

TEMPORAL RELATIONSHIPS IN NORWEGIAN AS A SECOND LANGUAGE SPOKEN BY ADULT VIETNAMESE

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ABSTRACT

This study examines the ability of Vietnamese speakers to reproduce stress patterns in Norwegian words by using reiterated speech. Norwegians produce stress patterns where a syllable's duration is governed by a hierarchy related to stress degree and sequential position. Both long- and short-term Vietnamese residents in Norway fail to produce this pattern. Longer stay implies mastery of higher levels in the hierarchy.

INTRODUCTION

Research has clearly demonstrated the influence of native language phonetic patterns upon second language production. However, there has been relatively little research on the influence of first language rhythmic patterns upon second language rhythmic patterns.

Rhythmic patterns in both first and second language speech may be heavily influenced by differences in phonotactic structure related both to phoneme distribution and syllable structure. This problem is more or less avoided by using reiterated speech as one can use syllable structures and speech sounds which the two languages have in common.

In studies based on this method, subjects are asked to substitute a single syllable for each of the original syllables in a word or in a sentence. At the same time the relationship between stressed and unstressed syllables in the original word should be maintained. The syllables used in reiterated speech usually have a CV-structure, and syllables like /ba/ and /ma/ are quite common. Acoustic and perceptual analysis of reiterated speech has shown that the prosodic characteristics of the original utterance is maintained [1], [2]. Most languages contain a bilabial consonant and an open unrounded vowel, consequently syllables like /ba/ or /ma/ will be suitable for crosslinguistic investigations based upon reiteration.

As Vietnamese has a maximum syllable structure of C(w)V(C) and Norwegian has (CCC)V(CCCC), the

method of reiterated speech seems applicable. The investigation was performed using the syllable /ba/.

EXPERIMENTAL PROCEDURE

Recordings

Recordings were made in the studio of Linguistic Department of Trondheim University and at Rosenhof school, Oslo. Three groups of speakers participated in this investigation, all of them male full-time students aged 20-27: 5 Norwegians studying Nordic languages at University of Trondheim (NOR), 5 Vietnamese with more than ten years stay in Norway and who had completed secondary school and high school in Norway, now students at the technical university (VIETLONG), and 5 Vietnamese students who had completed about 75% of an 500 hours introductory program in Norwegian as a Second Language at Rosenhoff (VIETSHORT). In order to maintain a consistent dialectal background, it was required that all informants had been living the major part of their stay in Norway in the south eastern part (i.e. vicinity of Oslo).

A list of 24 words were used to elicitate data of the informants reiterated speech. The words were parts of small dialogues of questions and answers:

"What is that?" "That's (an) X"
"What did you say?" "I said X"

There were four sets of common Norwegian words with 1-4 syllables to be reiterated. In polysyllabic words all stress positions were exploited, and for all words the stressed syllable contained long and short vowel. For words with final stressed syllable, both words with open and closed final syllable were reiterated. For open syllables only long stressed were used as Norwegian does not allow short stressed vowels in this position. Letting <x> represent unstressed syllables and <X> stressed syllables, the following stress patterns were exploited:

Stress patterns	Words	Reiteration example
X	'li	/ 'ba:/
Xx	'loven	/ 'ba:ba/
xX	ba'nan	/ ba'ba:/
Xxx	'korene	/ 'ba:baba/
xXx	fo'rening	/ ba'ba:ba/
xxX	para'ply	/ baba'ba:/
Xxxx	'bygningene	/ 'ba:bababa/
xXxx	ro'manene	/ ba'ba:baba/
xxXx	foto'grafen	/ baba'ba:ba/
xxxX	revolu'sjon	/ bababa'ba:/

Figure 1. Reiteration patterns

Analysis

The reiterated speech patterns were analysed using *Signalize*™ ver. 2.25 on a Macintosh Quadra 700. Durations of phrase, key word, stressed syllable, syllable onset and nucleus were registered, as well intensity level and F1, F2

ANALYSIS OF ACOUSTIC CUES

Intensity level differences

An analysis of differences in intensity between the word consisting syllables, shows that of 105 cases of comparable intensity level differences (35 per informant group), only 11 were greater than 2.5dB, none were greater than 3.7dB. 8 of the cases were related to differences between stressed and unstressed syllables for VIETSHORT.

The Just Noticeable Difference in intensity level under favorable listening conditions is 1 dB [3]. Here the differences is related to natural speech conditions, and based on the findings one concludes that intensity level differences is objectively not a cue to stress placement for any group though VIETSHORT is making an attempt to exploit this feature.

Spectrum

An analysis of spectrum shows that each group reiterate key words with

significantly different vowel qualities. While NOR is using a back half open to open vowel [a], VIETSHORT is using a more front open [a]. VIETLONG is intermediate [a]. This is regarded as an approach to Norwegian vowel qualities.

NOR demonstrates different formant values for initial stressed and unstressed syllables, but no differences is found for non-initial syllables. This pattern is not found for the Vietnamese informants where formant values are stable irrespective of stress position and degree.

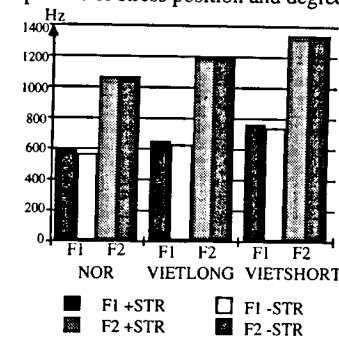


Figure 2. Formant frequencies stressed and unstressed syllables

F0 Pattern

There are significant different F0-patterns in stressed syllables. In accordance with the south eastern dialect, NOR and VIETLONG produces a low tone on the stressed syllable for all reiterated words. VIETSHORT, however, is using a high tone (fig. 3).

The reason for this is not clear. In the author's northern dialect a high tone is used in stressed syllables, so VIETSHORT's pattern might have been picked up as instructions were given. It is not likely that the short exposure to the northern dialect should overrule patterns acquired during the language course.

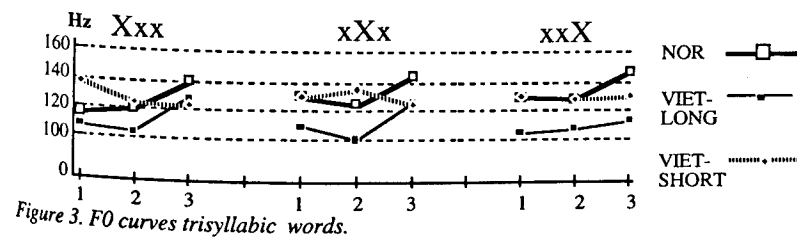


Figure 3. F0 curves trisyllabic words.

Duration

There are significant differences in durational patterns in the reiteration performed by the three groups. All groups produce identical duration of nucleus in monosyllabic word (215 ms). The stressed syllable of VIET-SHORT are however significantly shorter ($p < .001$) due to the short implosive bilabial [ɓ].

There are significant differences between NOR and both Vietnamese groups with respect to both duration of phrase ($p = .002$) and anacrusis ($p = .001$). There are no differences between the Vietnamese groups. The anacrusis constitutes 49,2% of NOR's phrase and 66,1% and 73,1% of VIETLONG resp. VIETSHORT. This pattern is found for all test words.

For polysyllabic words the investigation shows that both Vietnamese groups to some extent is able to reproduce Norwegian reiteration patterns. The reproduction ability is significantly related to duration of stay in Norway. The pattern is consistently expressed for all polysyllabic words, but will demonstrated here with reference to four-syllabic words only (fig. 4-7).

For NOR the following pattern is found: stressed syllable is lengthened, final syllable is lengthened, if this two features co-occur, a cumulative effect is found. Unstressed syllables following the stressed syllable is lengthened if their position is odd-numbered (stressed syllable given number 1). This effect is labelled *rhythmical lengthening* and reflects the claims of metrical phonology where alternations of strong and weak syllables is described [4]. This effect is also cumulative in relation to final lengthening.

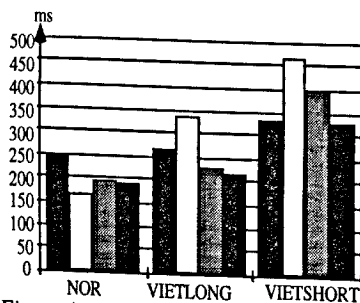


Figure 4. Reiteration pattern Xxxx-words

(In figures 4-7 duration of syllables 1-4 is shown as columns from left to right).

For 4-syllabic words stressed on the 1. syllable NOR is using stress lengthening (1. syllable), rhythmical lengthening (3. syllable) and final lengthening (4. syllable). The unstressed 2. syllable is short. Both Vietnamese groups fail to produce this pattern.

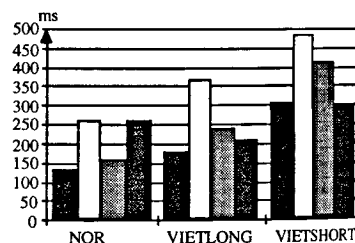


Figure 5. Reiteration pattern xxXx-words

For four-syllabic words stressed on the 2. syllable NOR produces stress lengthening for the 2. syllable, and the 4. syllable undergoes both rhythmical and final lengthening. The cumulative effect is shown as the duration of the final syllable is equal to the stressed syllable. The final syllable is also longer than in Xxxx-words. Both Vietnamese groups lengthen the stressed syllable only.

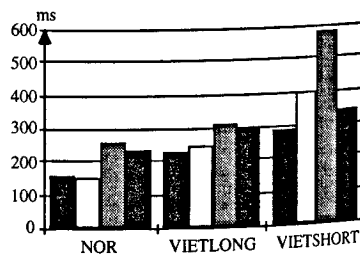


Figure 6. Reiteration pattern xxXx-words

For words stressed on the 3. syllable, NOR lengthens the stressed syllable, the 4. is lengthened due to final position. VIETLONG lengthens the stressed and final syllable, VIETSHORT only the stressed.

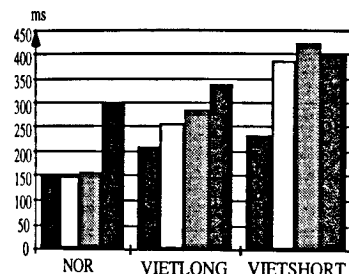


Figure 7. Reiteration pattern xxxX-words

For words stressed on the last syllable NOR lengthens this syllable which also is final. The same is found for the Vietnamese groups, who however demonstrates the lacking ability to shorten anacrusic syllables (see also fig. 5, 6).

An overall perspective (1-4 syllabic words) demonstrates the Vietnamese informants varying competence in using the lengthening principles. In monosyllabic words, all three groups produce identical durations nuclei in stressed syllables. In polysyllabic words, stress lengthening is only found for NOR and VIETLONG. Lengthening of final syllable is used by the same groups, rhythmical lengthening by NOR exclusively as shown in fig. 5.

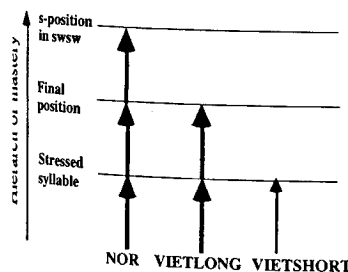


Figure 8. Lengthening principles as exploited by the three informant groups. The thin line for VIETSHORT illustrates a partial ability to lengthen stressed syllables.

CONCLUSION

This investigation has shown that in reiterating Norwegian words, Norwegian speakers apply three principles of lengthening both stressed and unstressed syllables to signal stress. The lengthening effects is working

cumulative. As a secondary effect vowel quality is used to express differences between stressed initial on non-initial syllables. In accordance with the Norwegian dialect used, the stressed syllable is pronounced with a low tone. Intensity is not used as a cue to signal stress differences.

Vietnamese learners of Norwegian as a Second Language apply different strategies according to length of stay in Norway. Long term residents has partial access to the hierarchical lengthening system as stress and final lengthening is used, also in a cumulative way. Vowel quality, and intensity is not used as cues of stress. The low tone is used on stressed syllables.

Short term Vietnamese residents has limited access to the hierarchical lengthening system. Spectrum is not used as a cue to stress. Where the other informants use low tone on the stressed syllable, this group is signalling stress by the use of a high tone. There is also an attempt of using intensity differences as a signal of stressed syllables.

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