Aspects of Prosody in Vietnamese

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Vietnamese is a Mon-Khmer language distinguishing six lexical tones (northern dialect). The canonical word order in Vietnamese is SVO (Nguyễn Đình-Hoà, 1997; Thompson, 1965), and this structure is used consistently when answering any *wh*-focus alternative question, i.e. focus is always marked in situ for all sentence constituents.This paper reports work on the expression of *Information Structure* in Vietnamese and argues that focus in Vietnamese is exclusively expressed prosodically: there are no specific focus markers, and the language uses phonology to express intonational emphasis in similar ways to languages like English or German. The exploratory data indicates that (i) focus is prosodically expressed while word order remains constant, (ii) listeners show good recoverability of the intended focus structure, and (iii) that there is a trading relationship between several phonetic parameters (duration, f0, amplitude) involved to signal prosodic (acoustic) emphasis. Occasional references to the use of prosodic means for emphasis and for phrasing can be found on some of the older, somewhat sparse, literature (Thompson, 1965; 1981; Nguyễn, 1990; Dung et. al. 1998).

> "Heavy stress singles out the syllable or syllables of each pause group which carry the heaviest burden of conveying information. Weak stress accompanies syllables, which bear the lowest information-conveying load in the pause group. They often refer to things which have been brought up earlier or which are expectable in the general context. Other syllables are accompanied by medium stress."

> Thompson (1965:106)

Tran (1967:24) also describes intensity as one of the integral aspects of intonation in Vietnamese. Intonation contours are "superimposed on the basic tone system; they modify the pitch characteristics of the tones, but do not affect the tonemic contrast between them […] the basic intonation contours are intrinsically linked with the overall intensity patterns."

For this investigation, we collected three different types of utterances, each having different lexical tonal specifications. The sentence in (1a) is specified for the neutral tone, the level tone *ngang*, with exception of the last syllable, which carries the *nặng* (final laryngealization) tone.

(1)   a. Phuong is riding a bicycle.   Phương đi xe đạp.
        b. Lan is drinking coffee.   Lan uống cà-phê.
        c. Men is drinking water.   Mến uống nuốc.

The sentence in (1b) has a neutral tone on the Subject, a rising tone on the verb (*sắc*) and a falling tone *huyền* on the first syllable of the compound *cà-phê* and a neutral tone again on the final syllable, while the sentence in (1c) is specified lexically throughout with the modal rising tone *sắc*. To investigate the phonological expression of focus in this language (see example 2), we elicited replies to focus alternative questions asking for sentence focus (a), subject focus (b), object focus (c), verb focus (d), and VP focus (e) from two native speakers of Hà Nội Vietnamese. A sample paradigm is shown below.

(2) a.   Chuyện gì vậy?   **What is happening?**
          [**Phương đi xe đạp**]_F   [**Phuong is riding a bicycle**.]_F

    b.   Ai đi xe đạp?   **Who** is riding a bicycle?
          [**Phương**]_F đi xe đạp.   [**Phuong**]_F is riding a bicycle.

    c.   Phương đi gì?   **What** is Phuong riding?
          Phương đi [**xe đạp**.]_F   Phuong is riding a [**bicycle**.]_F

    d.   Phương làm gì với xe đạp?   What **is** Phuong **doing** with the bicycle?
          Phương [**đi**]_F xe đạp.   Phuong [**is riding**]_F the bicycle.

    e.   Phương làm gì vậy?   **What is** Phuong **doing**?
          Phương [**đi xe đạp**.]_F   Phuong [**is riding a bicycle**.]_F

In each panel in Fig. 1, we have bracketed the particular part of the utterance that was in focus. The duration analysis of the three tokens of (1a) by the female speaker indicates that in the subject- and the

verb focus case, the subject and the verb respectively, have a tendency for relative elongation. For neither of the other focus conditions does there appear to be a clear tendency.
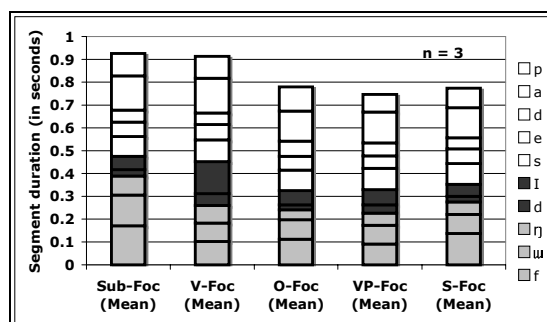

Fig. 1: Duration (in seconds) of each segment in the sentence "Phương đi xe đạp" based on three tokens rendered by one speaker.

In an answer-question matching test, we elicited 900 responses total (30 sentences x 5 repetitions x 6 listeners = 900). That is, a total of 180 responses were collected for each of the five focus conditions tested (900 items in perception test / 5 focus conditions = 180 items per focus condition). A   summary of the data and responses is provided in Table 1.

	Stimulus -Type				
response	Sub-Foc	V-Foc	O-Foc	VP-Foc	S-Foc
Subject	142 (78.89)	4 (02.22)	3 (01.67)	7 (03.89)	14 (07.78)
Verb	5 (02.78)	135 (75.00)	10 (05.56)	34 (18.89)	7 (03.89)
Object	11 (06.11)	15 (08.33)	94 (52.22)	34 (18.89)	33 (18.33)
Verb Phrase	9 (05.00)	21 (11.67)	33 (18.33)	46 (25.56)	56 (31.11)
Sentence	13 (07.22)	5 (02.78)	40 (22.22)	59 (32.78)	70 (38.89)
Grand Total	180 (100%)	180 (100%)	180 (100%)	180 (100%)	180 (100%)

Table 1: Number of responses in five categories per stimulus type (raw numbers and percentages).
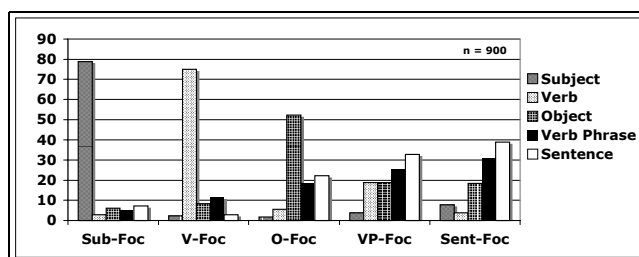

Fig 2: Visualization of the data (in %) presented in Table 1.

A chi-square test on the raw counts of the observed data was significant ($\chi^2 = 998.47$, df = 16, p<.001), indicating that the listeners did not match answer utterances randomly to questions but were able to differentiate between different contexts. Since word order has remained constant, the difference between the focus conditions has to be marked prosodically. However, precisely what parameters (duration, f0, intensity, vocal effort) or what combination thereof are modified is less clear at this point.

Despite the dense lexical tonal specification of this language (six tones and no tone sandhi), in the cases of subject, verb and object focus especially, (Fig. 3), we can observe F_0 excursions on the word that is being emphasized. (We are not yet sure if and what acoustic parameters are manipulated in cases of VP, and sentence focus). These F_0 excursions resemble that what we know from languages like English or German: accentual prominence. It is unclear as of yet what status this prominence takes but given an autosegmental metrical account to intonation (Ladd, 1996), this evidence suggests for Vietnamese to have a prominence hierarchy that could be structurally equivalent to English. In English, one important means of making a particular word more prominent than surrounding words is to align a pitch accent — a prominence lending tonal morpheme — with the syllable in a word that bears

primary stress. Independent evidence also suggests that *stress* is a viable concept in this language. For example, "xe đạp" *bicycle* is a compound and requires emphasis on the second syllable in order to be interpreted as such (cf. Dung et al., 1998:399; Ingram & & Nguyễn). Thus, there is evidence for the concept of stress as one level of the prosodic hierarchy to play a role.
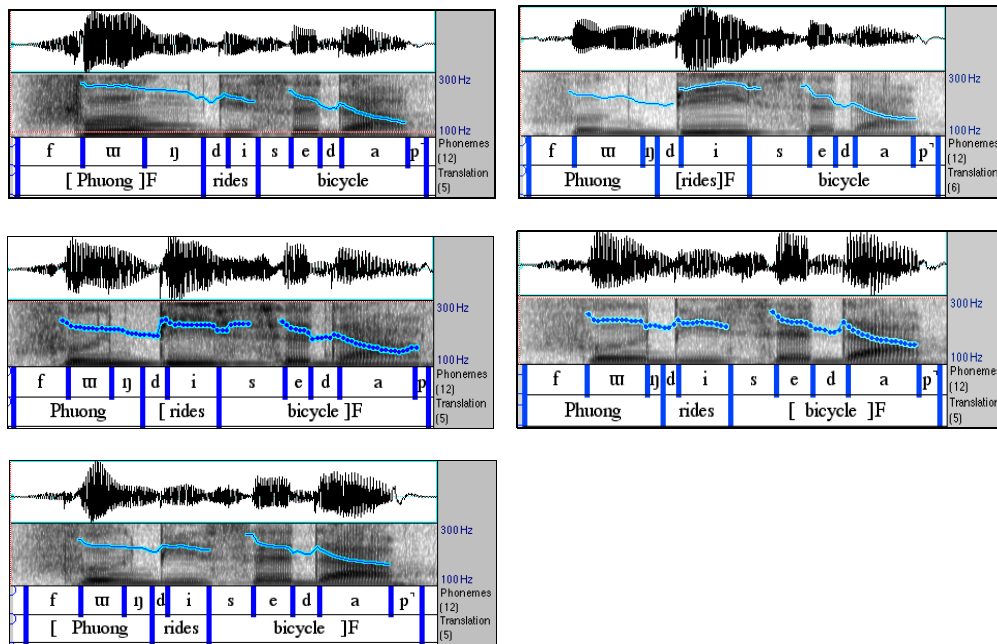

Fig 3: : Spectrogram, waveform and f0 display of five segmented and annotated replies to *wh*-focus alternative questions for speaker 1 (subject, verb, VP, object, sentence).

We do notice particularly in the subject and verb focus cases (upper panels) that the F0 excursions which we interpret to be due to prominence lending tonal morphemes are aligned with the focussed constituent. We also notice an amplitude difference between these two contours as evidenced by the waveform. The exact phonetic mechanisms and their phonological modelling are still under investigation. We are currently investigating other lexical tonal specifications and their interplay with sentence prosody.

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