A comparison of native speaker and American adult learner Vietnamese lexical tones

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Native Speaker Open Syllables

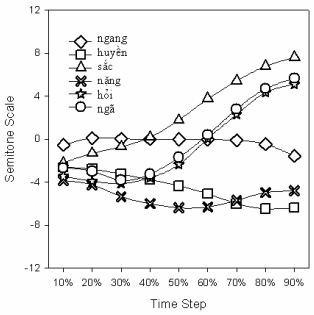


Fig. 1. Native **Southern** Speaker 10 (Female)

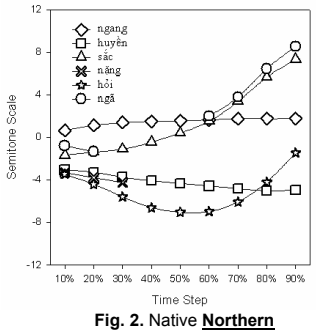


Fig. 2. Native **Northern** Speaker 01 (Female)

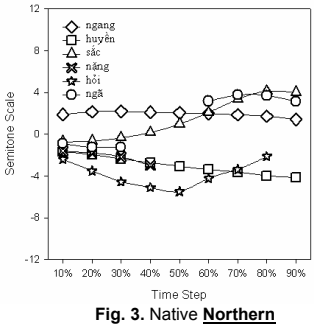


Fig. 3. Native **Northern** Speaker 08 (Male)

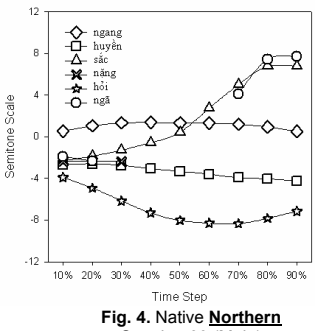


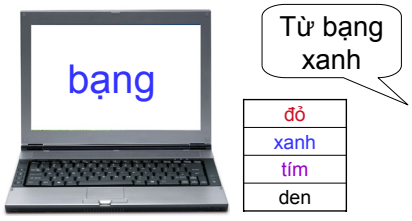
Fig. 4. Native **Northern** Speaker 09 (Male)

Goals of Study

• Replicate Vu's (1981) normalized tone trajectories for Northern and Southern Vietnamese.

• Identify difficulties in tone production for adult native speakers of American English learning Vietnamese.

Dynamic Carrier Sentence Task



To accommodate adult learners, the task used short utterances (e.g., "The word *bạng* is blue") and four familiar colors. Because target words always changed in color, tone, and vowel, speakers generated novel content each time. They worked at their own pace and repeated utterances at will.

Normalization Procedures

• **Duration:** Fundamental frequency was sampled at 11 evenly spaced points from vowel onset to word offset (or vowel offset for stop-final syllables); time steps 0% and 100% were omitted to exclude segmental perturbation or generally undefined pitch.

• **Pitch:** Hertz values were converted to semitones using each speaker's average pitch as his or her baseline (Nolan, 2003).

• **Tone:** Trajectories were averaged across vowels (all monophthongs), but within syllable type (vowel, stop, or nasal final) and tone. Figures show results from open syllables, but nasal final patterns were similar.

Adult Learner Results

• Common problems emerged among the idiosyncratic systems.

• The Low Falling-Rising Trajectory: Students struggled with Northern *nặng* and Southern *hỏi*. They often rose too high (Figs. 5, 6, 8) and/or failed to dip below *huyền* (Figs. 7, 8, 9, 10).

• Relative Starting Points: One adopted a single location (Fig. 8), another started falling tones high and rising tones low (Fig. 6), and another started falling tones low and rising tones high (Fig. 9).

• Glottalization: This voice quality was missing from Northern *ngã* (Fig. 6) and *nặng* (Figs. 6, 7) and added to Southern *ngã* (Fig. 9).

Table 1. Previous Groupings of **Northern** Vietnamese Tones by Relative Starting Point

	Brunelle (2003)	Nguyen & Edmondson (1998)	Pham (2003)	Vu (1981)
Level 1	ngang, hỏi, ngã, nặng	ngang, hỏi, ngã, nặng, sắc	ngang, hỏi, nặng	ngang
Level 2				ngã, sắc
Level 3	sắc, huyền	huyền	huyền, ngã	nặng
Level 4			sắc	huyền, hỏi

Native Speaker Results

• Generally replicated Vu's (1981) normalized trajectories with one exception: the current native Southern speaker (Fig. 1) started *sắc* below *ngang*, whereas Vu showed *sắc* starting at the same level as *ngang* (as in Fig. 10).

• The relative starting positions of Northern tones have been described inconsistently (see Table 1). Across our native Northern speakers:

  • *Ngang* consistently started higher than all other tones.

  • No single rank order described the remaining tones.

Adult Learner Open Syllables

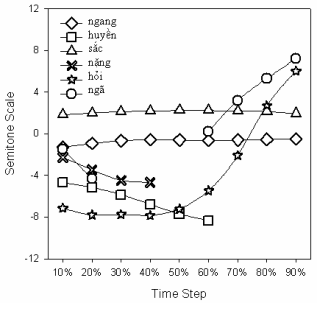


Fig. 5. **Northern** Adult Learner 02 (Male)

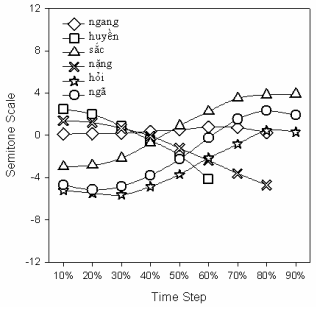


Fig. 6. **Northern** Adult Learner 03 (Male)

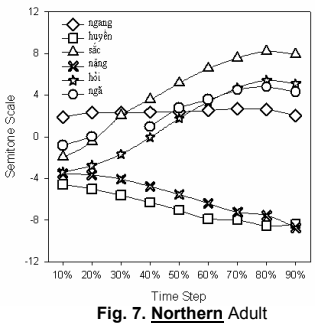


Fig. 7. **Northern** Adult Learner 07 (Male)

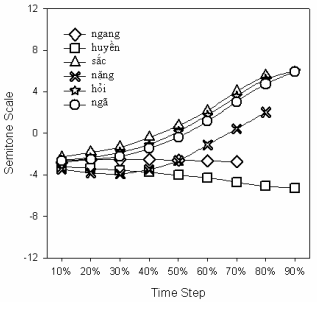


Fig. 8. **Southern** Adult Learner 04 (Female)

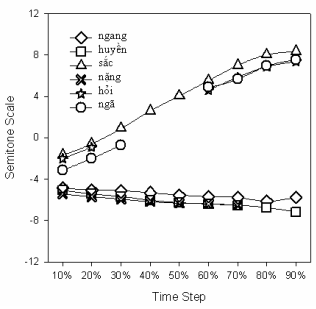


Fig. 9. **Southern** Adult Learner 05 (Male)

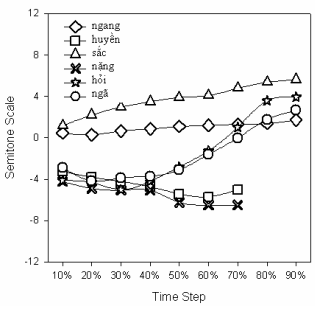


Fig. 10. **Southern** Adult Learner 06 (Female)

Conclusions

• Variation in the literature regarding the relative starting points of Northern Vietnamese tones may:

  • Result from interspeaker differences.

  • Reduce to a two-way distinction in which *ngang* simply starts higher than all other tones.

• Although adult learners showed individual patterns of tones errors, common problems emerged including difficulty with low falling-rising trajectories, relative starting points, and glottalization.

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