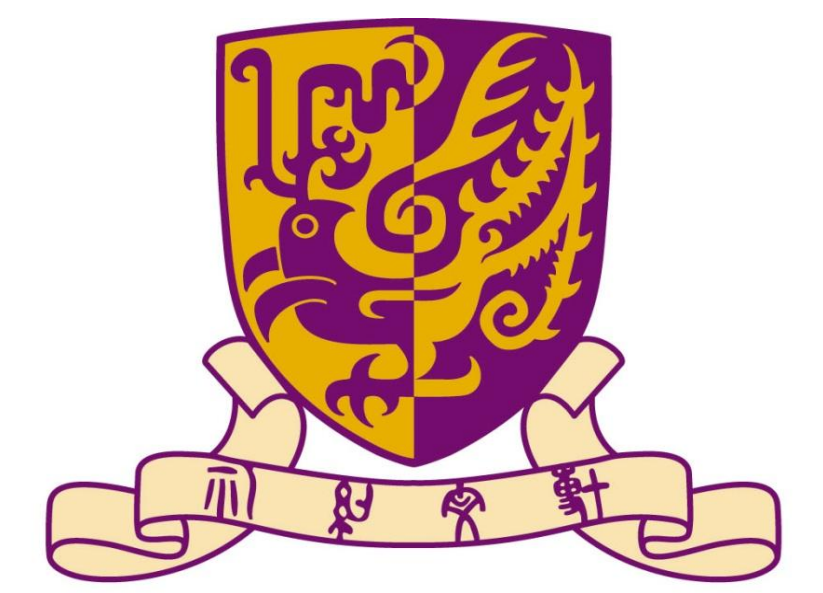


A case study of speech rhythm acquisition in a Cantonese-English bilingual child



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1. Introduction

- Linguists have proposed three main categories of speech rhythm [1]:
 - Stress timing** (English, German)
 - Syllable timing** (Spanish, French)
 - Mora timing** (Japanese)
- Children acquiring a stress-timed language and a syllable-timed language simultaneously have patterns that are distinct from monolinguals acquiring the same languages: less rhythmic separation between languages of the bilingual children [2, 3, 4].
- The present study examines two languages that differ both rhythmically *and* typologically, English and Cantonese, in the utterances of a balanced bilingual child longitudinally at two ages: 3;0.15 and 4;2.0.

2. Method

Subjects

- Kathryn, a Cantonese-English bilingual from birth
- Four age-matched monolinguals (two from each language at each age)

Materials

- 20 utterances per language/age for both monolingual and bilingual children
- all utterances between 5 and 9 syllables in length
- utterances segmented into consonantal (C), vocalic (V) and syllabic (S) intervals
- 7 recently developed *rhythmic metrics* were used to measure speech rhythm based on duration:
 - %V, nPVI_S, nPVI_V, nPVI_C, Varco S, Varco V, Varco C [4,5,6,7]
- syllable structure* of the bilingual child was also analysed

3. Results

- Several monolingual scores were significantly different at both ages (Figure 1), showing clear rhythmic separation
- Less separation between Kathryn's scores at both ages. Only %V and nPVI_S were consistently different at both ages (Figure 2)

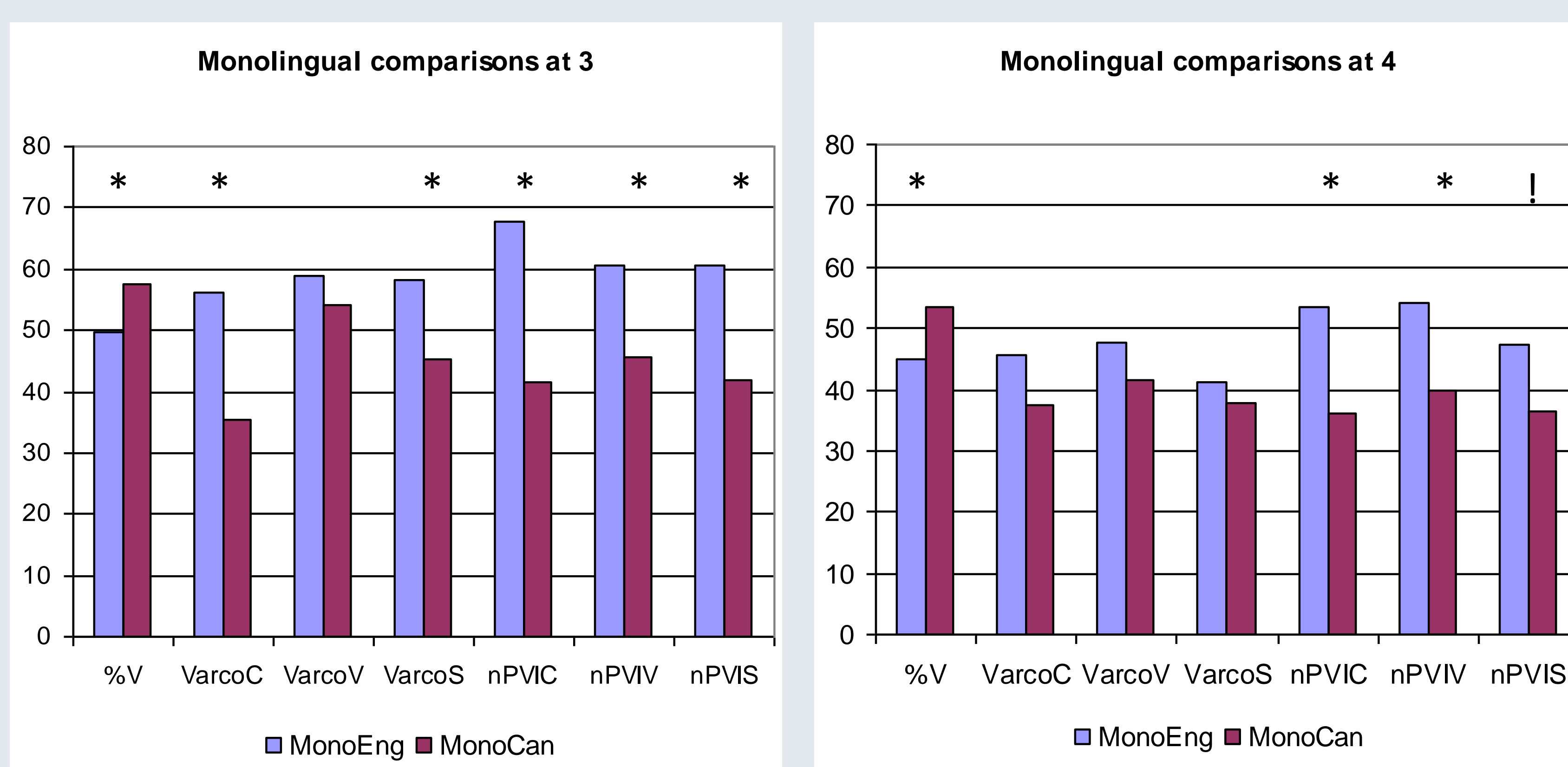


Figure 1: Monolingual comparisons at age 3 and age 4 (* = $p < 0.0125$; ! = $p < 0.015$)

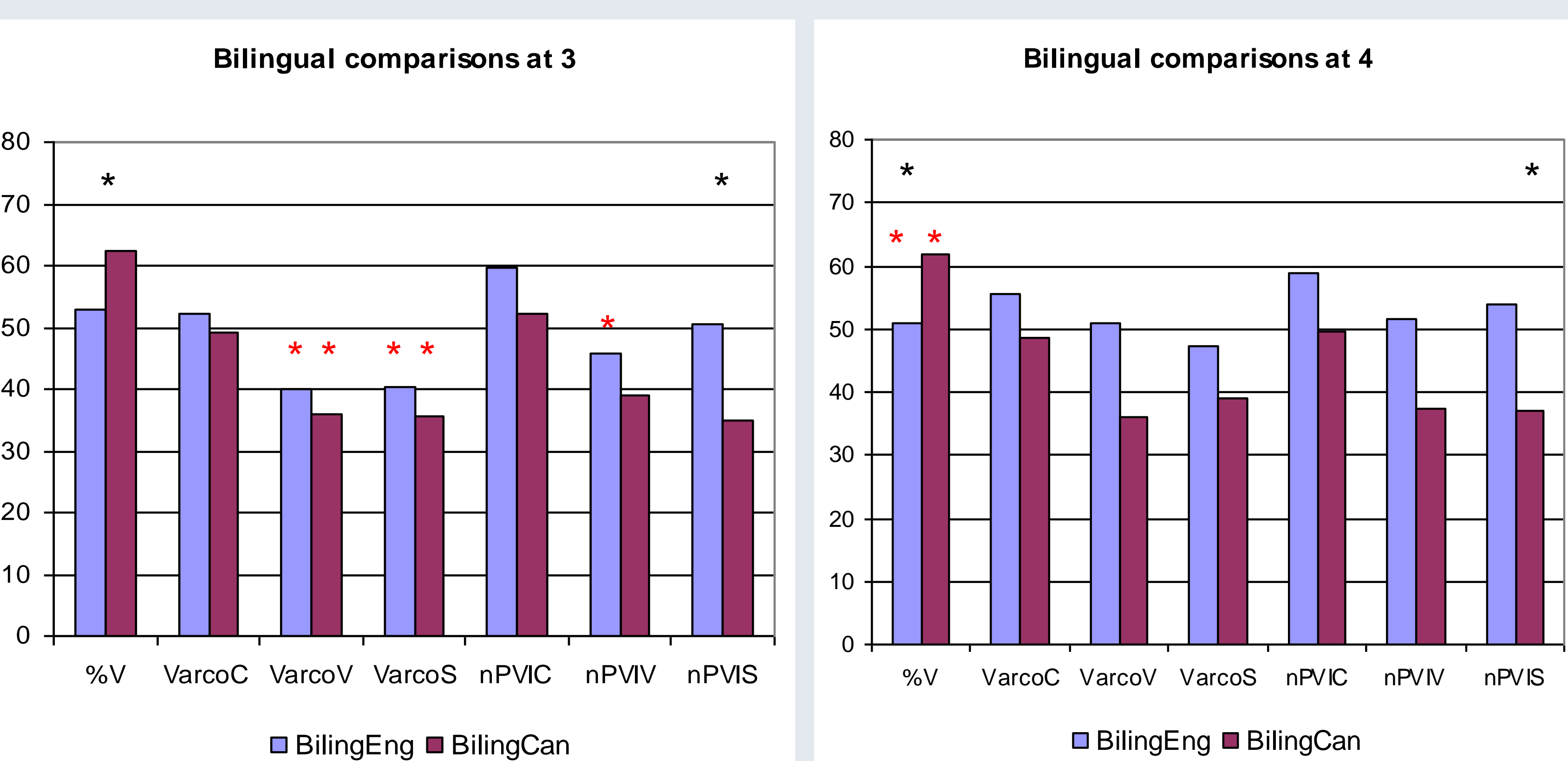


Figure 2: Bilingual comparisons at age 3 and age 4 (* = $p < 0.0125$ for bilingual comparison; ** = $p < 0.0125$ for bilingual and monolingual comparison at the same age)

Evidence of influence from Kathryn's Cantonese to her English

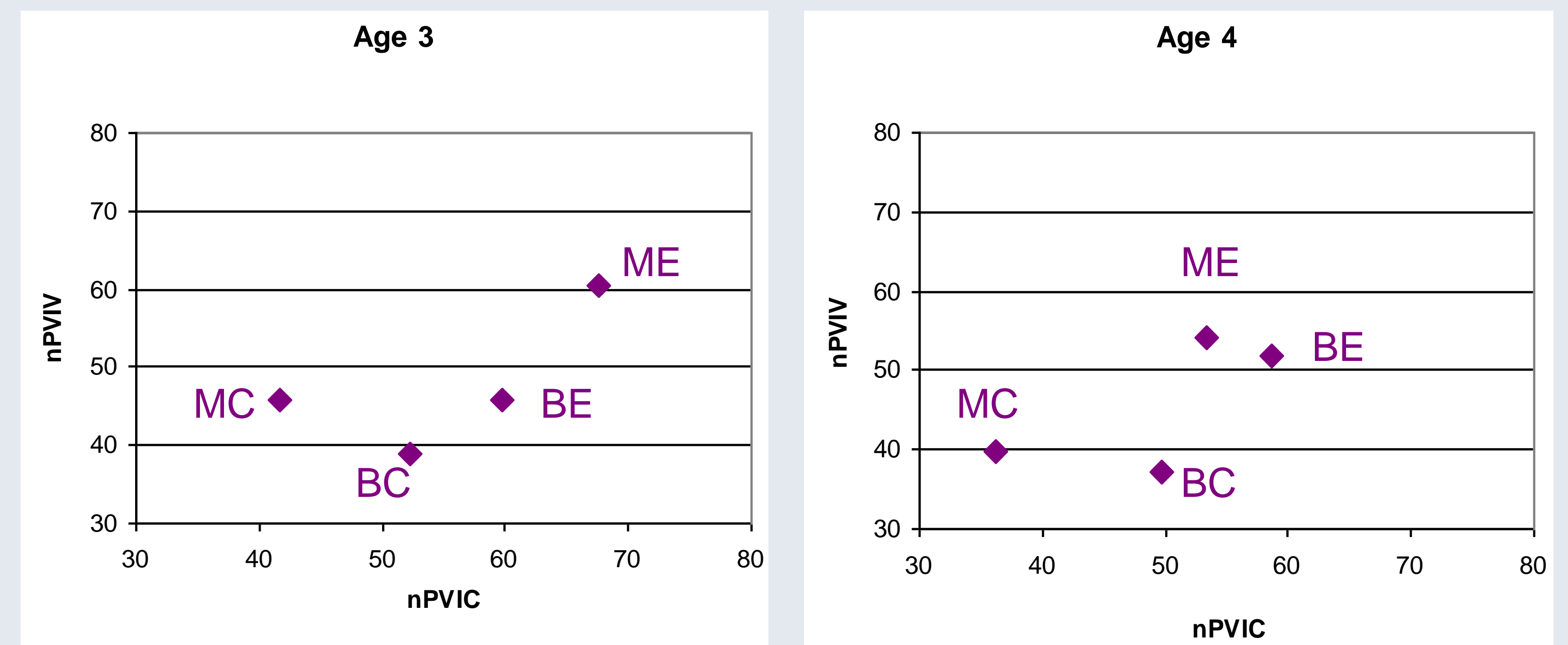


Figure 3: Monolingual and bilingual nPVIC and nPVI_V scores at both ages

Syllable structure complexity entrenched at an early age for Kathryn
CV proportions can be correlated with the languages spoken

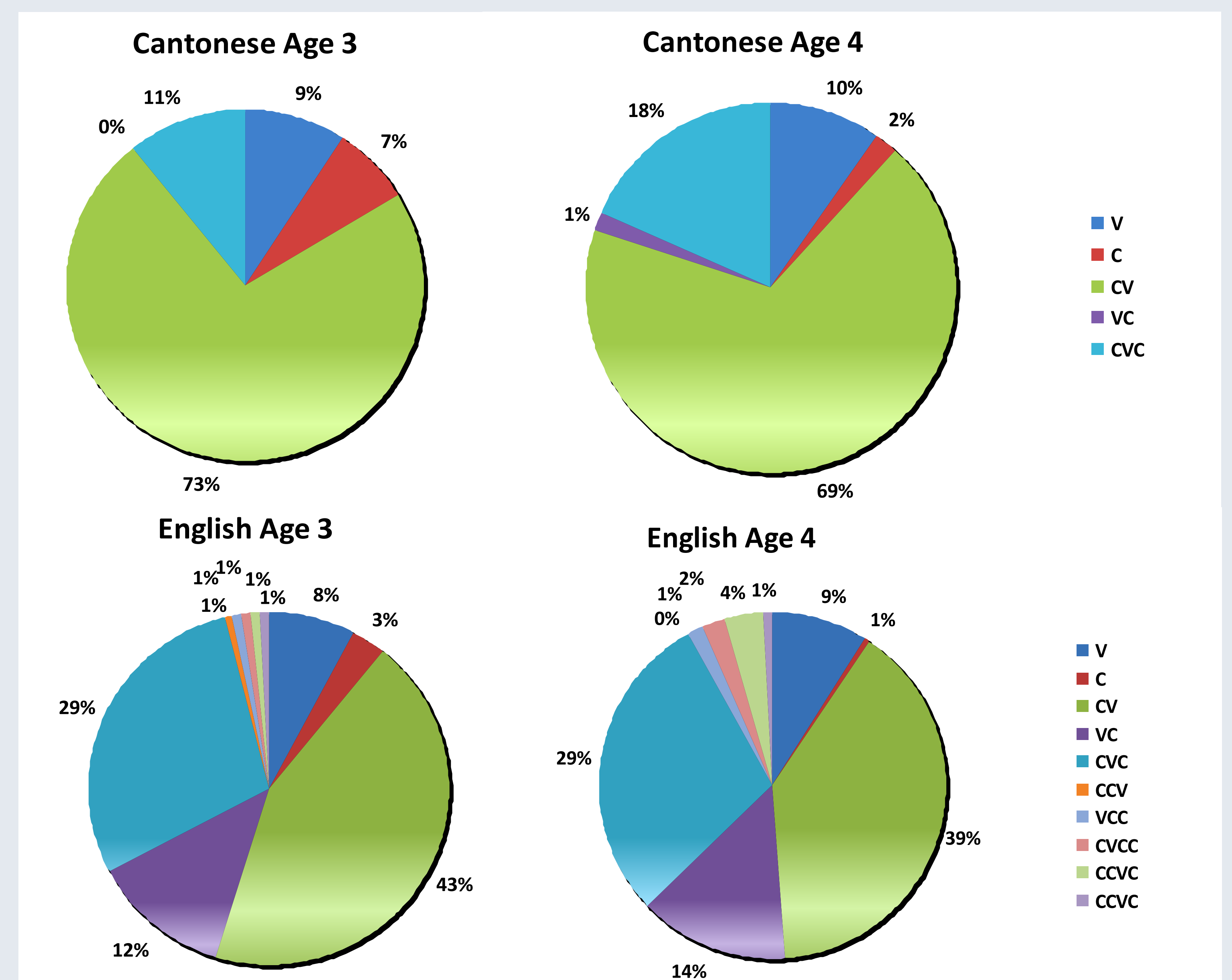


Figure 4: Complexity of syllable structure produced by Kathryn at age 3 & 4

4. Discussion

- Both *separation* and *interaction* between Kathryn's languages:

Separation

- Consistent differences in nPVI_S, %V, syllable structure complexity suggest that these areas are unaffected by bilingual context
- Early distinctions between her languages in phonotactic structure and global proportion of vowels

Interaction

- Less vowel reduction in Kathryn's English compared to English monolinguals (sig.diff in VarcoV, nPVI_V at age 3 and in %V at age 4)
- Kathryn's English variability is affected by the longer vowels and more open syllables in Cantonese

- The surfeit of metrics is effective for examining the subtleties of Kathryn's rhythmic development:

- %V and nPVI_V underline the distinction between global vocalic content and vocalic variability; similar variability with different %

- Further case studies of this kind will increase understanding of rhythm acquisition; by focusing on a single subject we can establish a more intricate model of rhythmic development

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