Rhythmic Development of Monolingual and Bilingual Children at 2;06

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Introduction

- Linguists have long argued that languages belong to distinct rhythm classes
  - **stress-timed**: English, German
  - **syllable-timed**: French, Spanish
  - **mora-timed**: Japanese [1]
- Speech rhythm forms the prosodic cornerstone in early language acquisition, as newborn infants can distinguish languages based on their rhythms [2]
- Children have a bias towards syllable-timing because consonant clusters and vowel reduction are difficult to acquire
- Only few studies on the acquisition of speech rhythm

Rhythmic Metrics

- No isochrony (units of equal duration) can be found acoustically
- Important phonological differences between stress- and syllable-timing [3]

	Stress-timed languages	Syllable-timed languages
Word stress	Variable, complicated	simple
Syllable structure	complex	simple
Vowel reduction	frequent	infrequent

- Rhythmic metrics based on durational variability were developed
  - **Δ, %V, Varco** (global variability) [4, 5]
  - **PVI** (local variability) [6]
- English: stress-timed; Cantonese: syllable-timed [7]

Bilingual Acquisition of Speech Rhythm

- Monolingual children at age 3;0 already have different rhythmic patterns [8, 9, 10]
- Bilingual children have distinct patterns from monolinguals: rhythmic delay affected by language dominance
- Less language separation for younger bilingual children
- Rhythmic metrics based on syllable duration are more robust than those on consonant and vowel duration for young children
- **The present study**

  Can the observed differences between monolingual and bilingual children be found at an even younger age (2;06)? [11]

Method

- 15 children aged ~2;06
  - 5 Cantonese-English bilingual
  - 5 Cantonese monolingual
  - 5 English monolingual
- At least 20 utterances for each language
- 4-9 syllables for each utterance (MLU 5.5)
- Rhythmic metrics on syllable, consonant and vowel duration
- Vowel duration of English trochaic disyllable words in sentence medial position (stress patterns)

Results

- **Rhythmic metrics**

  Bilingual patterns less separated than monolingual patterns

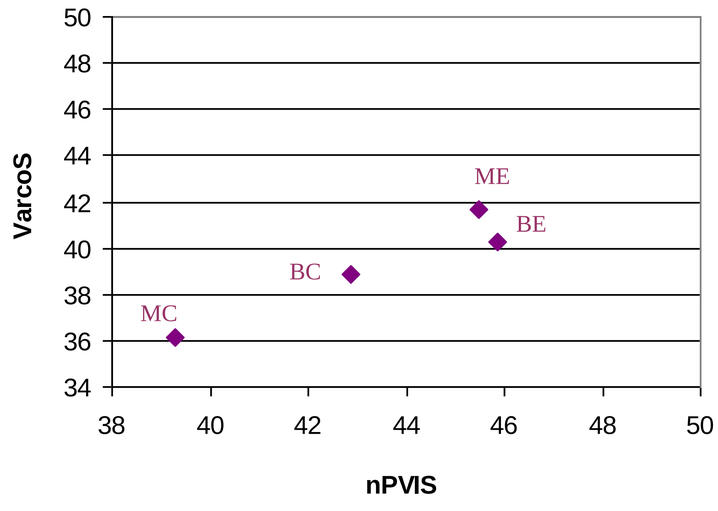

Figure 1. Rhythmic metrics on syllable duration at 2;06

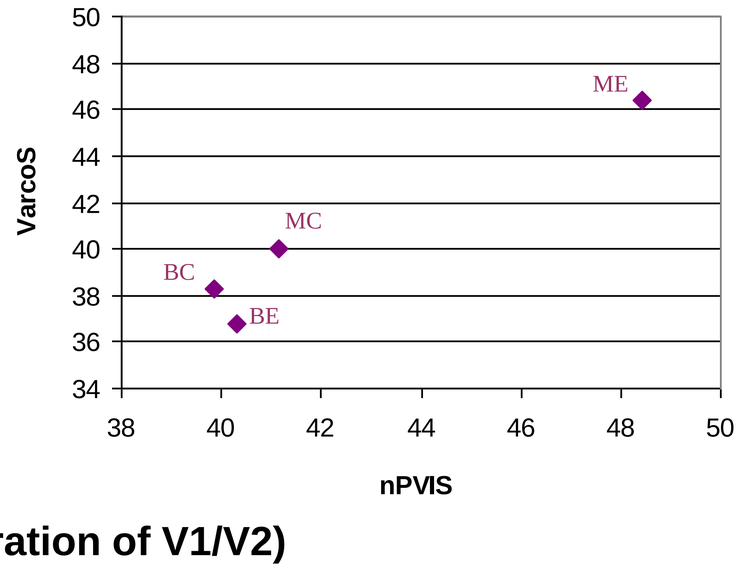

Figure 2 Rhythmic metrics on syllable duration at 3;0

- **Stress patterns (duration of V1/V2)**

  A tendency for weaker trochaic pattern in bilingual speech

Child	Bilingual	Monolingual
1	1.09	1.08
2	1.34	1.32
3	1.30	1.27
4	*0.94*	*1.22*
5	*0.95*	*1.57*
AVG	**1.11**	**1.29**

Discussion

- **Monolinguals**

  - Already display distinct rhythmic patterns at 2;06 → early separation of speech rhythm begins before 2;06

  - A bias towards syllable-timing in younger children, especially evident in monolingual English between 2;06 and 3;0

- **Bilinguals**

  - Rhythmic patterns of the two languages are more similar

  - Weaker trochaic pattern in bilingual English, possibly influenced by Cantonese which has no lexical stress

  - Increased Cantonese influence from 2;06 to 3;0

  - Evidence for mutual influence between the two languages, supporting a distinct developmental path for bilingual

- More longitudinal rhythmic development of both monolingual and bilingual children are needed

Acknowledgement

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