past studies in bilingual language acquisition have found quantity of input to account for variation in language outcomes[2,3], but only a few have examined the effects of differences in the phonological and phonetic quality of parental input on acquisition[4,5]. Further, little attention has been given to such variation in prosodic development, despite considerable variation in tonal alignment and scaling between dialects in adult speech[1]. This study examined phonetic variation in the pitch scaling in the English of simultaneous child bilinguals in Singapore and explored how differences in their ethnic mother tongue (eMT), language dominance, and maternal input contributed to the variation.

The participants were nine simultaneous bilingual children (mean age = 58 months, *SD* = 8.8) and their mothers. To test the effects of their eMT and language dominance on their English production, three children were English-dominant English-Chinese bilinguals (EC, average English use: 85%), three English-dominant English-Malay bilinguals (EM, average English use: 82%), and three English-Malay bilinguals who were more Malay-dominant than EM (MM, average Malay use: 38%). Based on existing literature on the effects of CLI and language dominance, we may expect the production of EC and EM, who would be typically regarded as monolinguals, to be more similar to each other than to MM. The dataset consisted of 172 semi-spontaneous declarative sentences from an information gap activity, which involved the child describing what he/she saw in picture cards so that their mother could match the correct character with the right item. Each target sentence contained a mono- or disyllabic subject, monosyllabic verb in the present continuous tense, and mono- or disyllabic object with a determiner (e.g. '*Mary is eating an orange.').* All disyllabic words were stress-initial. The confirmational replies of mothers in the same form were taken to be the mothers' production. The recordings were analysed according to the autosegmental-metrical intonation model of Singapore English[6,7]. Time-normalised F0 (ten points per syllable) was then extracted, and converted into semitones to normalise across participants.

A smoothing spline ANOVA analysis with 95% CI (Figure 1) revealed that, compared to Malay children, Chinese children had: (A) larger LH rises, (B) larger HL falls, and (C) larger L-downstepping. There were only small group differences between MM and EM. These ethnic group differences in the rise/fall/downstep ratios were further examined using static measurements, and tested using linear mixed-effects modelling, taking into account various linguistic (e.g. no. of syllables, duration) and non-linguistic variables (e.g. language dominance, eMT). Language dominance was not a significant predictor of variation in scaling for any of the ratios. By contrast, there were significant effects of eMT in each ratio, although some differences were significant only when linguistic factors were considered. Similar patterns were found in mothers' production. The results suggest that the children's production patterns were influenced more by quality of input (eMT, patterns in maternal input) than by quantity (language dominance). The similarities between EM and MM show that CLI and quantity of input cannot fully explain variable outcomes in bilinguals. The findings also contrast with other heritage learners, who tend to assimilate to the major accent, highlighting the differences in the relative influence of the input.

References

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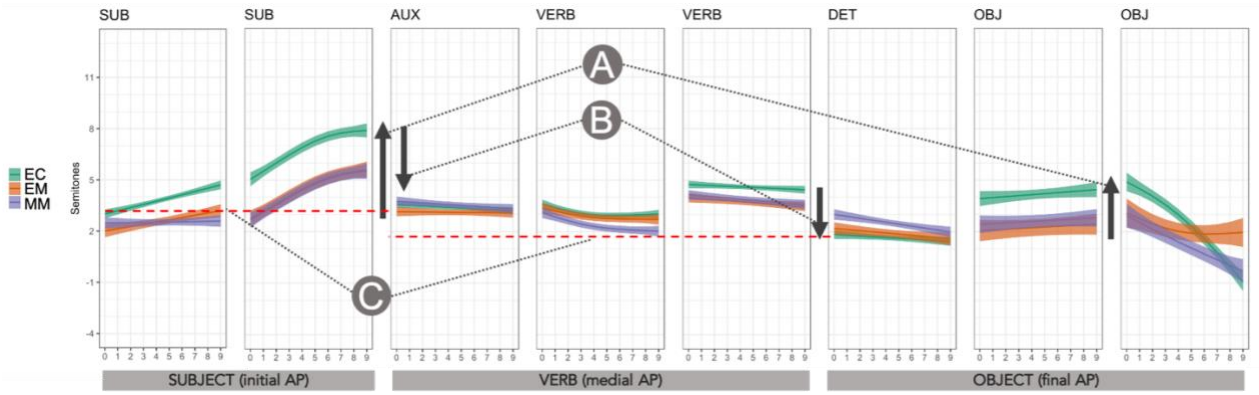

Figure 1: SSANOVAs of normalised pitch contours of each syllable for each group of child participants, with 95% confidence interval (ribbon around spline).