

Eastern Cham prosodic phrasing and intonational phonology

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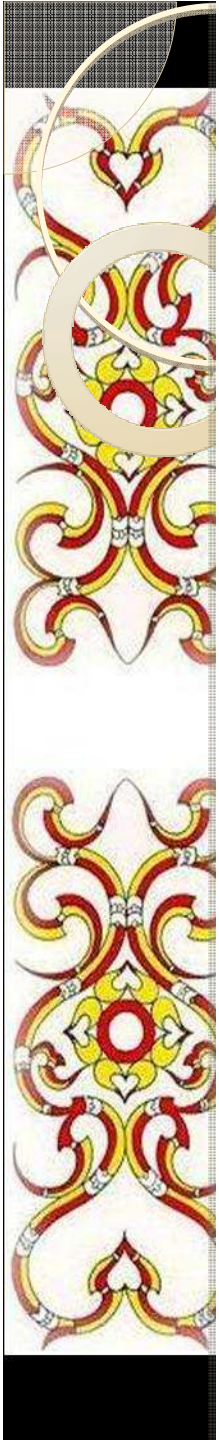
SEALS 22, Agay, June 1st





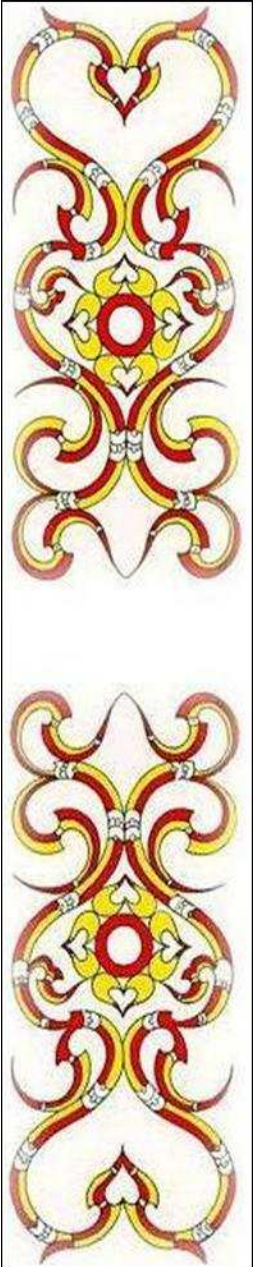
Overarching Research Questions

1. How does intonation behave in tone languages?
2. Is the Prosodic Hierarchy universal (Nespor & Vogel 1986) or can languages skip levels (Bickel et al. 2009)?



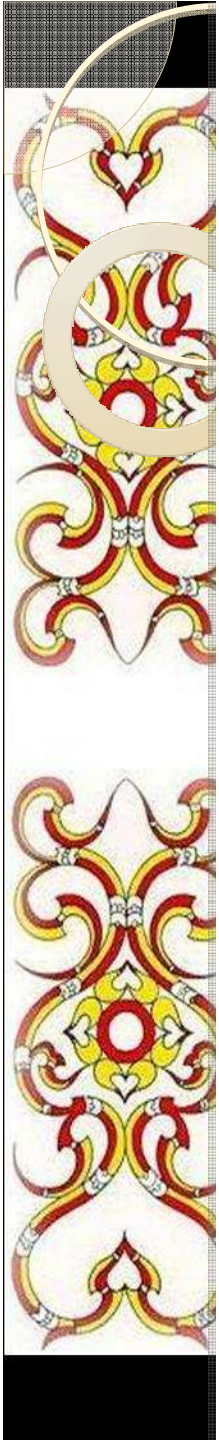
BACKGROUND

Eastern Cham (EC)



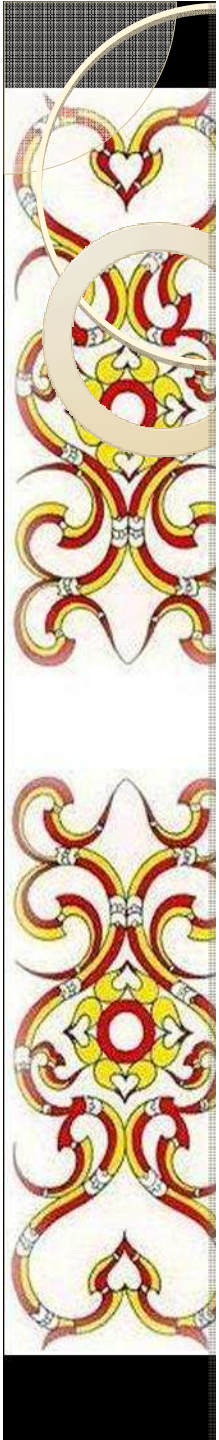
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Intonation in tone/register languages

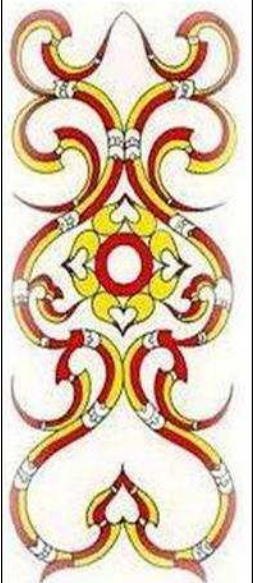
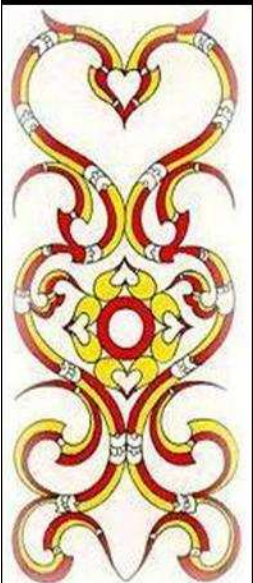
- How do you realize intonation when lexical items are already making contrastive use of f_0 ?
 - A bit Eurocentric, yet very relevant typologically
- Two possible strategies
 - Superposition: Small ripples on a big wave (Chao 1933)
 - Boundary tones: Intonational targets interspersed between lexical targets

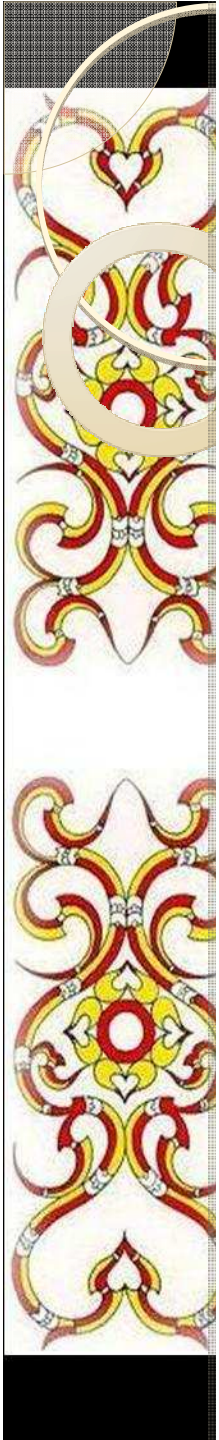


Previous work on intonation in East/Southeast Asian tone languages

- Mandarin
 - Both boundary tones and superposition (Peng et al. 2005, Shih 1988)
 - Superposition only (Xu 1999, Yuan et al. 2002, Yuan 2004, 2006)
- Cantonese
 - Boundary tones only (Wong et al. 2005)
 - Superposition only (Fox et al. 2008)
- Thai
 - Evidence for boundary tones, but overridden by lexical tones (Pittayawat 2007)
- Northern Vietnamese
 - Great variety of strategies, sometimes contradictory (Brunelle, Ha and Grice 2012, Đỗ et al. 1998, Hà and Grice 2010, Jannedy 2007, 2008, Nguyễn and Boulakia 1999, Thompson 1965, Vũ et al. 2006)

Universal Prosodic Hierarchy





Examples of Phonological Processes in the different Prosodic Domains

Utterance Phrase (U)

e.g. British Linking-*r* (N+V; p.249)

[The crime, according to Amanda **r**, is the work of a band of thieves **U**]

Intonational Phrase (IP)

e.g. North American English Flapping (N+V; p.245)

[John met Anne and Sue **IP**] vs. [Tonight **IP**] [Ann is working **IP**]

Phonological Phrase (PPh)

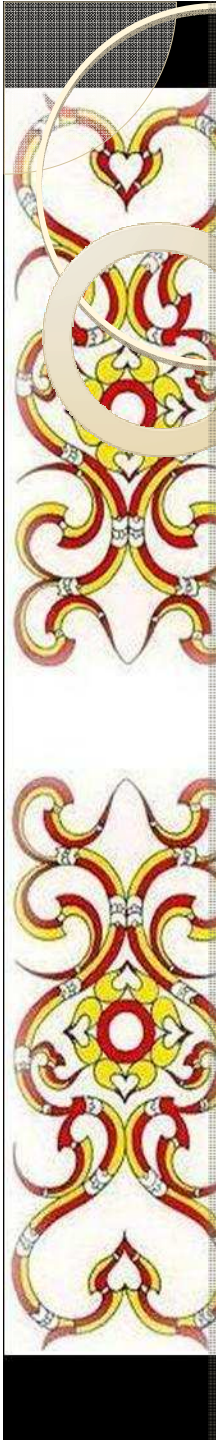
e.g. French liaison

[Les gros éléphants **PPh**] vs. [Les maisons **PPh**] [italiennes **PPh**]

Prosodic Word (Pwd)

e.g. Compounds in English: only one accent

[**Greenhouse**] vs. [**Green**] [**house**]



Previous work on Cham Intonation and Prosody

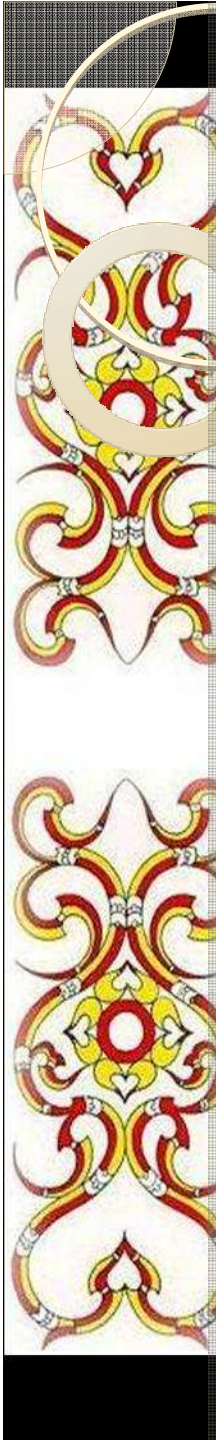
Blood (1977) on Eastern Cham

- Final particles are the main way to encode communicative functions
- But intonation is also found:
 - Interrogative sentences rise in pitch on the last element of the sentence (whether they take an interrogative particle or not)
 - Exclamatives fall in pitch on the final element.

Ueki (2011) on Western Cham

- Does not take register into account

No segmental rules indicative of prosodic domains

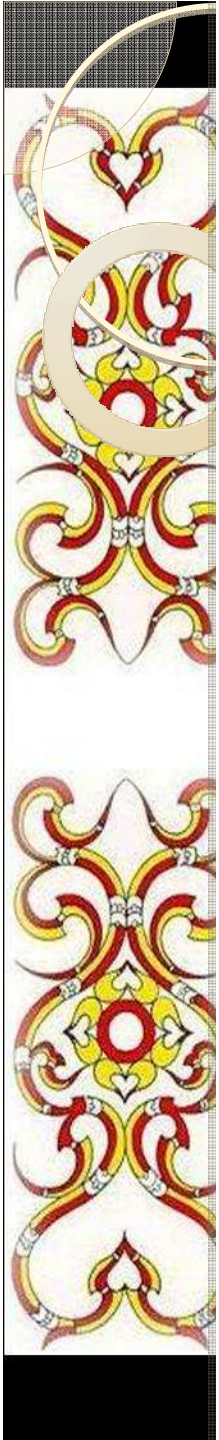


RESEARCH QUESTIONS



Specific Research Questions

1. Do function words cliticize with neighbouring lexical words?
 - Evidence for prosodic word
2. What intonational and/or durational cues exist in EC and what can they tell us about the prosodic structure of EC?
 - Evidence for Phonological and Intonational Phrases
3. How do register and intonation interact?
 - a. Are there boundary tones or does intonation affect entire phrases?
 - b. Are boundary tones superposed or sequential?



METHODOLOGY



Corpus

- 1 hour 10 minutes of speech
 - 6 speakers (3 men, 3 women)
 - 3 interviews, 1 story
- Coded in a ToBI-like system
 - Examples below
- Praat scripts to extract acoustic information
- SPSS used to analyze prosodic data



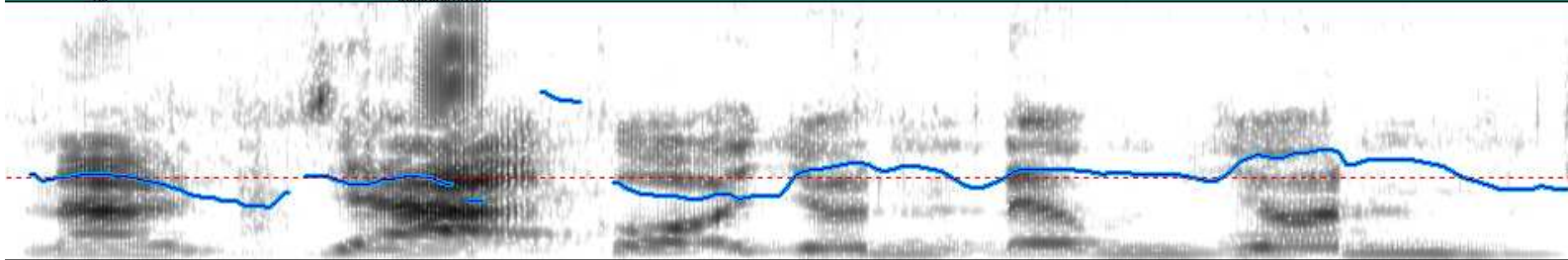
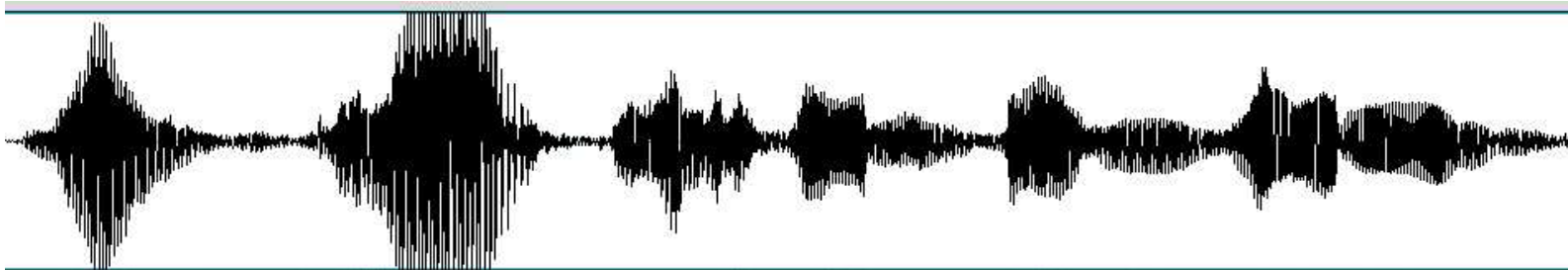
Prosodic Domain Labeling

We labeled what we've called *accentual phrases (AP)* that we impressionistically determined based on perceived rhythm

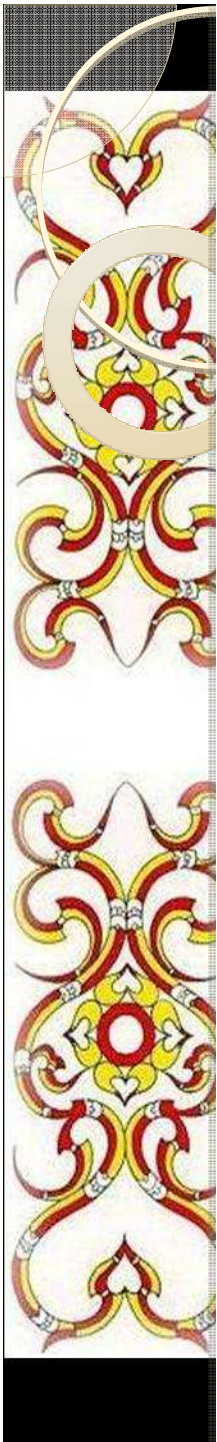
At first, we didn't know if they captured something meaningful or not

Not a theoretical construct: They were meant to serve as a starting point for analyzing prosodic domains

Example of AP labeling

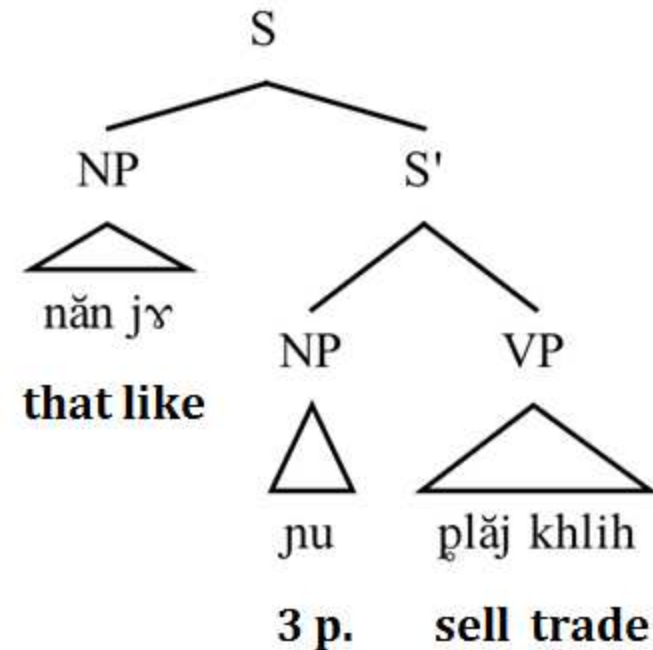


H	L	L	H	H	H
naw	jaʔ	kəʔ	jon	dəm	jon
4		3		3	4
	AP		AP		AP
	PP		PP		PP
	IP		IP		IP
go	market	meet	Vietnamese	speak	Vietnamese
	Cont		Cont		Decl
When you go to the market, you meet Vietnamese and you speak Vietnamese					
F2					



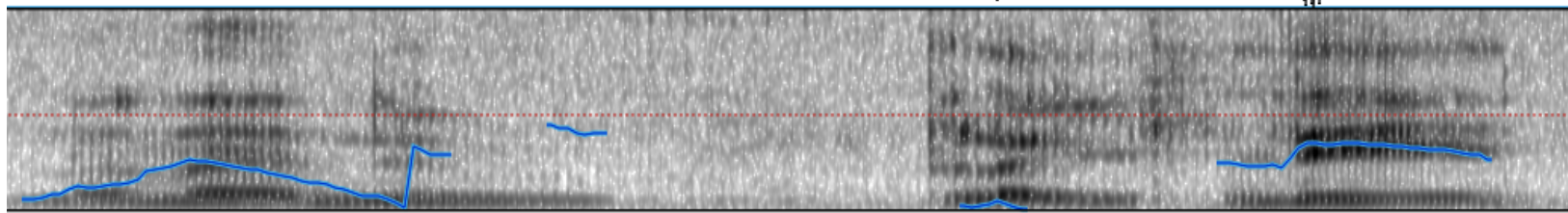
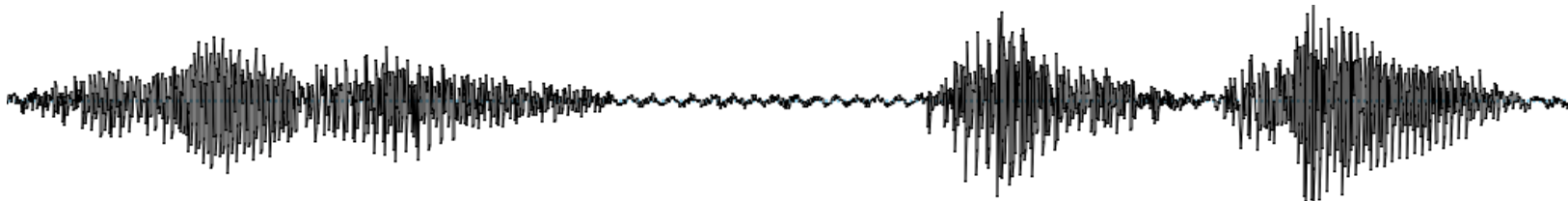
PPh & IP labeling

- PPh & IP labeling based on syntactic structure (Nespor & Vogel 1986)
 - IP = root clauses, adjuncts, lists...
 - PPh = lexical XP
 - Pronouns are counted as lexical XPs



$[_{IP} \{_{PPh} \text{This way}\}] [_{IP} \{_{PPh} \text{they}\} \{_{PPh} \text{could trade}\}]$

Example of PPh and IP labeling

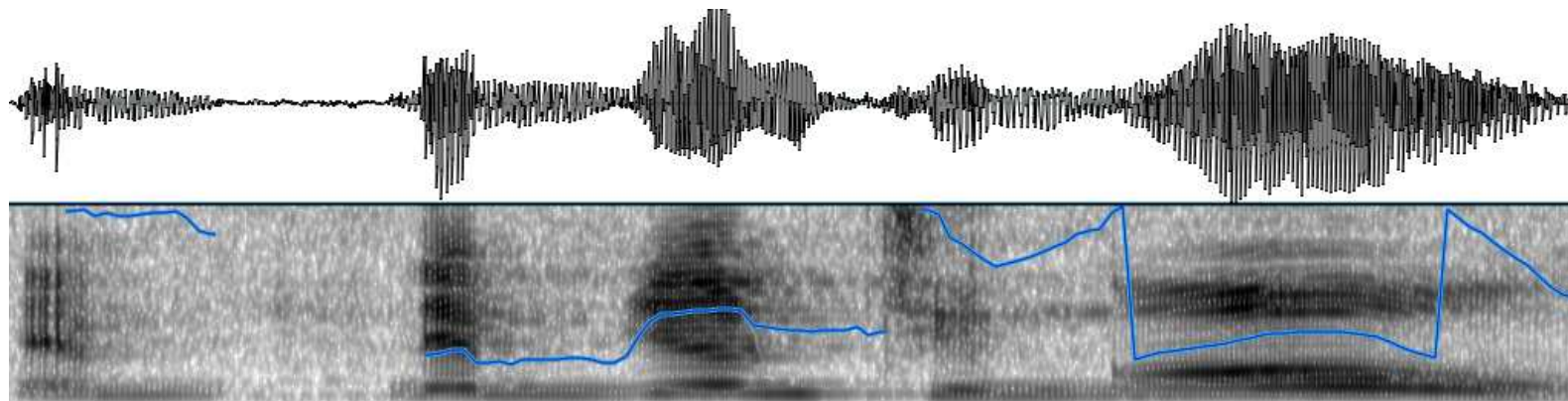


H	L	H	L	H
nän	jɤ	ju	pläj	khlih
AP	PP	AP	PP	AP
IP			IP	
there	already	3p	sell	exchange
Cont		Cont		Cont
This way, they could trade				
M3				

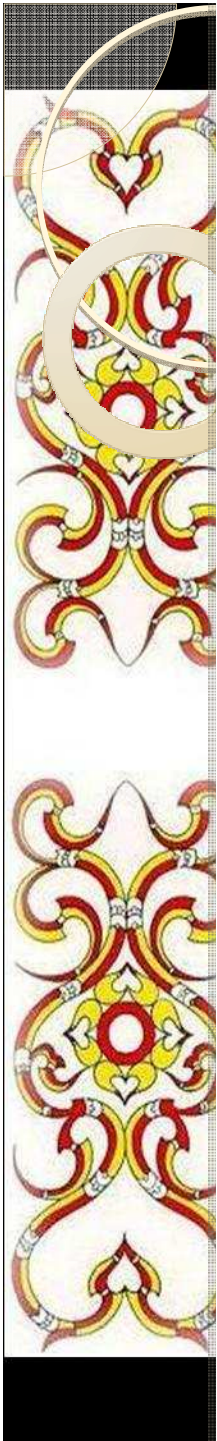
[_{IP} {_{PPh} This way}] [_{IP} {_{PPh} they} {_{PPh} could trade}]

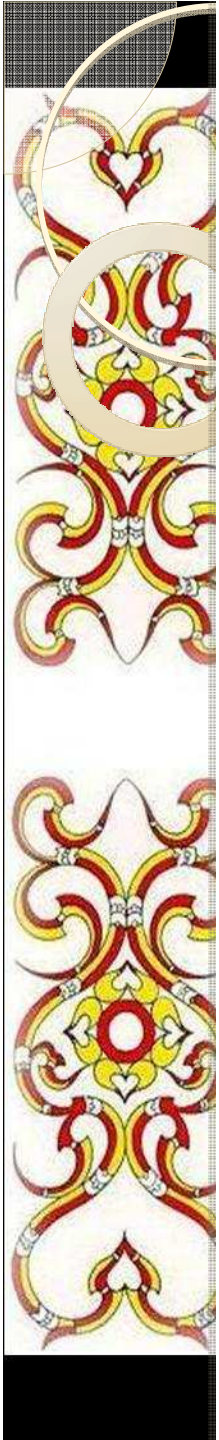
Hesitation

- Three hesitation strategies
 - Repetition
 - Fillers
 - Lengthened words
- Hesitation creates accentual breaks



H	H	H	L	H
dom	dom	jon	çiŋ	o
AP			AP	
PP			PP	
speak	speak	IP		not
Hes		Vietnamese	able	
			Decl	
They can't speak Vietnamese				
		F1		





RESULTS

Results – AP Labeling

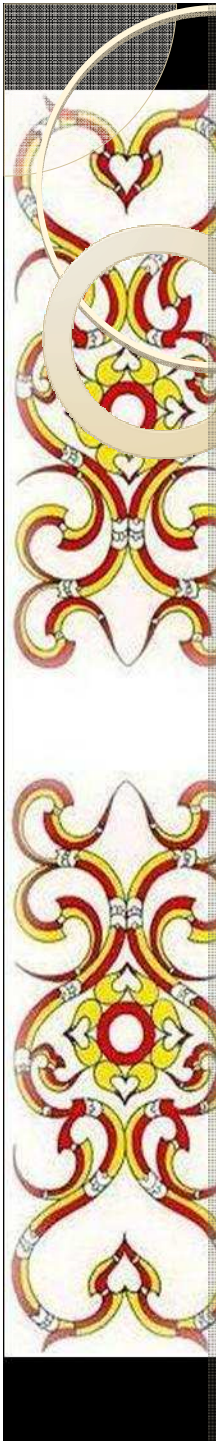
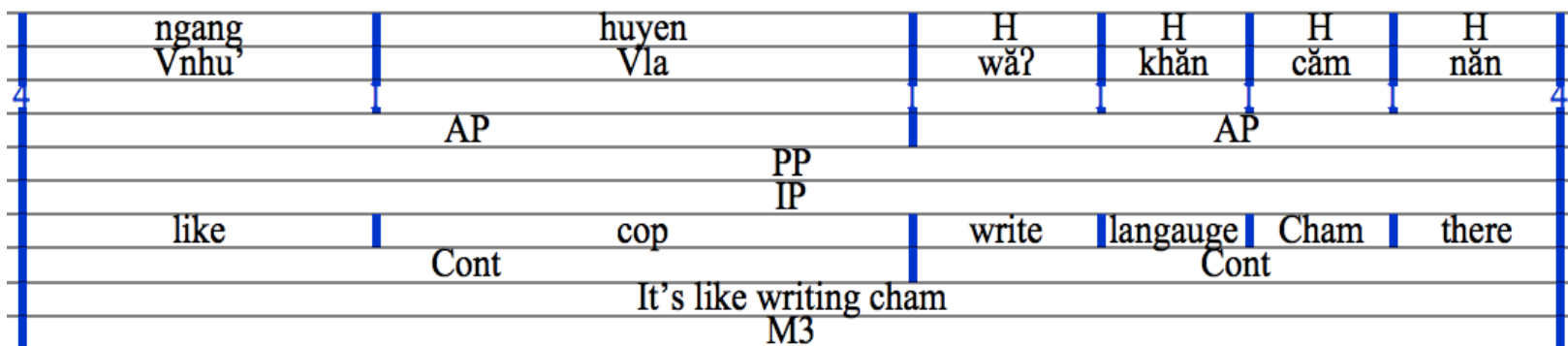
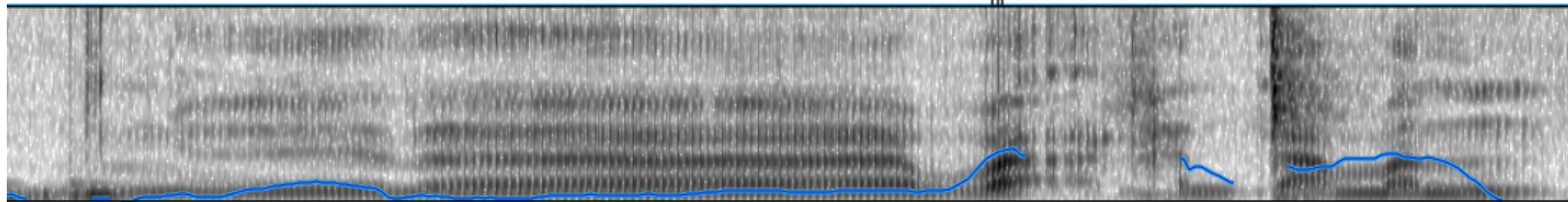
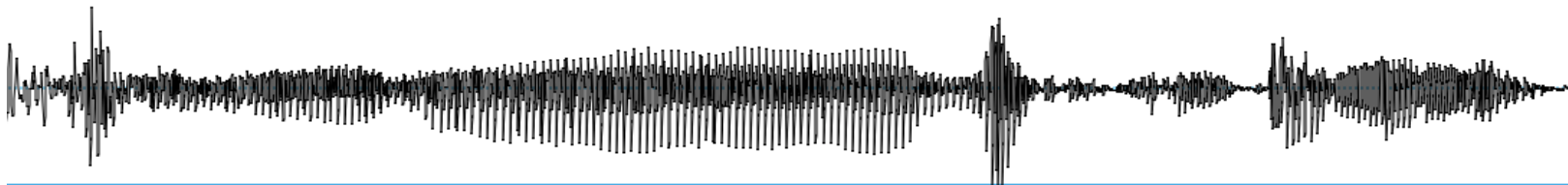
Correspondence between APs and PPhs/IPs

% match	INITIAL		FINAL		INITIAL		FINAL	
	AP-PPh	PPh-AP	AP-PPh	PPh-AP	AP-IP	IP-AP	AP-IP	IP-AP
F1	89	90	89	90	61	89	61	99
F2	84	89	84	89	61	84	60	98
F3	87	90	88	91	34	87	35	98
M1	91	69	90	68	76	91	74	94
M2	81	86	83	86	56	81	57	97
M3	86	85	85	85	55	86	46	95
Average	86	85	87	85	57	86	56	97

- APs and PPhs
 - Very good match between APs and PPhs (formed from lexical XPs)
- APs and IPs
 - IP edges match AP edges: accentual breaks at IP edges (which are also PPh edges)
 - AP edges do not match IPs: because many APs are formed from PPhs
- The main rhythm unit in EC is a PPh formed around lexical XPs

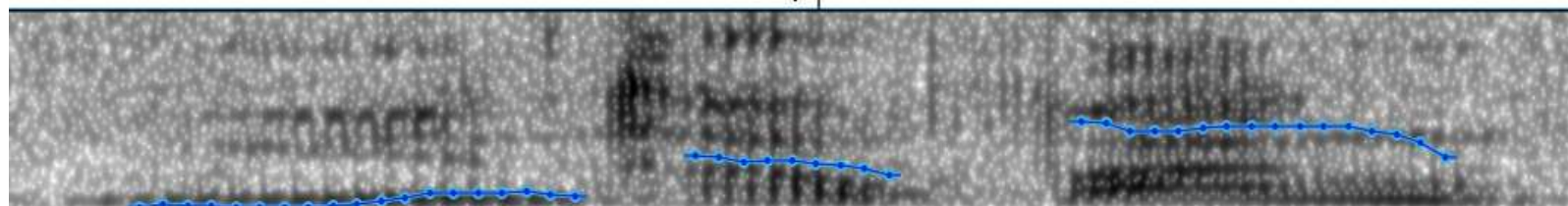
Research Question I: Clitics

- Regular function words are often cliticized
 - Short duration
 - Phonetic reduction

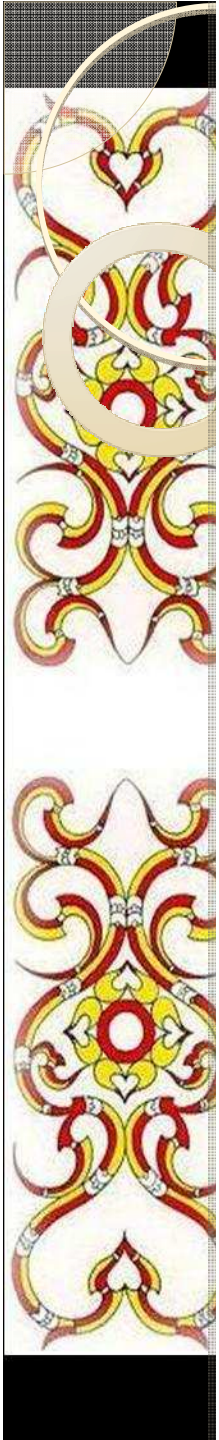


Are pronouns clitics?

- Lack of reduction suggests that pronouns are **not** clitics
- They are thus treated like lexical XPs and can form PPhs (= APs)



H	H	H
nu	thɔw	pən
AP		AP
PP		PP
3p	IP	listen
Cont	know	Decl
	They understand	
	M3	



Research Question 2: Acoustic Cues of Larger Prosodic Domains

We looked at the possible role of 3 acoustic properties in demarcating PPhs and IPs:

1. f_0

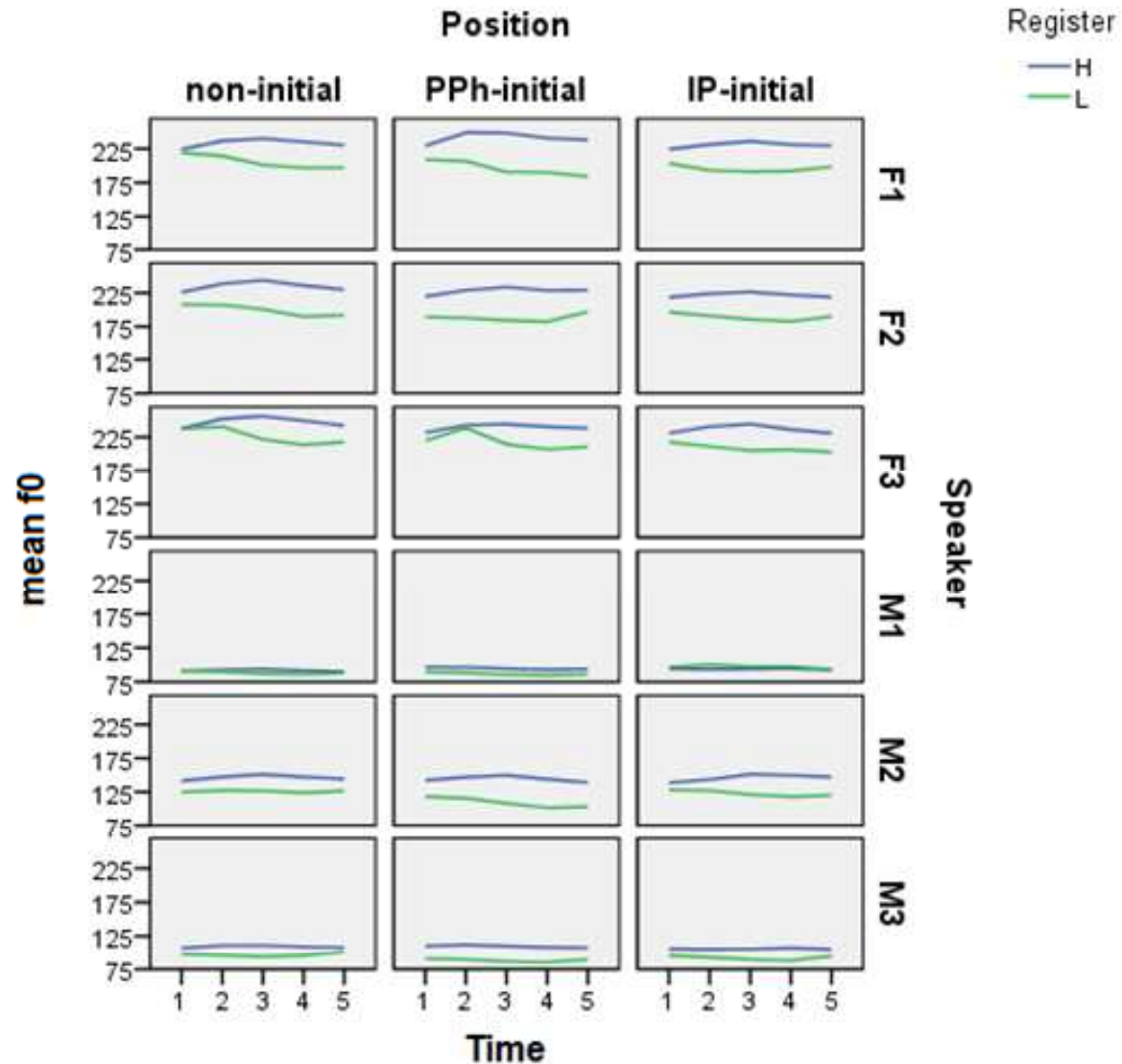
2. Amplitude

3. Duration

- Looked at all speakers individually
- Separated H and L registers
- Compared at domain initial and domain final syllables with non-final, non-initial syllables

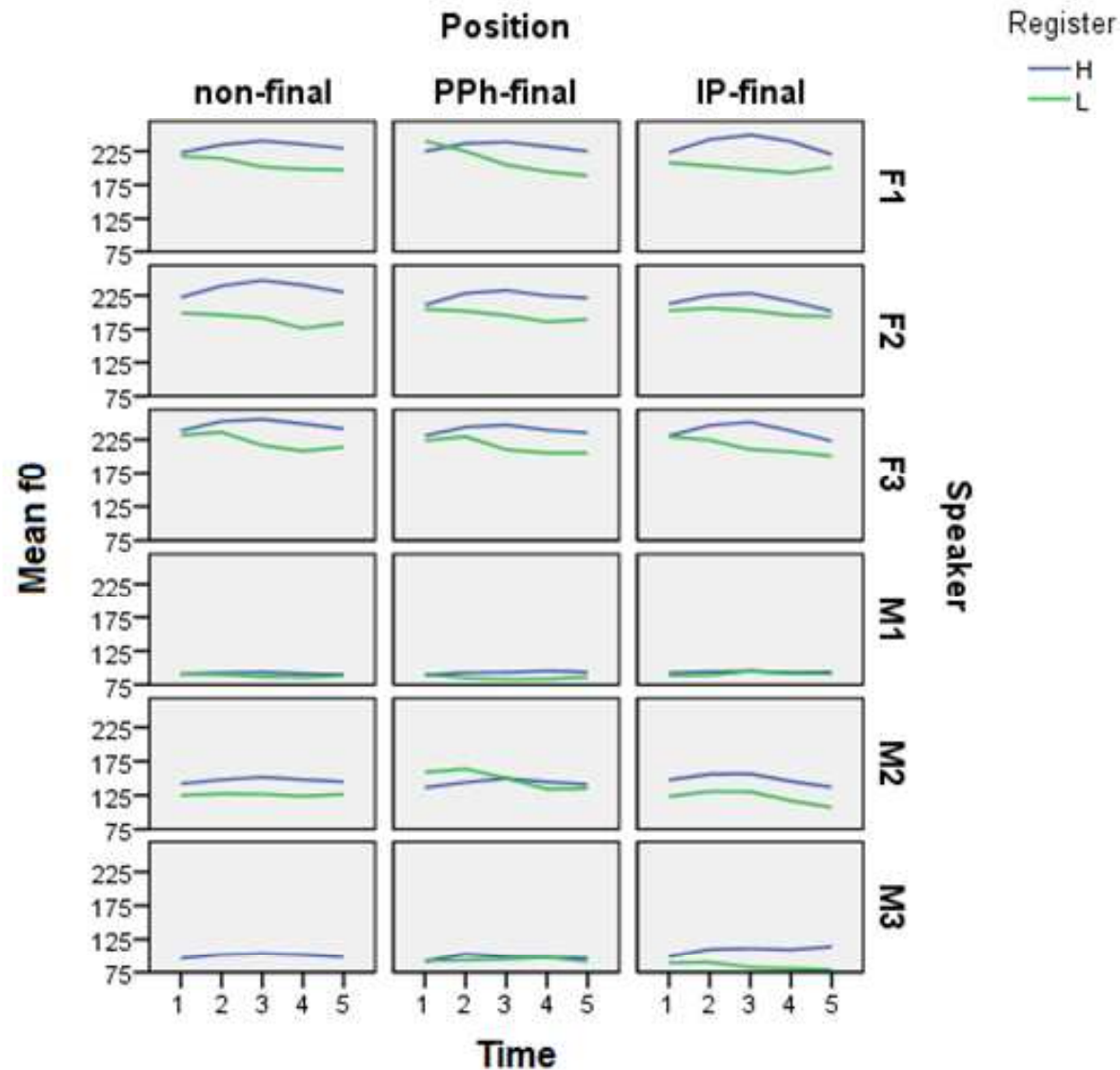
F0 on domain-initial syllables

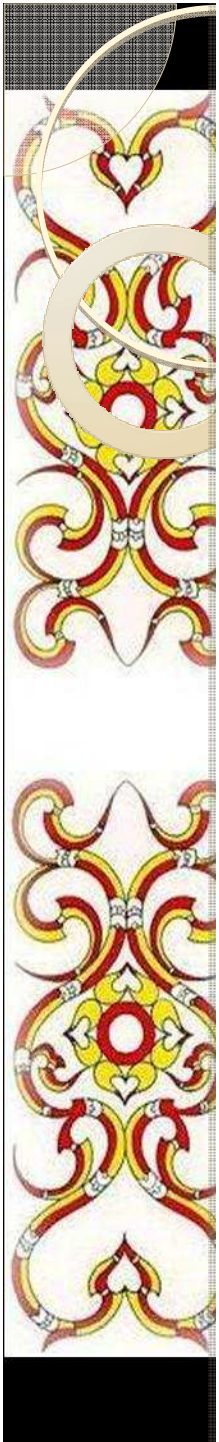
No systematic difference between domains



F0 on domain-final syllables

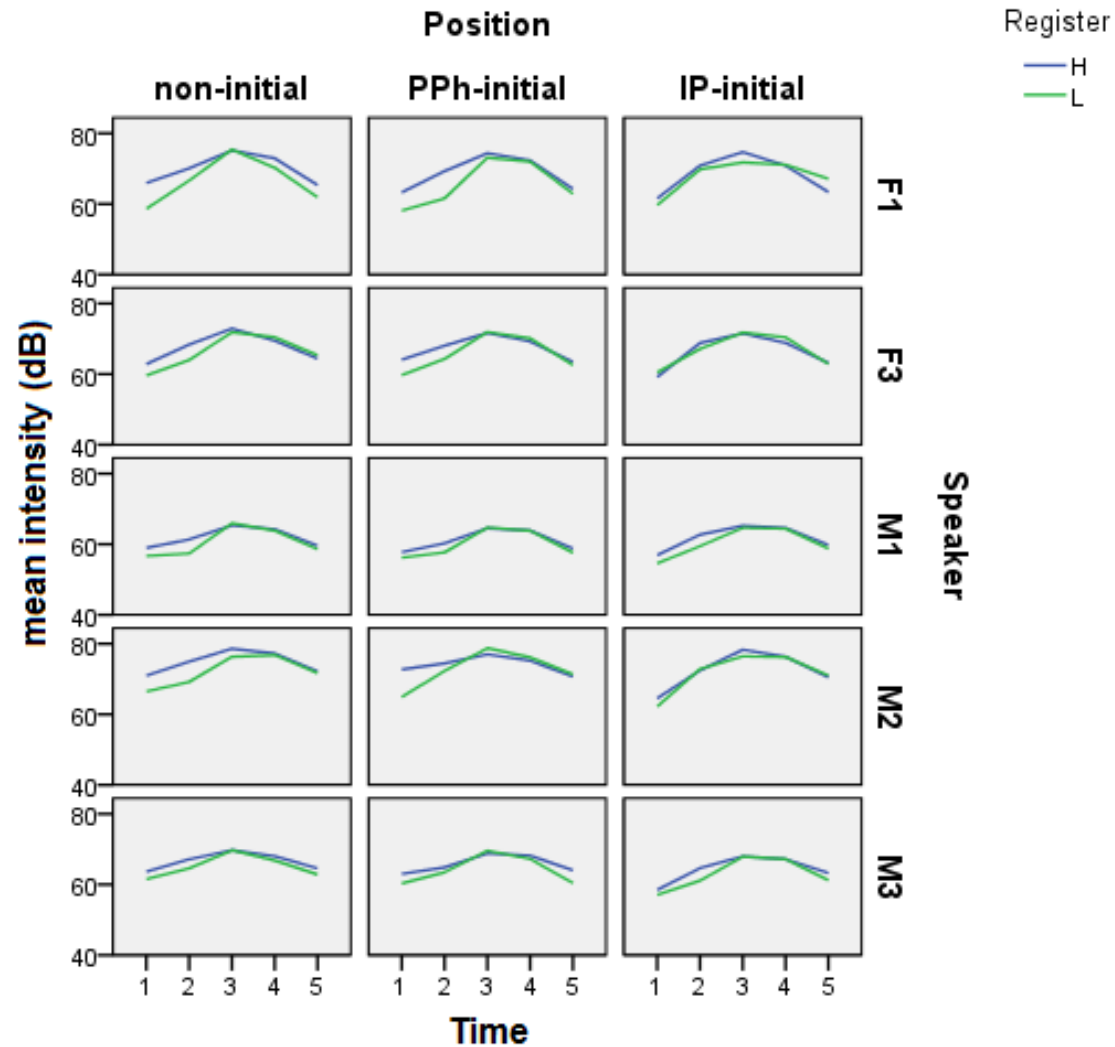
No systematic difference between domains





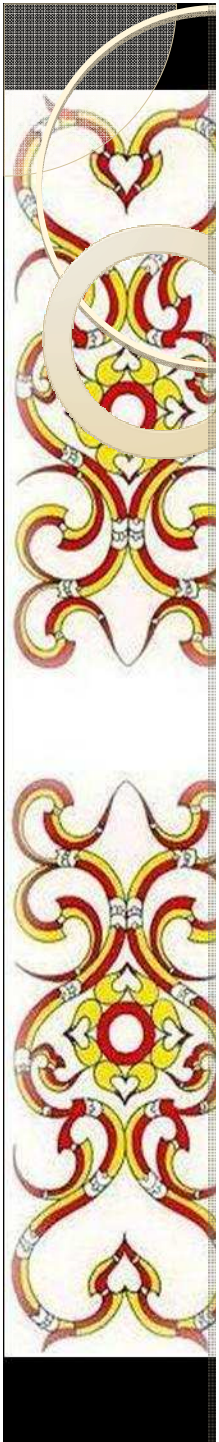
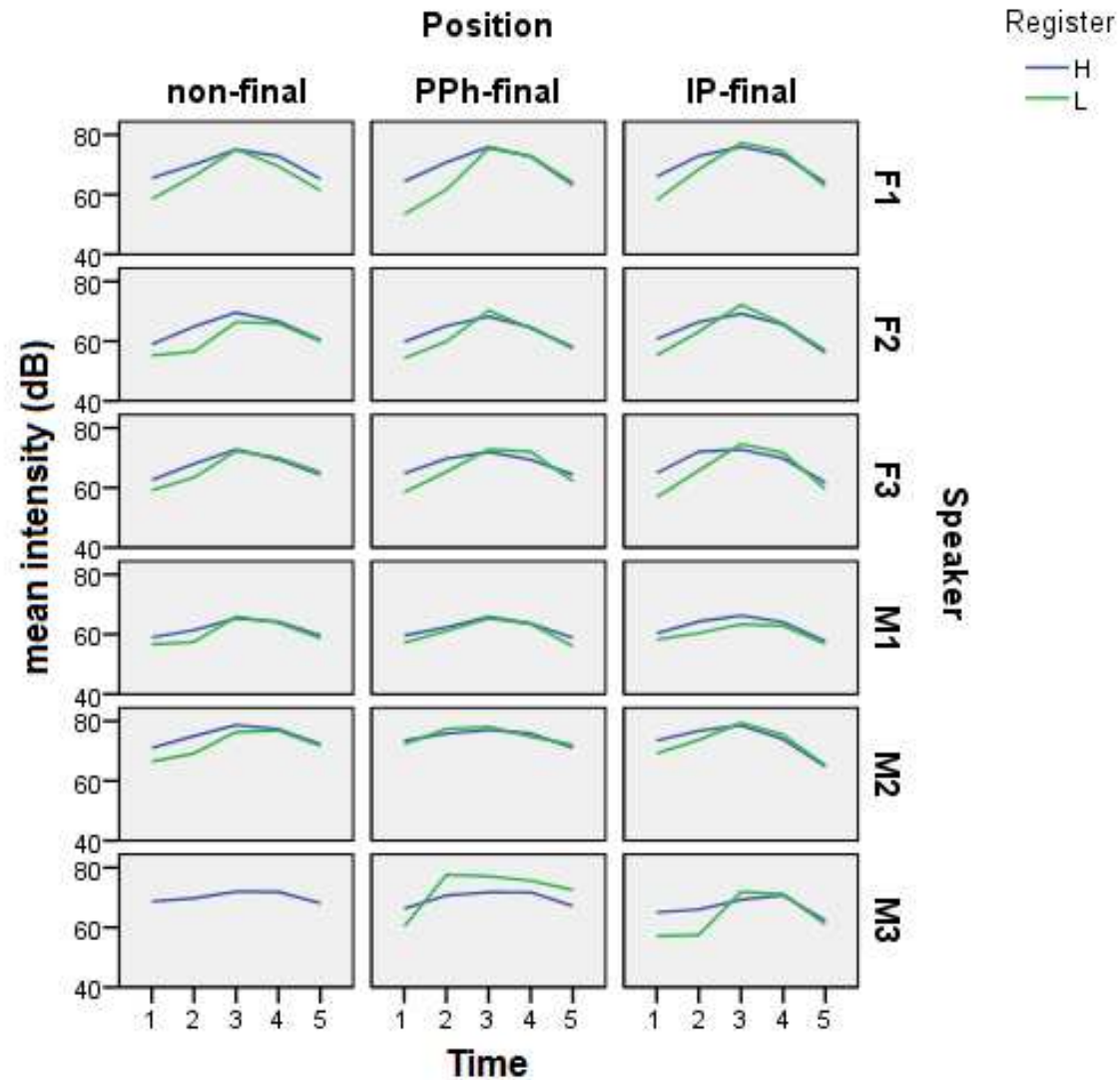
Amplitude in domain-initial syllables

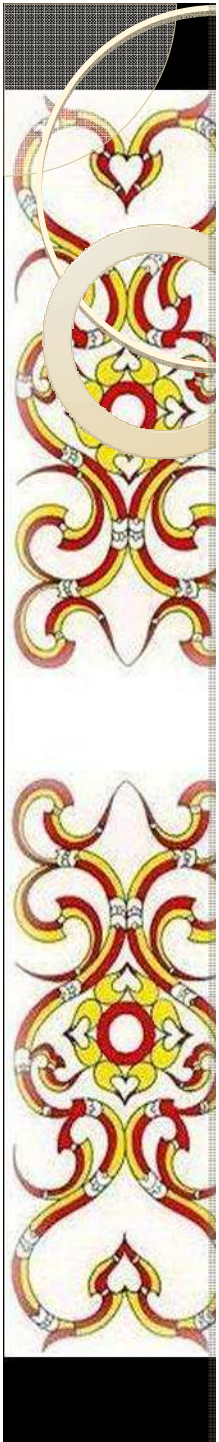
No systematic difference between domains



Amplitude in domain-final syllables

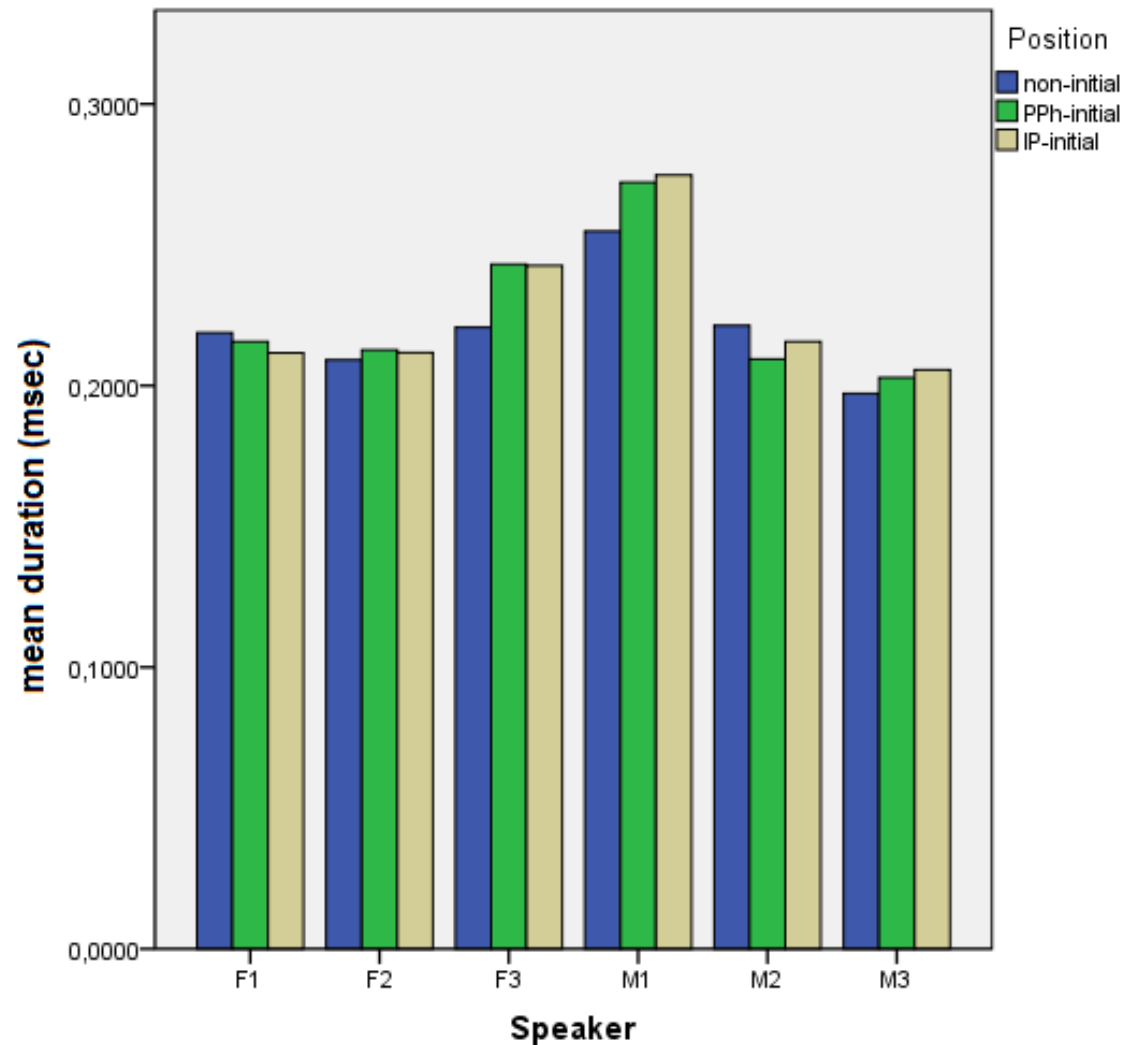
No systematic difference between domains





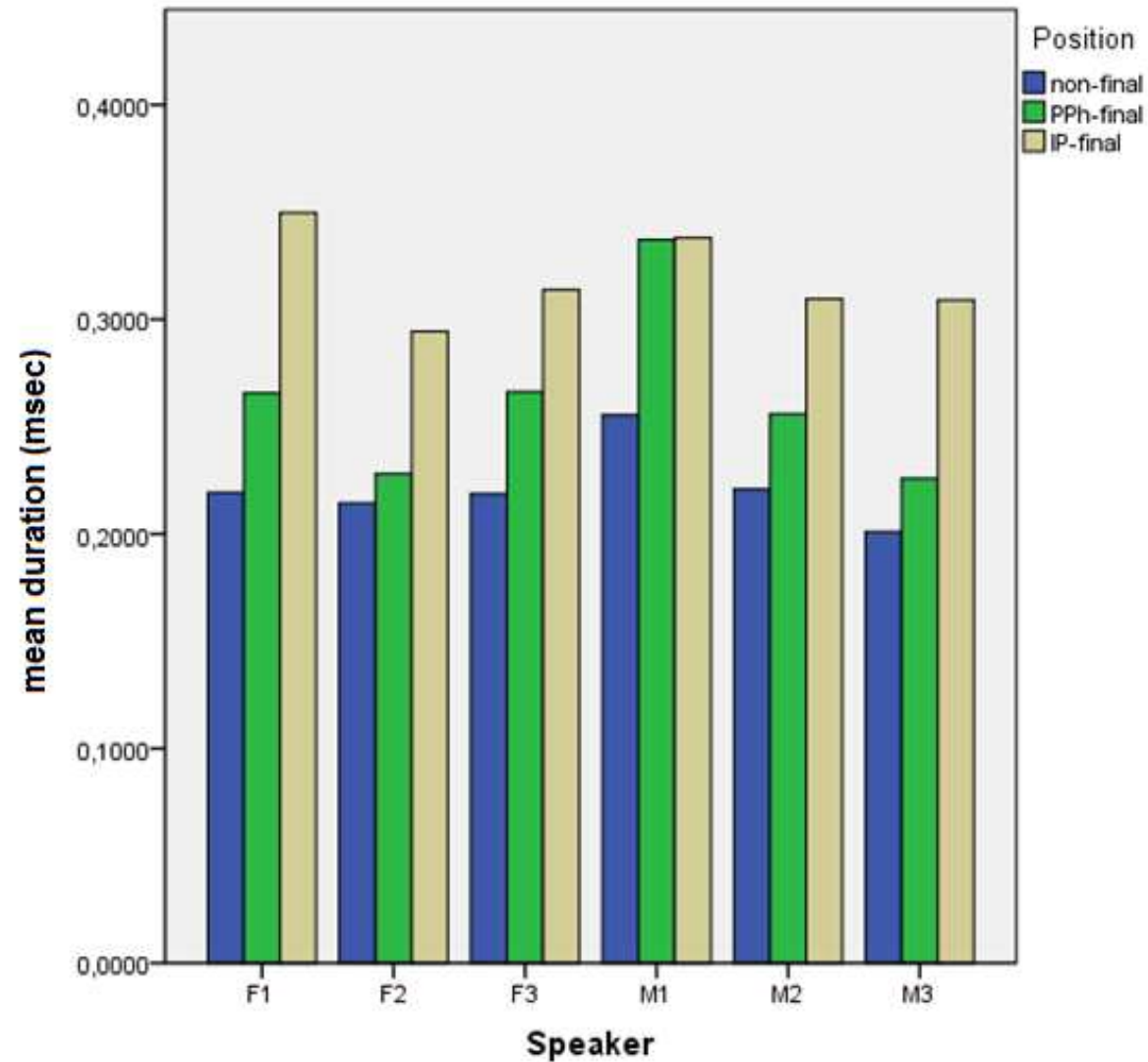
Duration of domain-initial syllables

Slight tendency to PPh-initial lengthening for some speakers?



Duration of domain-final syllables

IP-final syll. > PPh-final syll. > non-final





Summary: Prosodic Cues

F0 and amplitude

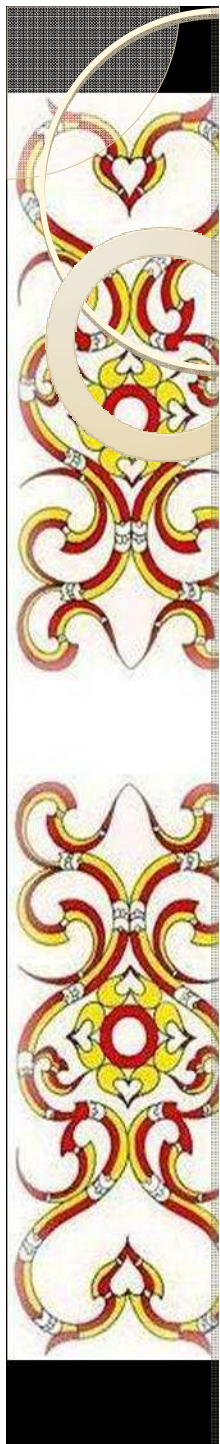
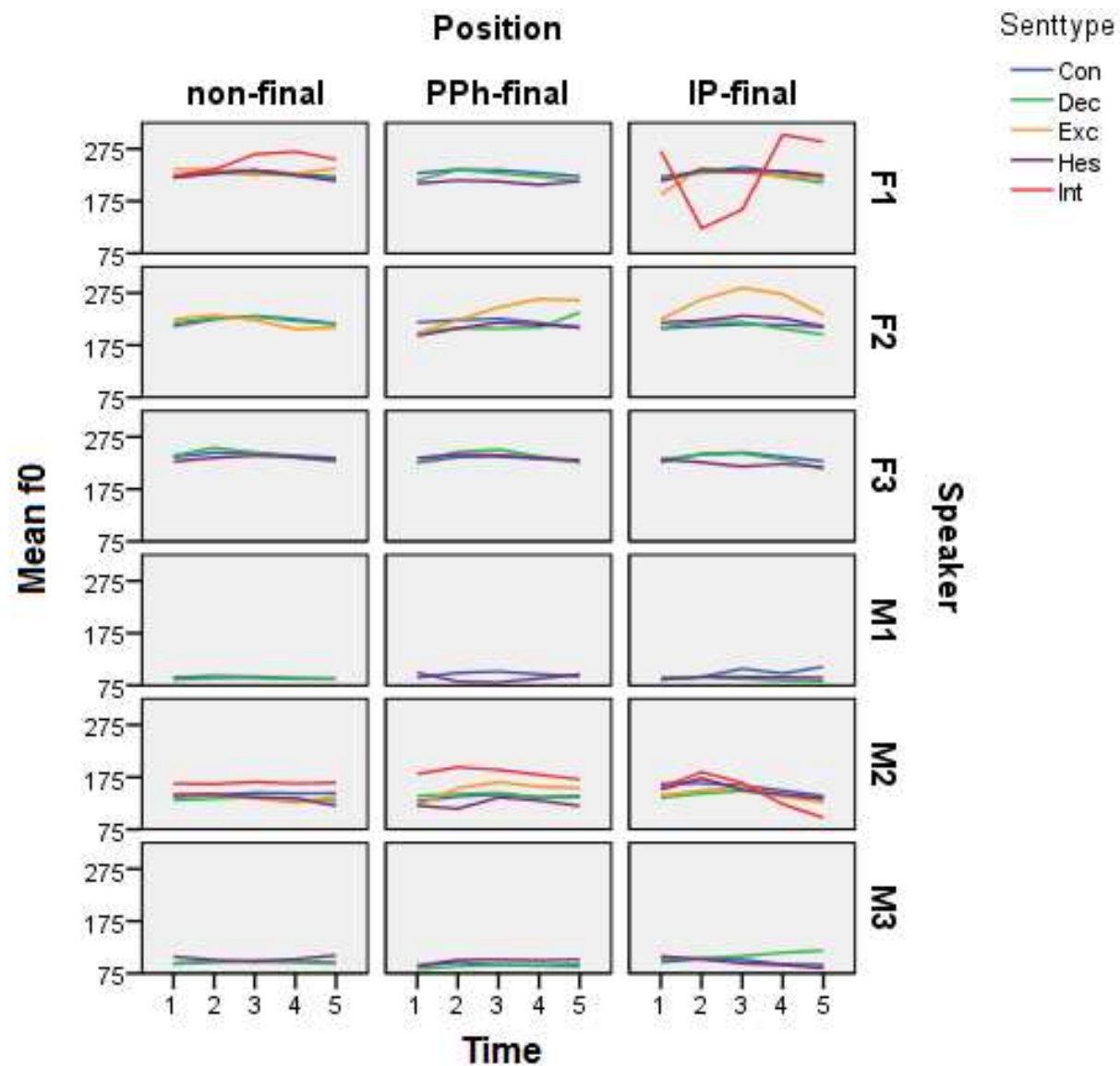
Not used for delimiting Phonological or Intonational Phrases

Duration

Final lengthening in PPhs

Additional final lengthening in IPs

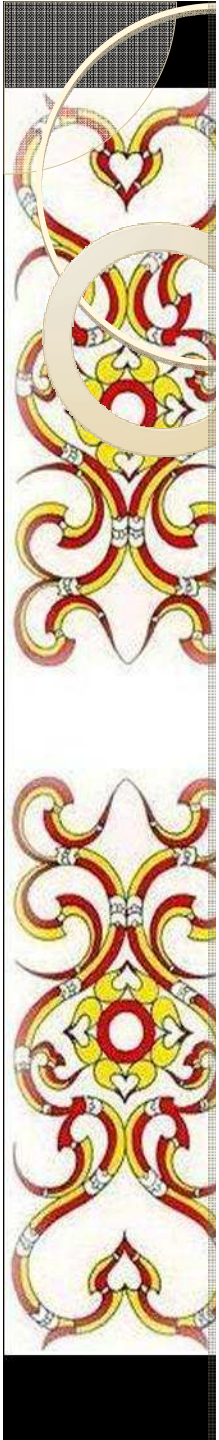
Research Question 3: Communicative functions





Communicative functions

- f0 shows minor idiosyncratic patterns
 - For instance, exclamatives are higher than other sentence types for F2 , but not for M2
- Slightly more f0 variation on PPh-final and IP-final syllables than on other syllables
- Other acoustic properties (domain initial or domain final) are even less systematic



DISCUSSION



Answers to Q1: function words

- Function words tend to be shortened or phonetically reduced (=cliticization?)
 - Pronouns are not normally cliticizing
- However, it is difficult to show that function words “attach” to lexical words like clitics normally do
 - They seem to preserve their own register
 - But perhaps a reduction of register would be observed in perfectly controlled conditions



Answer to Q2: prosodic domains

- Prosodic word
 - Possible cliticization of function words
 - *Lexical word + neighbouring function words*
- Phonological Phrases
 - Final lengthening
 - Weak initial lengthening in some speakers
 - *Corresponds to lexical XPs, or to pauses introduced by hesitation*
- Intonational Phrases
 - Final lengthening
 - *Corresponds to root-clauses and adjuncts*



Answer to Q3: communicative functions

- Communicative functions (sentence types and emotions) seem to affect the last syllable of PPhs/IPs
 - However, this is limited to a weak f_0 effect
 - The effects are idiosyncratic and do not seem to generalize to all speakers or to genders
- Probably no phonologized intonation patterns for marking communicative functions
 - Similar to Northern Vietnamese (Brunelle, Ha and Grice 2012)
 - Possibly because of important role of final particles
- Interaction between register and intonation might therefore be an irrelevant question
 - But this requires further investigation in controlled environments



Theoretical insights

- Evidence for all major prosodic domains proposed by Nespor and Vogel (1986)
- There is intonation in Eastern Cham
 - However, it does not seem to be very phonologized
 - Similar to Northern Vietnamese
 - Is the lack of phonologization due to register or to the presence of final particles and of other syntactic means of marking communicative functions?



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