

On establishing the existence of word stress

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Structure of talk

- Stress definitions
- Nigerian English has tone and stress (Acceptability experiment, production experiment)
- Ambonese Malay has no stress (Production experiment).
- Zwara Tamazight has stress (Preliminary production data).
- Persian has no lexically marked word prosody.

Definitions of stress

- Obligatory and culminative syllabic prominence feature of words (Hyman 2006, 2012)
- Word based prominence realized by phonetic variables other than just f_0 ('stress accent', Beckman 1986)
- Feature of a language whose speakers are not 'stress-deaf' (Peperkamp & Dupoux 2002)

Frequent additional properties: Predictability and privilege

- Predictable location (there's always a default location).
- Edge-orientation.
- Phonologized segmental correlates:
 - Weight to Stress Principle (Dutch)
 - Stress to Weight Principle (Dutch)
 - Restricted unstressed vowel set (Russian, English).
- Phonologized prosodic correlates:
 - Location of tone contrasts (Swedish)
 - Location of intonational pitch accents (Swedish, English).

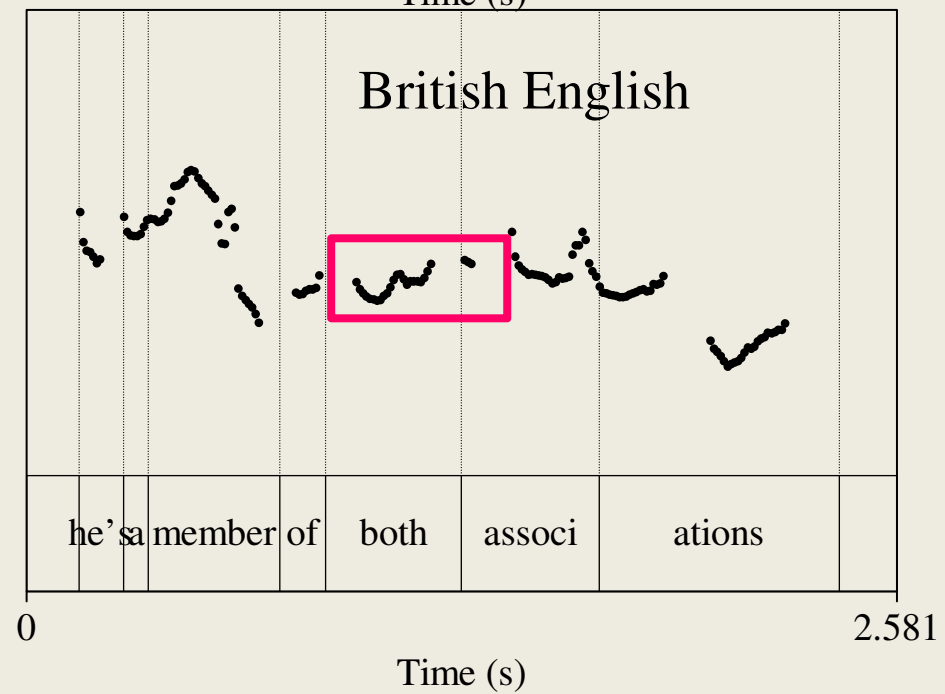
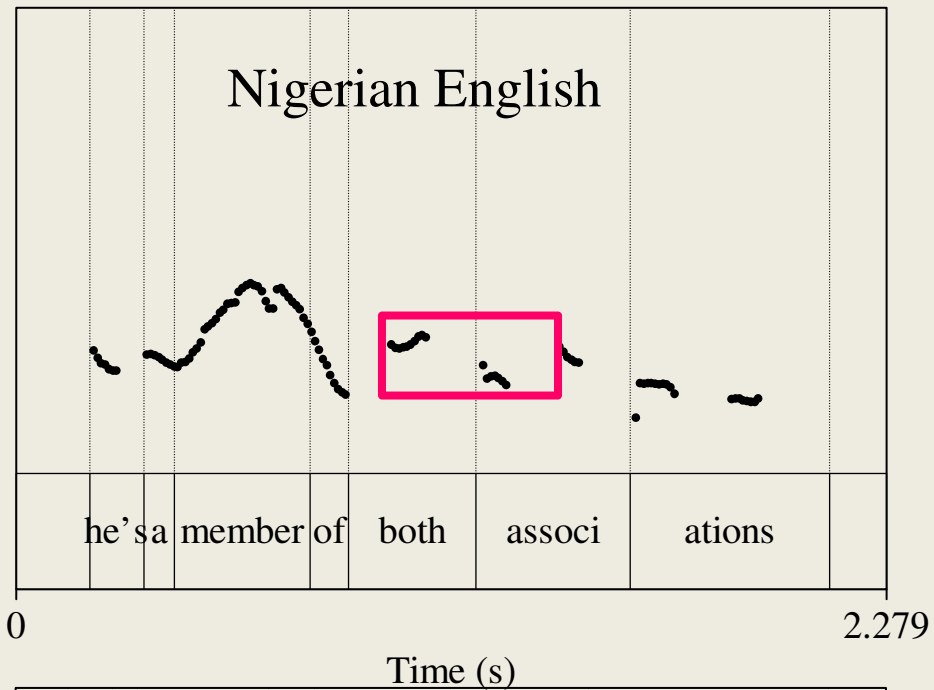
‘Stress deafness’

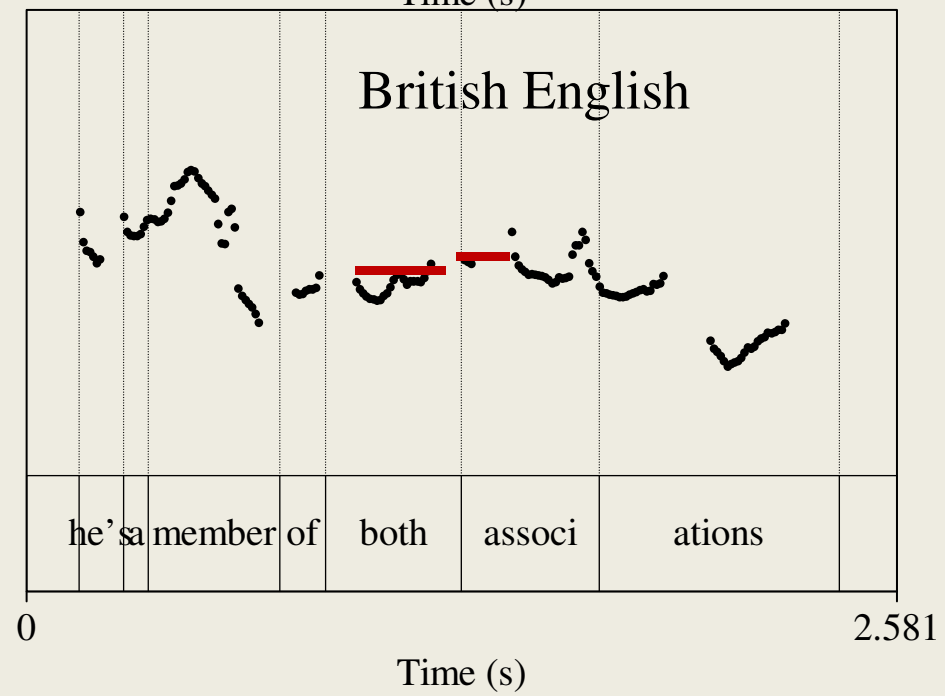
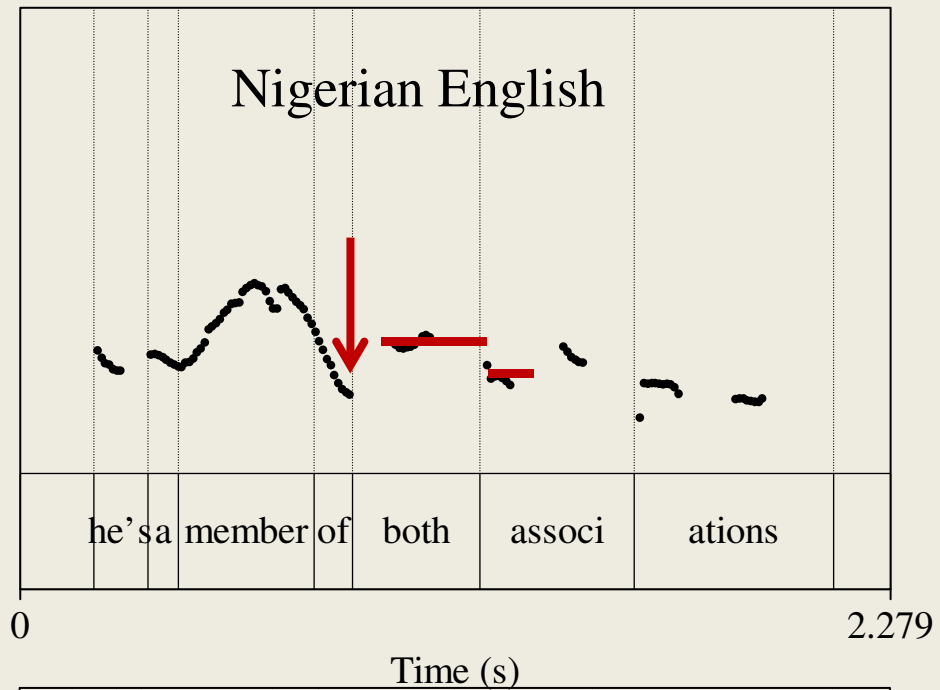
- Auditory stimuli: series of alternating stress patterns (númi – numí) (3, 4 or 5), followed by a distractor stimulus.
- Task: give the order of the stress patterns in the series.
- Baseline: phoneme differences (múni – múki)

(Peperkamp & Dupoux [2002] and following work)

Nigerian English

- Nigerian English has many tonal substrate languages, and has become standardized (*Standard Nigerian English*, Eka 1985).





2010 acceptability experiment

- Is pitch drop at word boundary obligatory?
 - Are function words L?
-
- Twelve words with peninitial stress.
 - Final position in sentence.
 - Function word in IP-medial position.
 - 20 BrE and 20 Nigerian listeners.

Gussenhoven & Udofot (2010)

Tasks

- SNE listeners: These are educated speakers of Nigerian English (broadcasting, university teaching). Rate acceptability.
- BrE listeners: These are Nigerian students who took a course in British English intonation. Rate acceptability.

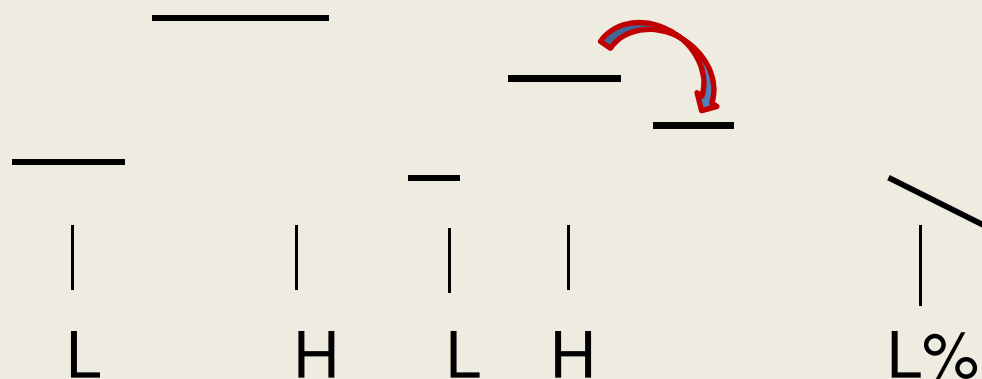
Results

- Yes, in NigE pitch is lowered at the word boundary, and
- yes, function words are L.
- Neither of which are BrE.

Gussenhoven & Udofot (2010)

What is that first syllable: !H or L?

They grow the best bananas



Standard Nigerian English

- Lexical words: H
 - Function words: L
 - Declarative: L%
 - Interrogative: H%
 - Downstep (IP): $H \rightarrow [!H] / H \dots \underline{\quad}$
- } Udofot 2007

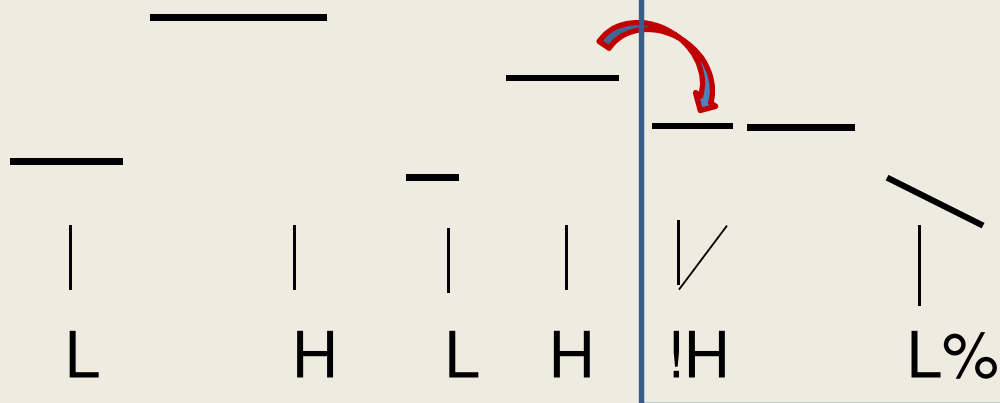
Standard Nigerian English

- Lexical stress: (L)H
 - Function words: L
 - Declarative: L%
 - Interrogative: H%
 - Downstep (IP): $H \rightarrow [!H] / H \dots \underline{\quad}$
- } Gut 2005

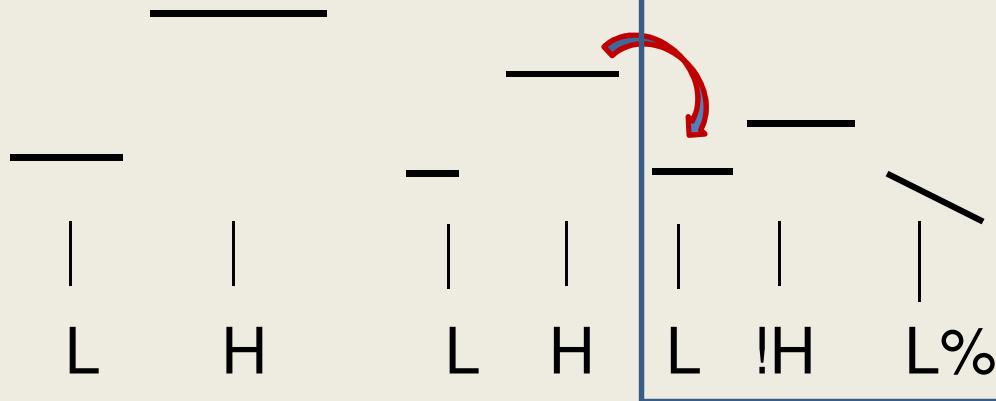
Do lexical words have (L)H or H?

- Check acceptability of:
 - pitch rise to non-initial stress
 - in words like *September, banana*, as compared to words like *Canada, melody*, etc.
 - both IP-finally and IP-medially.
- Check f0 and durations in a production experiment.

They grow the best bananas



They grow the best bananas



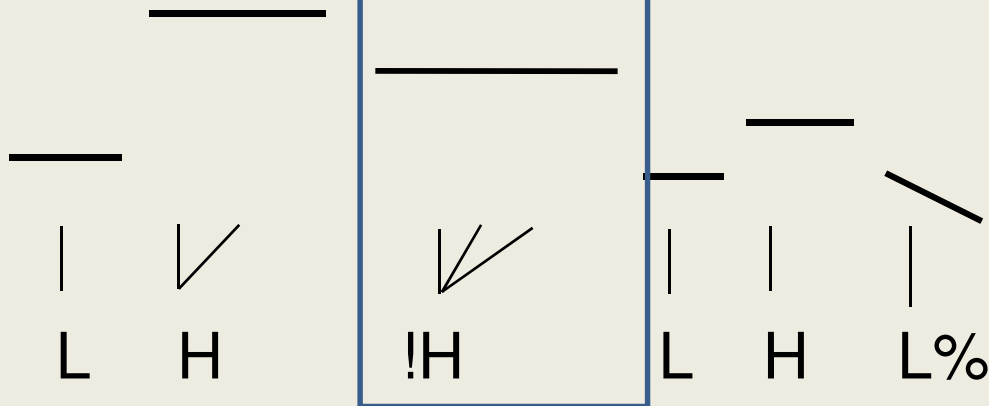
Hypothesis:

- Peninitial stress with H.
- Initial syllable has L.

Hypothesis:

- Initial stress with H.

The doctor's therapy is working



Acceptability Experiment

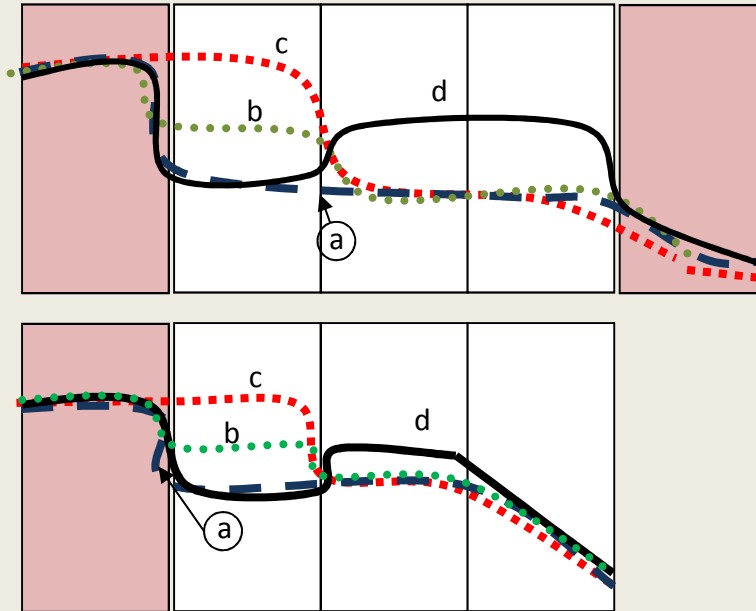
(Gussenhoven & Udofot, in prep)

- 6 trisyllabic words embedded in sentences, 3 with penultimate stress (e.g. *employer*), 3 with initial stress (e.g. *cinnamon*).
- 2 speakers (M and F).
- Embedded medially and finally in simplex sentences, always after a lexical word.
- Each of these 24 source utterances was provided with 4 artificial f0 contours.
- 21 SNE listeners (Uyo University)

Four synthetic f0 contours

Pitch fall at

- (a) left word boundary.
- (b) left word boundary and 2nd syllable boundary.
- (c) 2nd syllable boundary.
- (d) left word boundary and a *rise* at 2nd syllable.

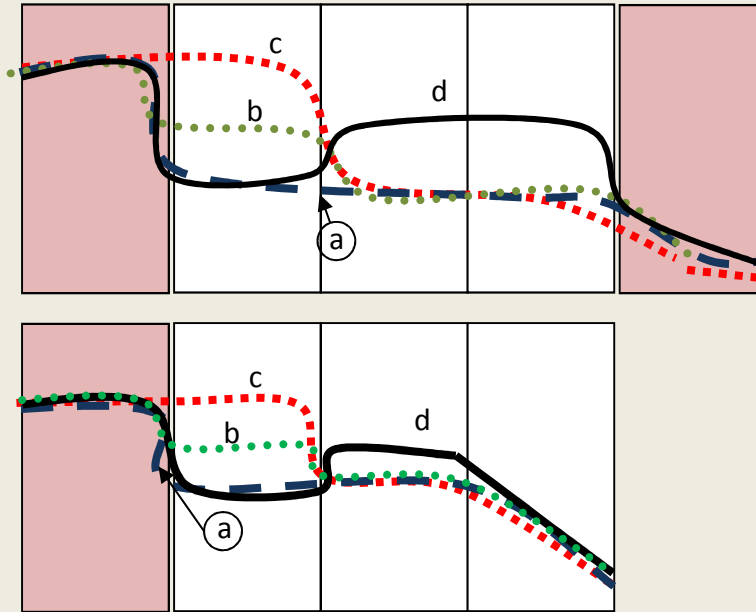


c

Predictions

Initial stress

- fall at word boundary: (a) is best
- level at 2nd syll: (d) is worst

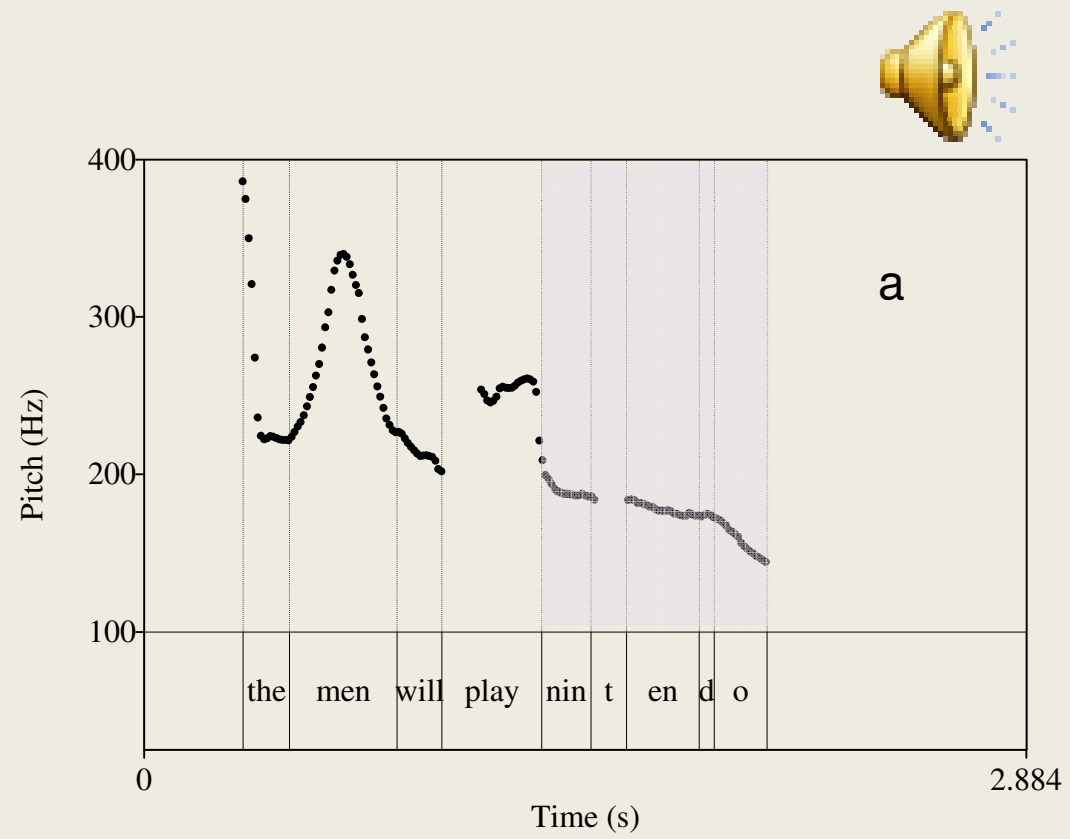


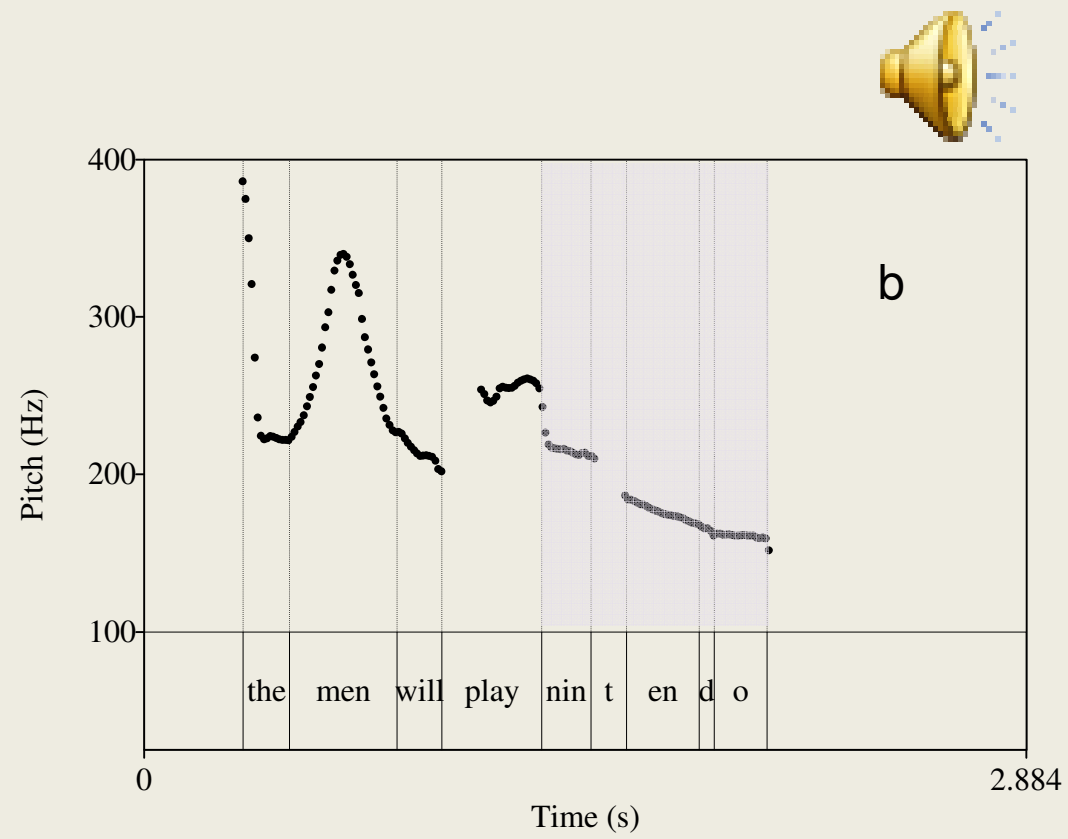
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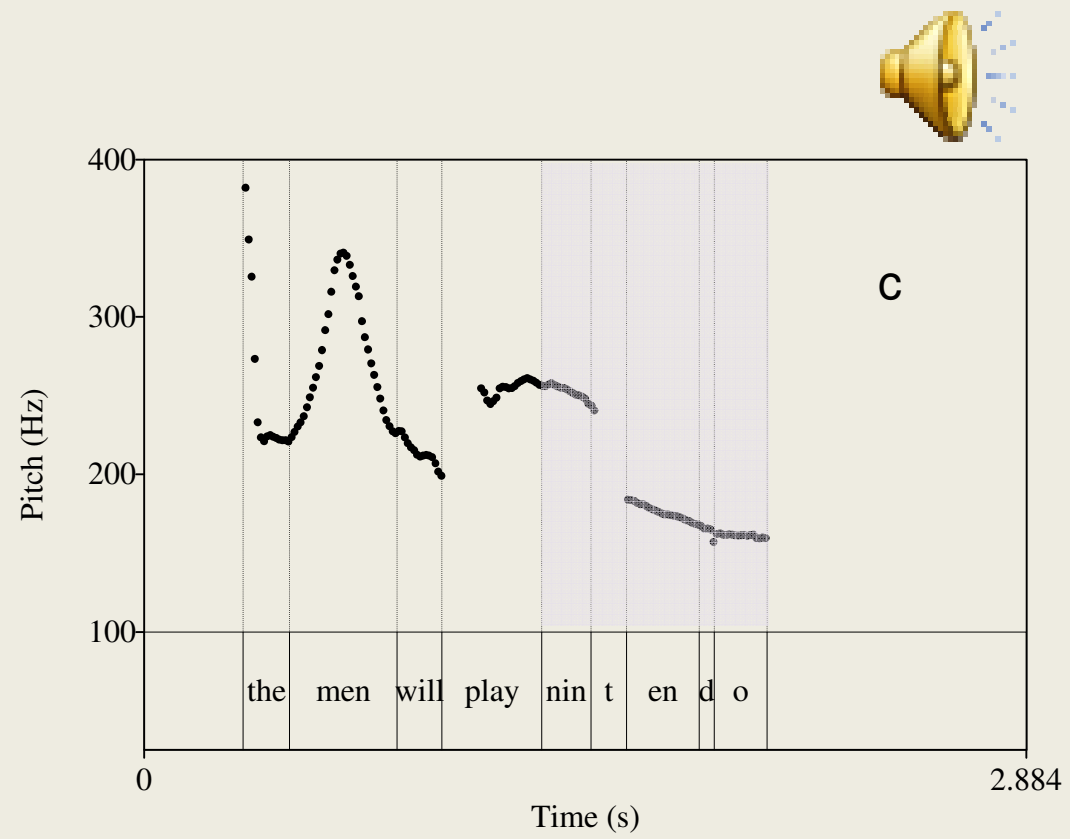
Predictions

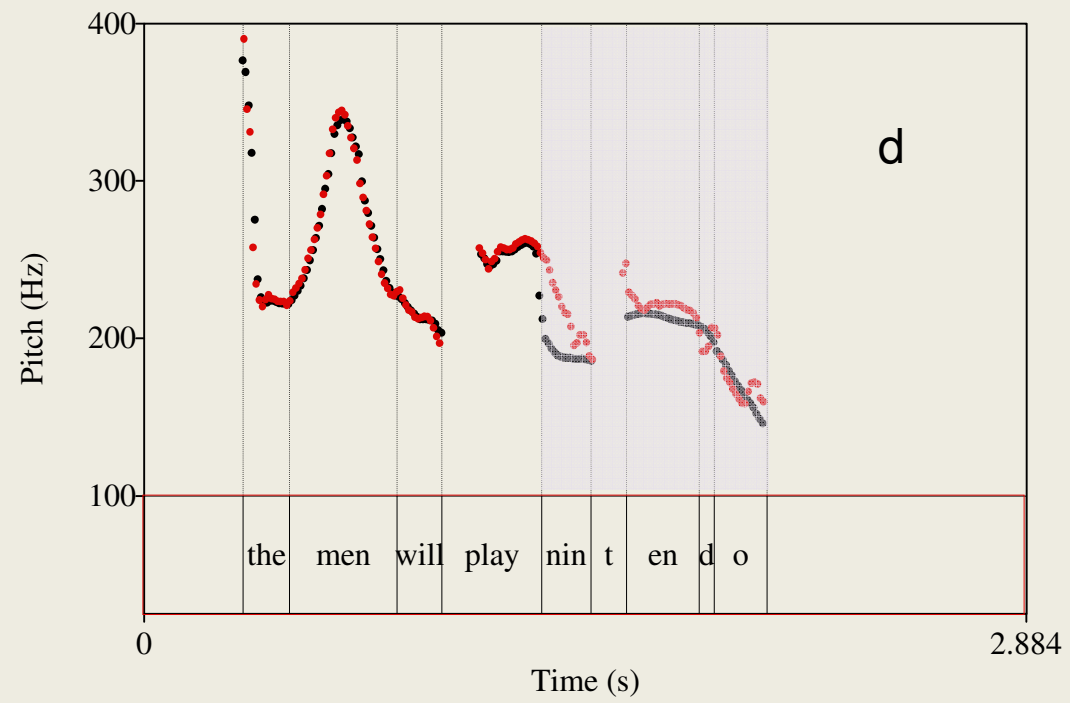
Peninitial stress

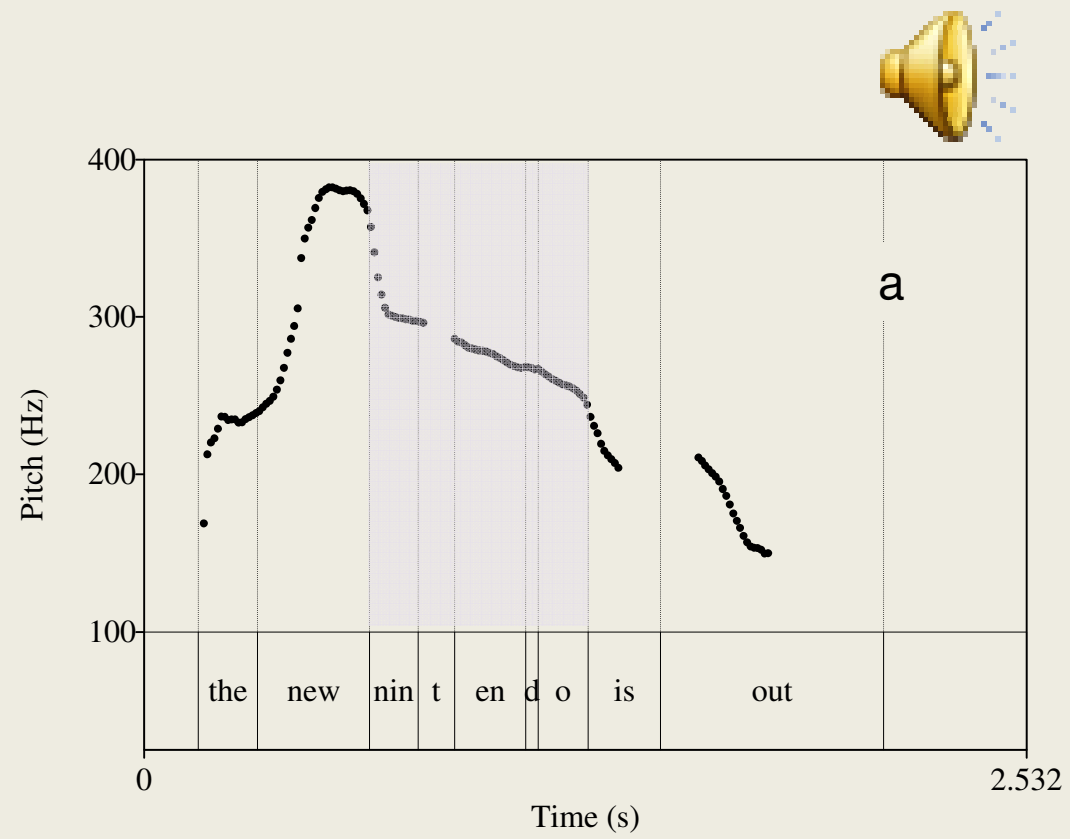
- fall at word boundary, rise at 2nd syll: (d).
- (a)(b)(c) bad.

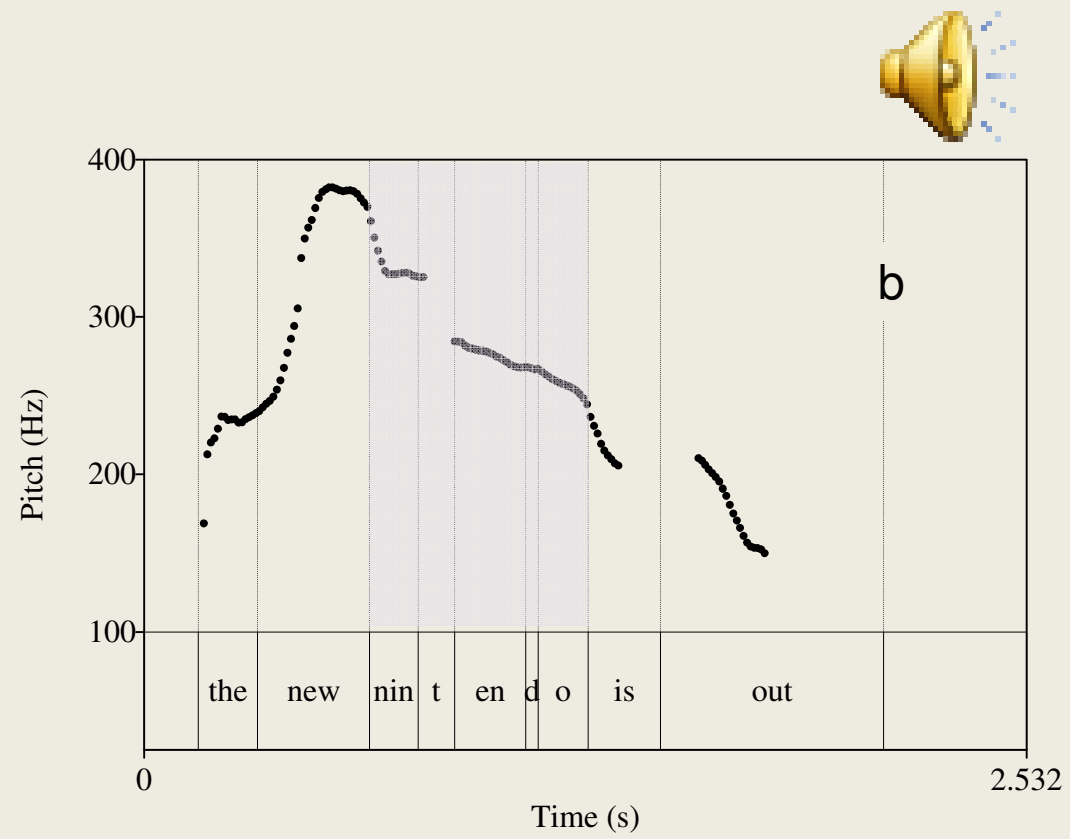


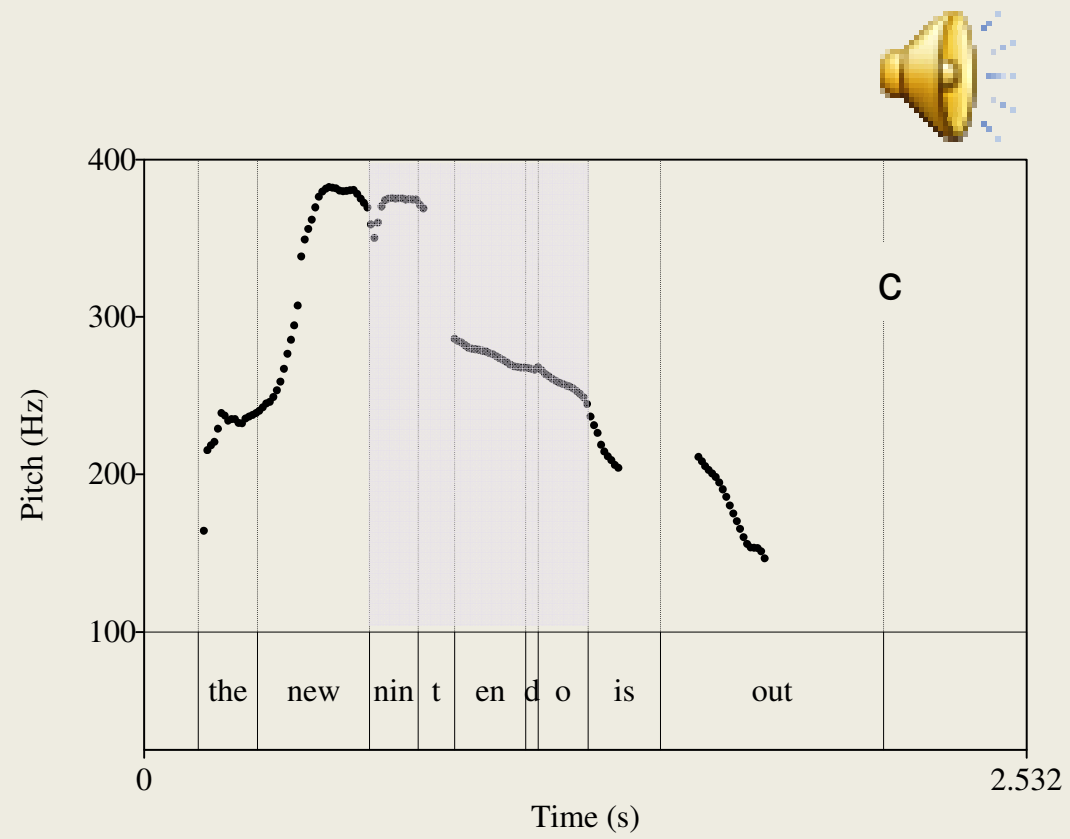


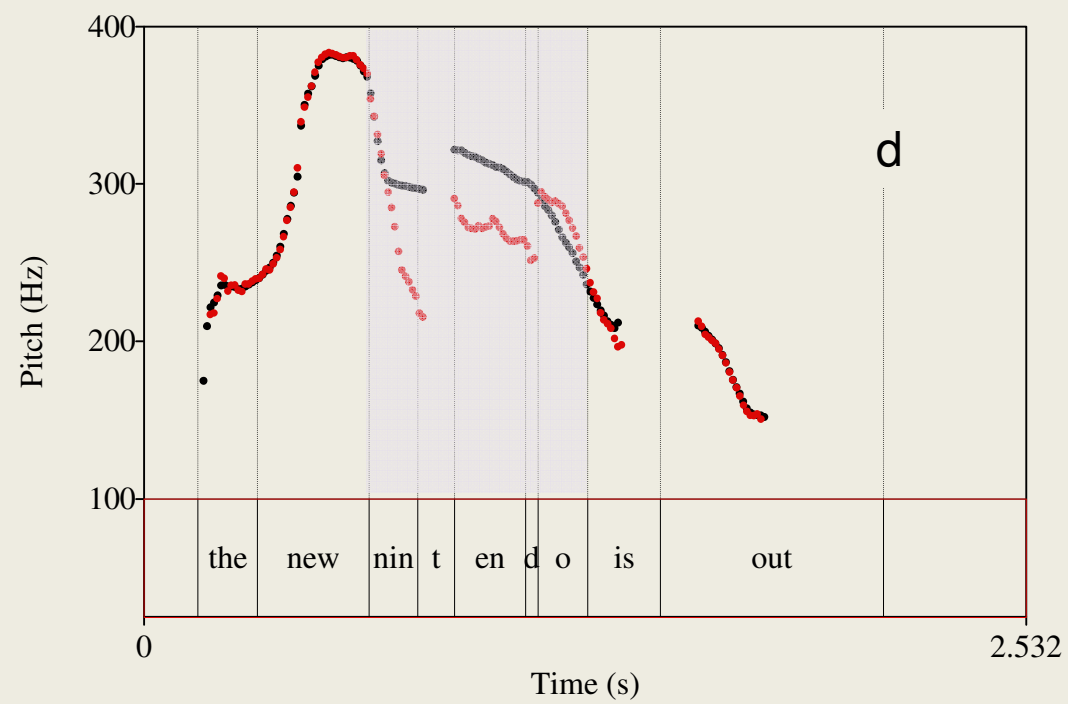


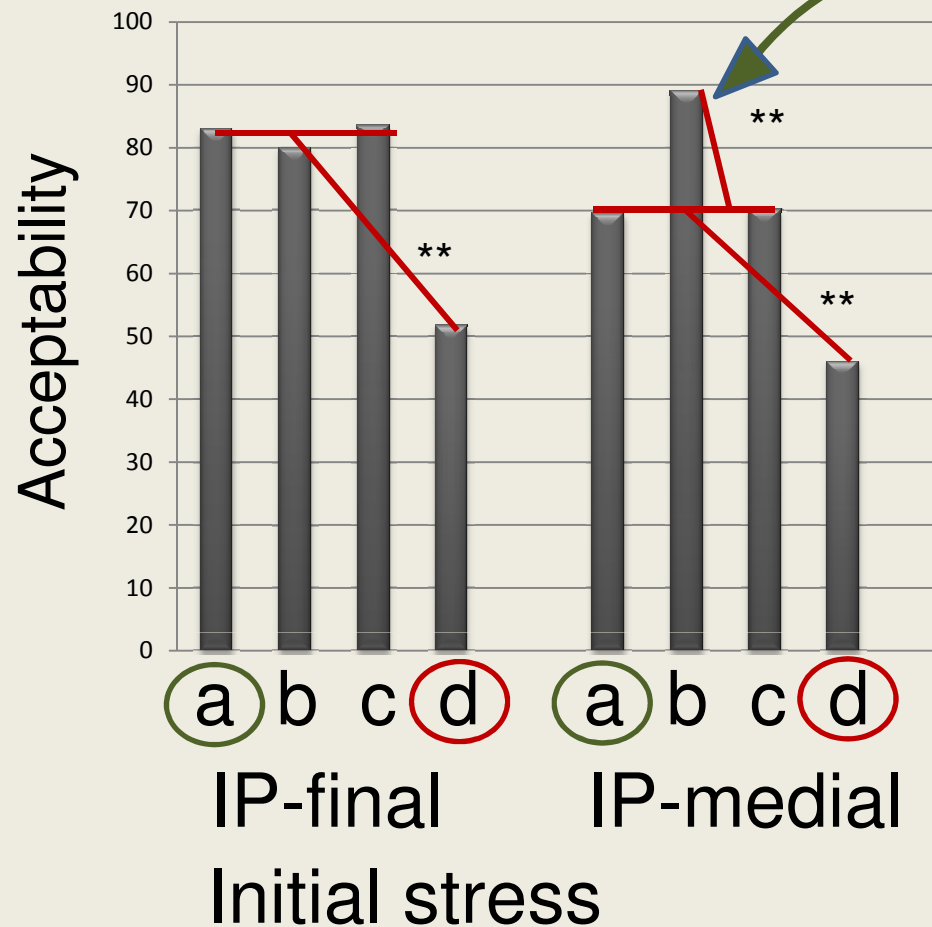






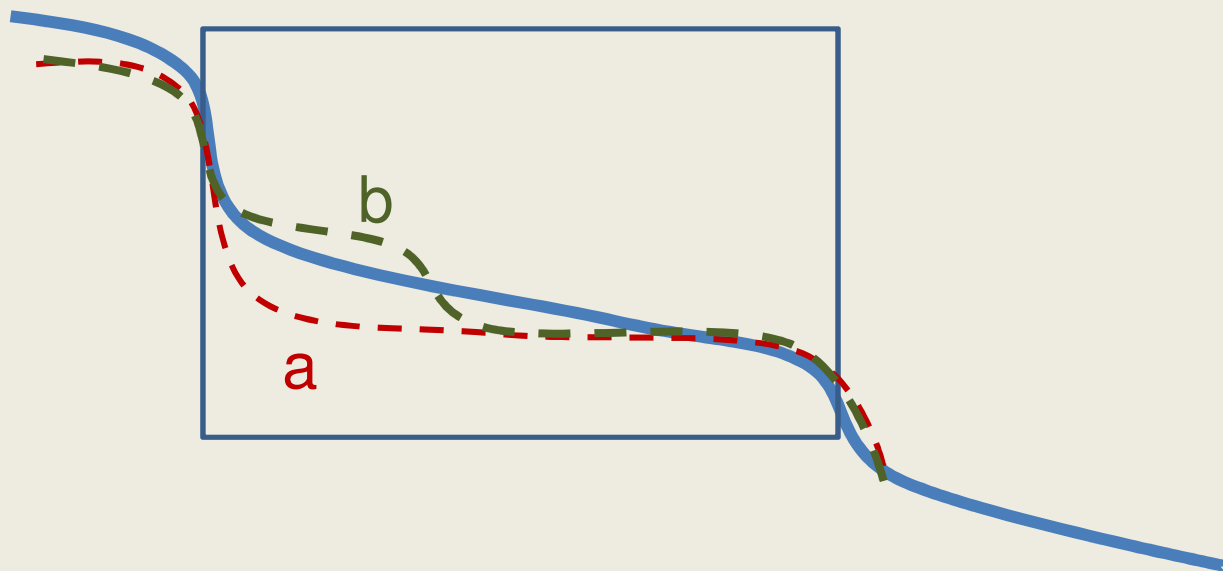






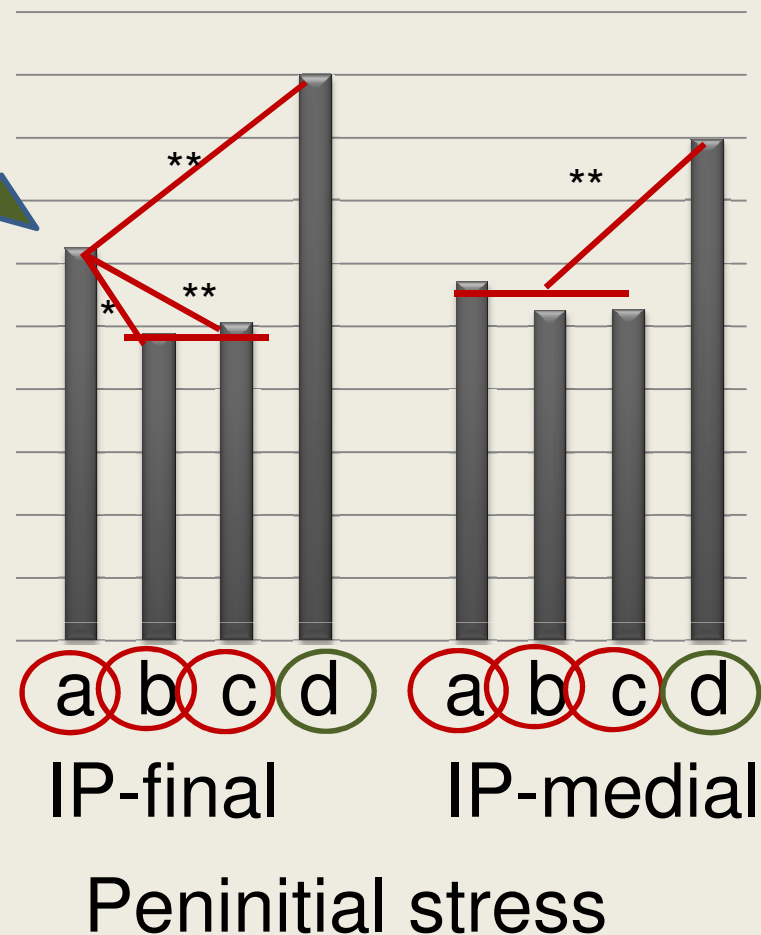
Contour (b) is good, because it better matches the declination between H and !H in the first syllable.

Medial: wider pitch range.



Contour (a) is relatively good, because it *doesn't fall* to stress where it should rise. (b) and (c) *fall* to stress.

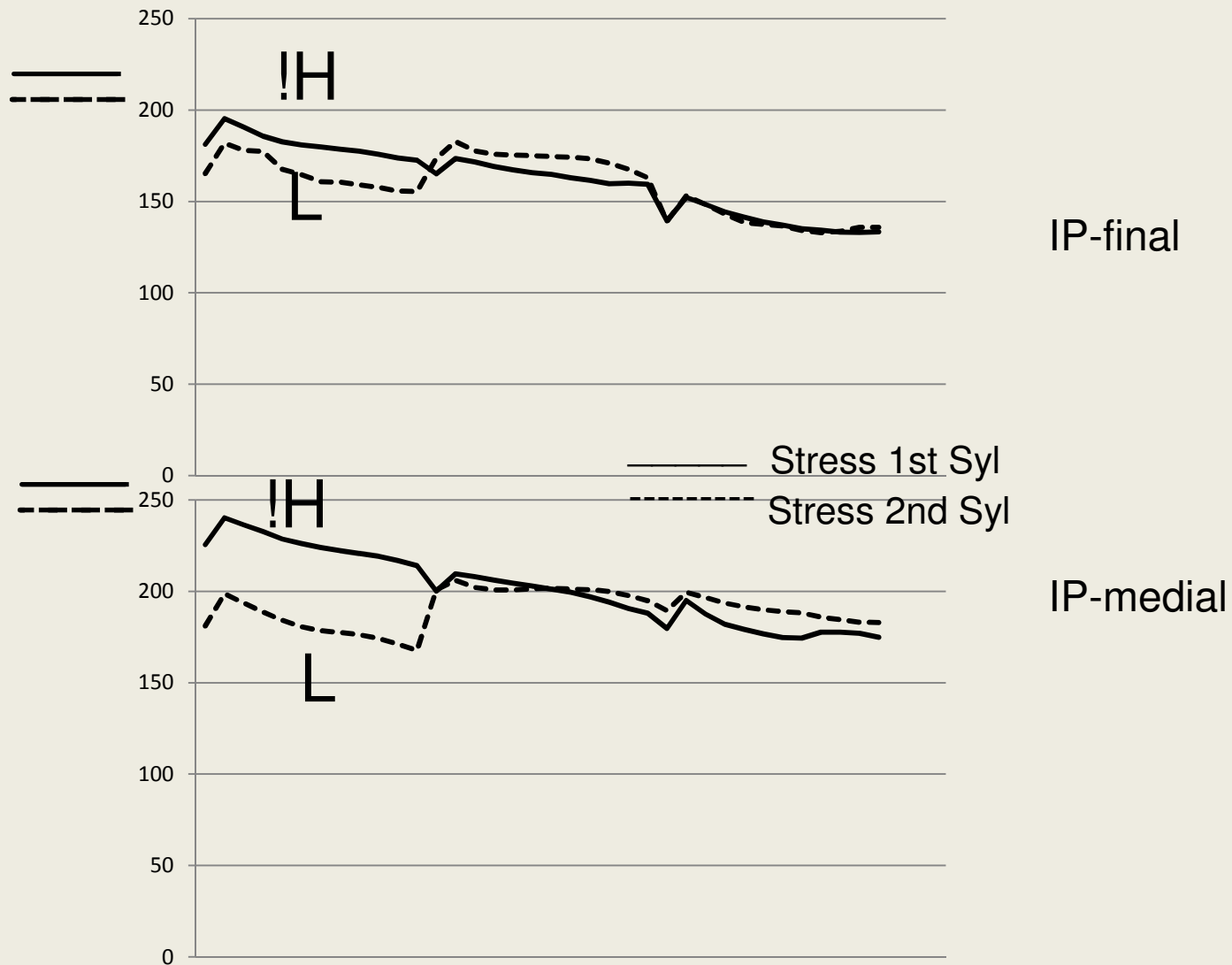
Final: more salient.



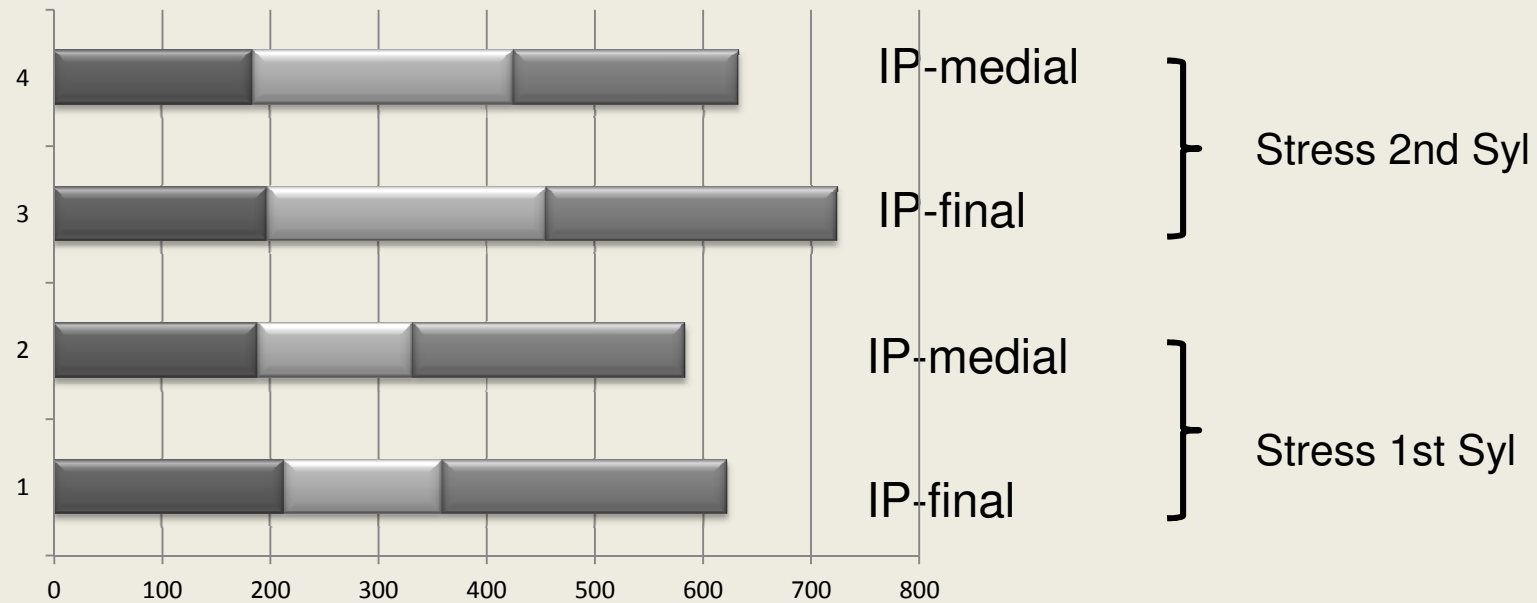
Production Experiment

- 1 male, 3 female speakers of SNE (SOAS).
- 18 trisyllabic words embedded in sentences, 9 with penultimate stress (e.g. *September*, *employer*), 9 with initial stress (e.g. *cinnamon*, *spectacle*).
- Embedded medially and finally in simplex sentences.
- Measurement of f0 and duration of all syllables

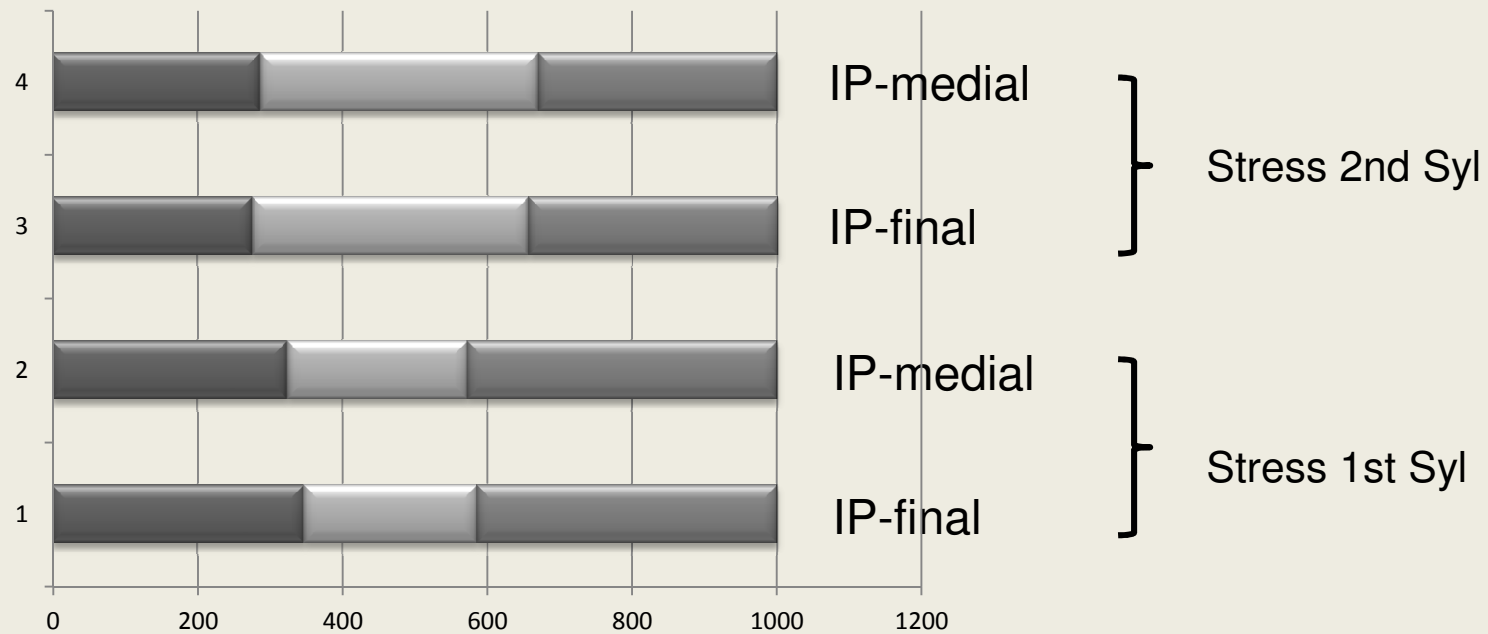
Results f0



Results duration



Results duration



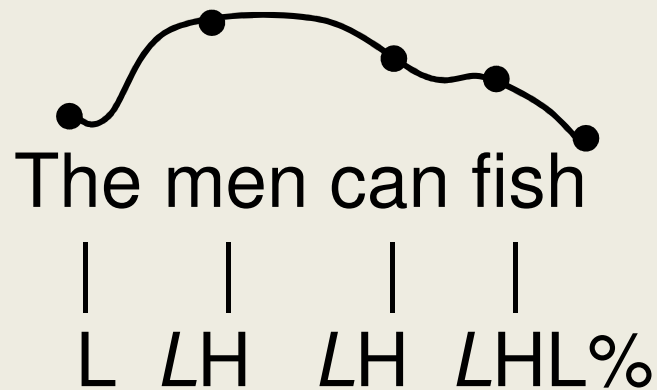
Conclusion for Nigerian English

1. It has (initial vs peninitial) stress.
2. It has tone: lexical words have LH, with H going to the first or second syllable.
3. L causes downstep (whether floating or not).
3. Function words have L.

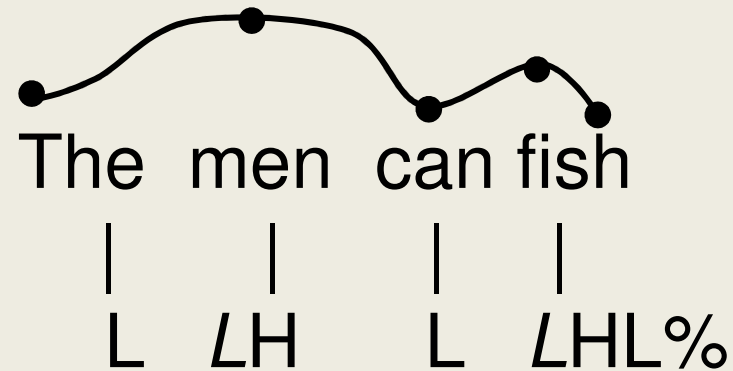
What's so good about Nigerian English?

- **Contrast between compound and single word**
syntax – sin tax; insect – inn sekt
- **Contrast between function words and lexical words**
would – wood; in – inn; are – R; were – whirr, etc.

Minimal pairs



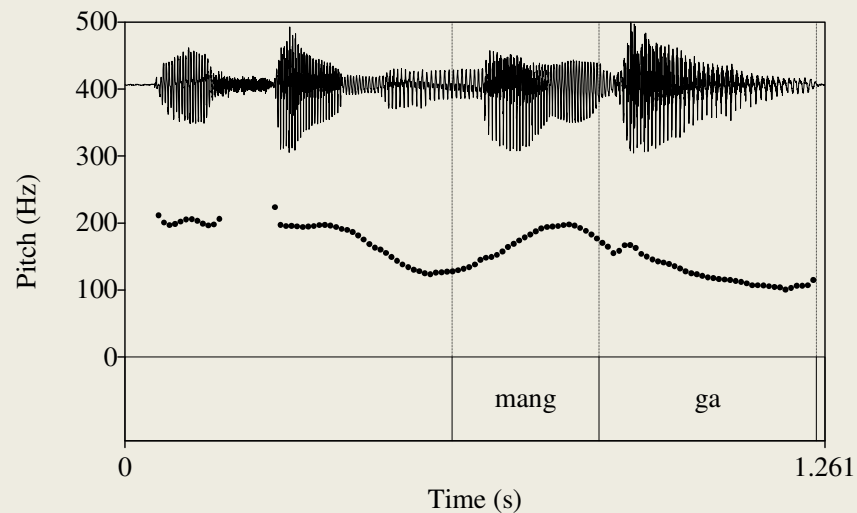
The men put fish in tins



The men are able to fish

Ambonese Malay:

No stress, no pitch accent, no focus



Dorang suka makang pisang deng mangga
'They would like to eat a banana and a mango.'

Possible intonational tone structures for a final peak

(1) a. ... ma ma **ma**)_ω)_φ)_i
|
H*+L

b. ... ma ma ma)_ω)_φ)_i
|
H* L%

c. ... ma ma ma)_ω)_φ)_ι
|
H% L%

d. ... ma ma ma)_ω)_φ)_ι

H% L%

Two arguments for stress in Ambonese Malay:

1. Stress location is rule governed.
2. There are minimal pairs (Ambonese Malay).

Variation among 13 authors

‘Stress is penultimate’

Two sources of variation:

- schwa in the penultimate syllable
- intonational melody.

-Penultimate schwa moves stress to final syllable in disyllables, but to antepenult in trisyllabic or longer words, unless the penult also has schwa (Halim 1974).

-Stress is penultimate without exception, i.e. also when it has schwa (Laksman 1974) .

- Penultimate schwa moves stress to final syllable (Java), unless 2 consonants separate schwa from final syllable (outside Java) (Prentice 1987)..

- In pre-final pause groups, stress is final, in final pause groups, stress is penultimate (Halim 1974).

(Odé 1994)

Minimal pairs

Beta mobilan
'I say'

parang
parang
masing
masing
barat
barat

'machete'
'war'
'salty'
'machine'
'West'
'heavy'



van Minde 1997

Minimal pairs

But /a/ would be the only vowel that can reject stress. There is no penultimate /i, e, o, u/ without stress.

Short /a/ is like schwa in Indonesian.

It's an *a-caduc*.

There are six vowels, not five.

French

Phonetic signal without stress

French [pəle] *peler* 'peal'

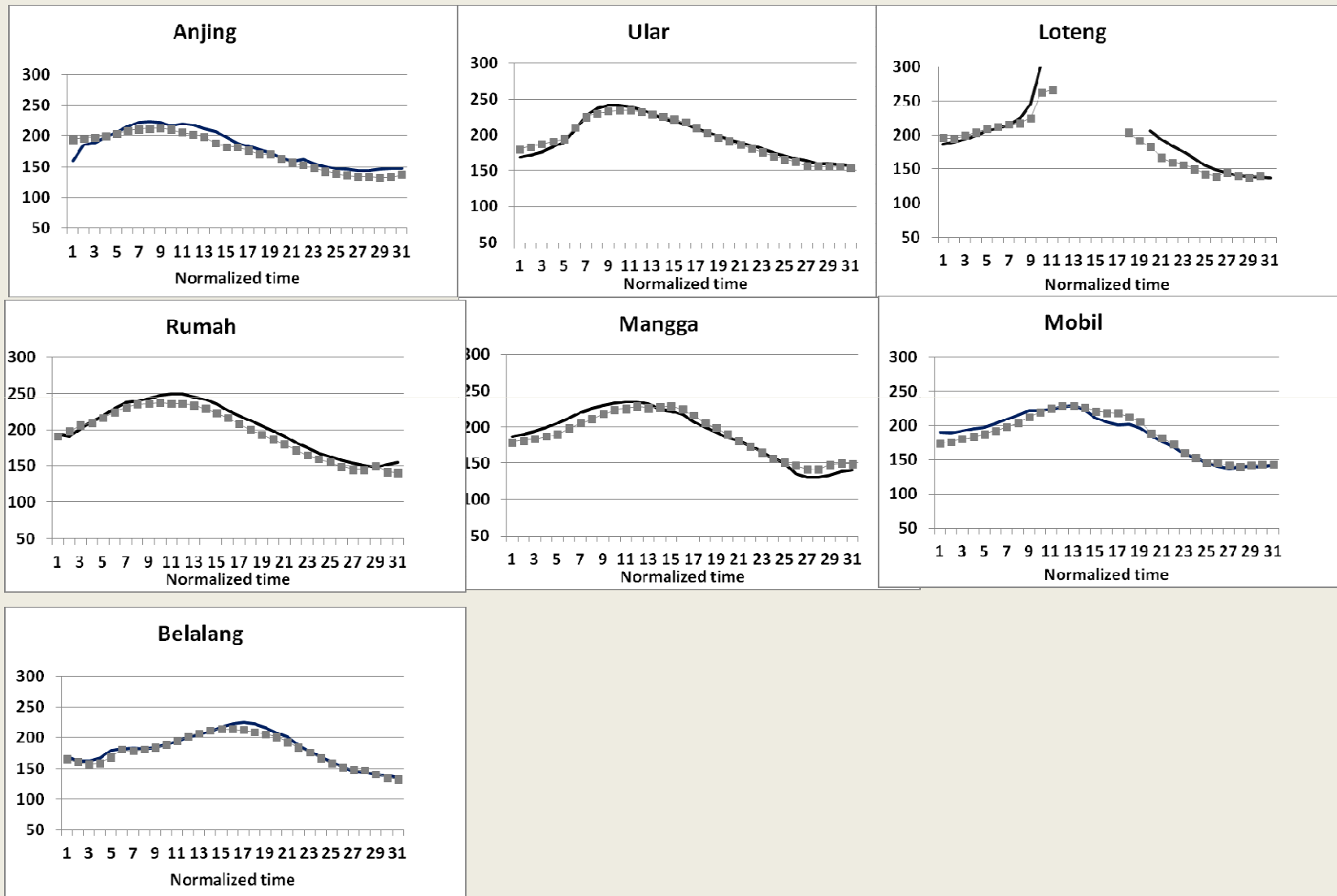
[pele] *Pelé* 'Edson Arantes do Nascimento'
(e-*caduc*)

Peak alignment

Raechel Maskikit & C. Gussenhoven, submitted

- 2 female and 2 male speakers from Ambon.
- Six disyllabic target words, 1 trisyllabic.
- Declarative/Interrogative/Prefinal.
- Repeated word/Corrective focus.

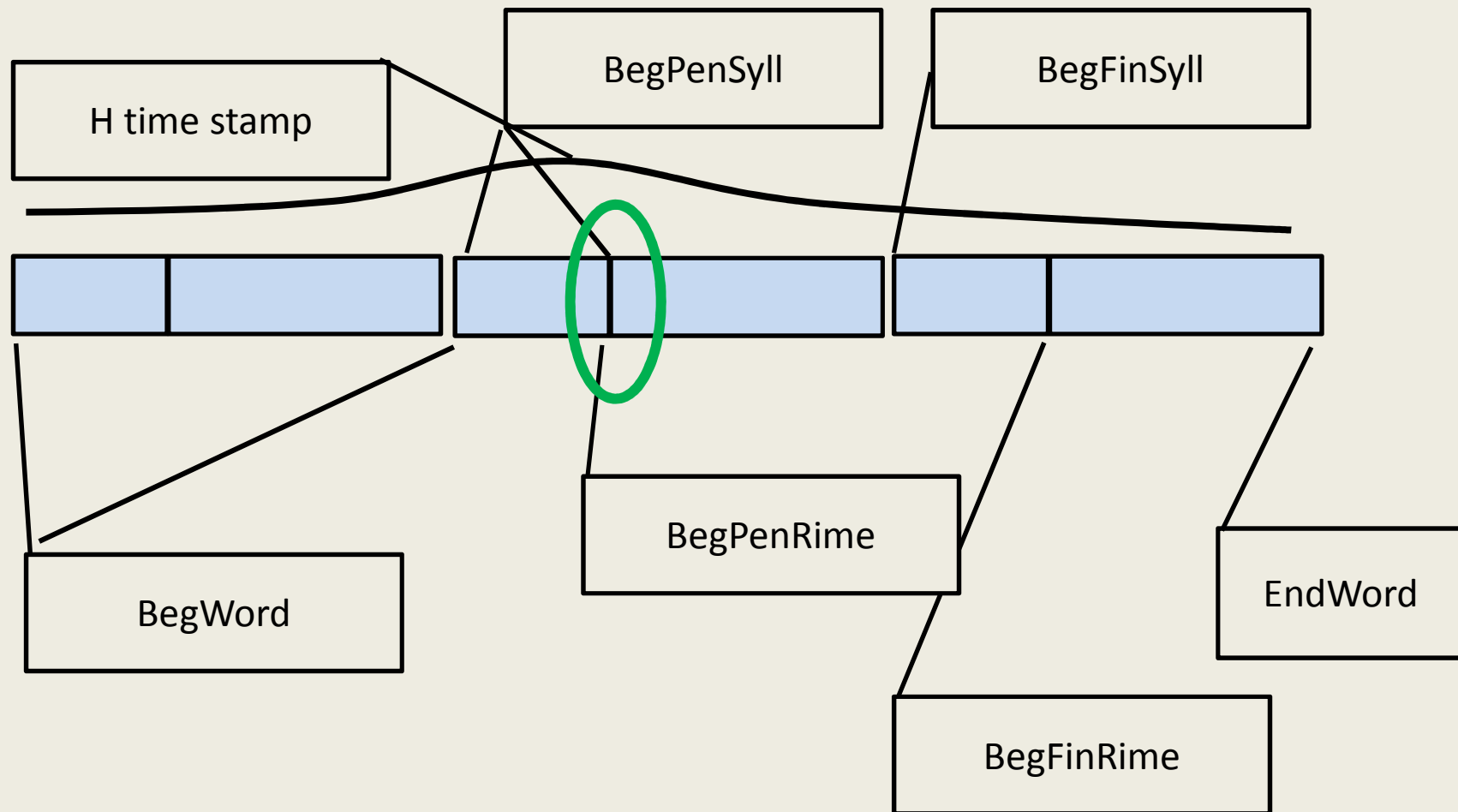
No difference between Given and Corrective focus



Matched Ambonese Malay and Dutch corpora

anjing	‘dog’	Anjum	
balalang	‘grasshopper’	bemaling	‘drainage’
loteng	‘attic’	loting	‘lottery’
mangga	‘mango’	mango	
mobil	‘car’	meubel	‘piece of furniture’
rumah	‘house’	Roma	
ular	‘snake’	Oeral	

F0: the alignment of peak



Alignment: Two types of analysis

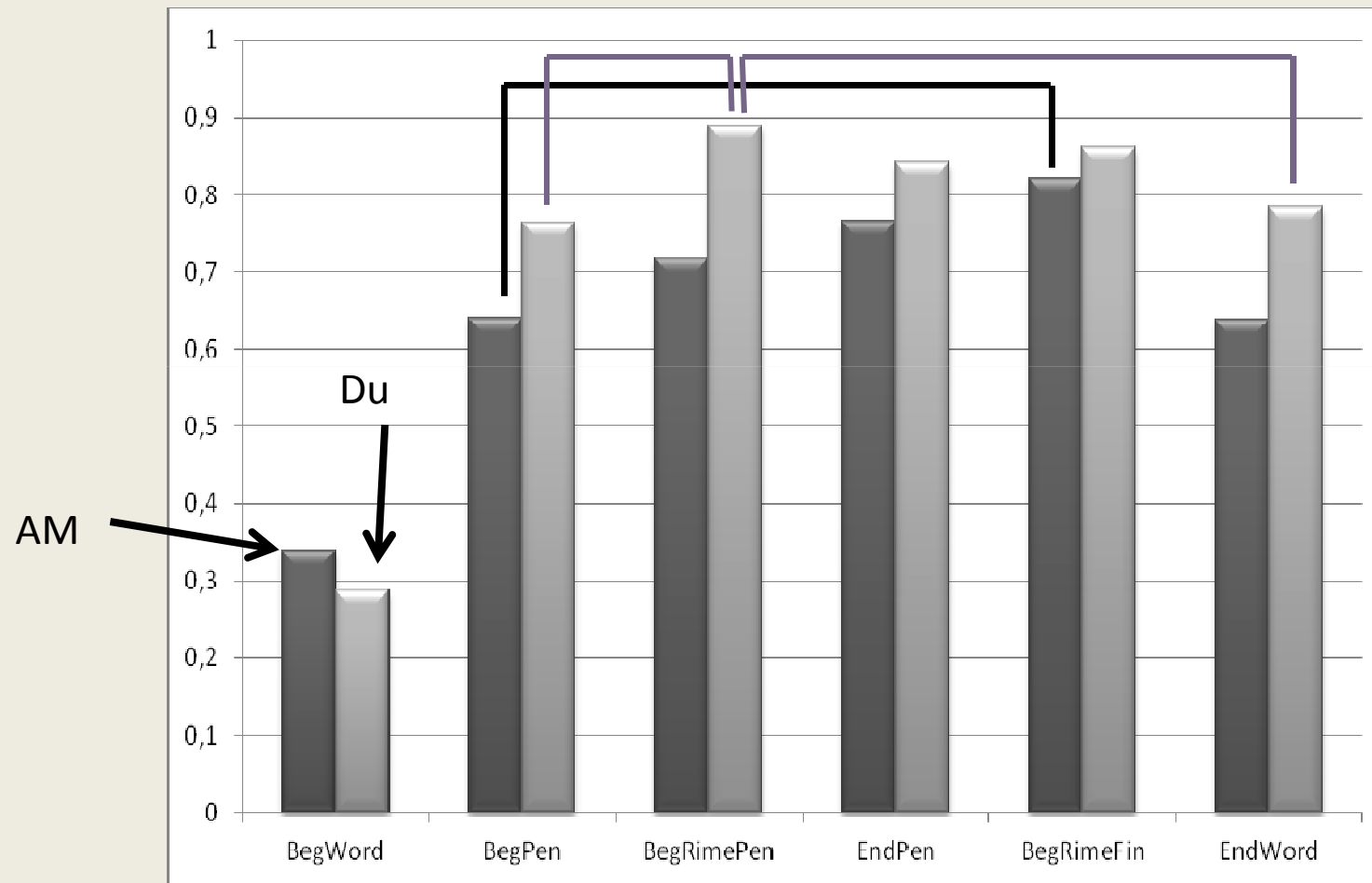
- Time stamp analysis:

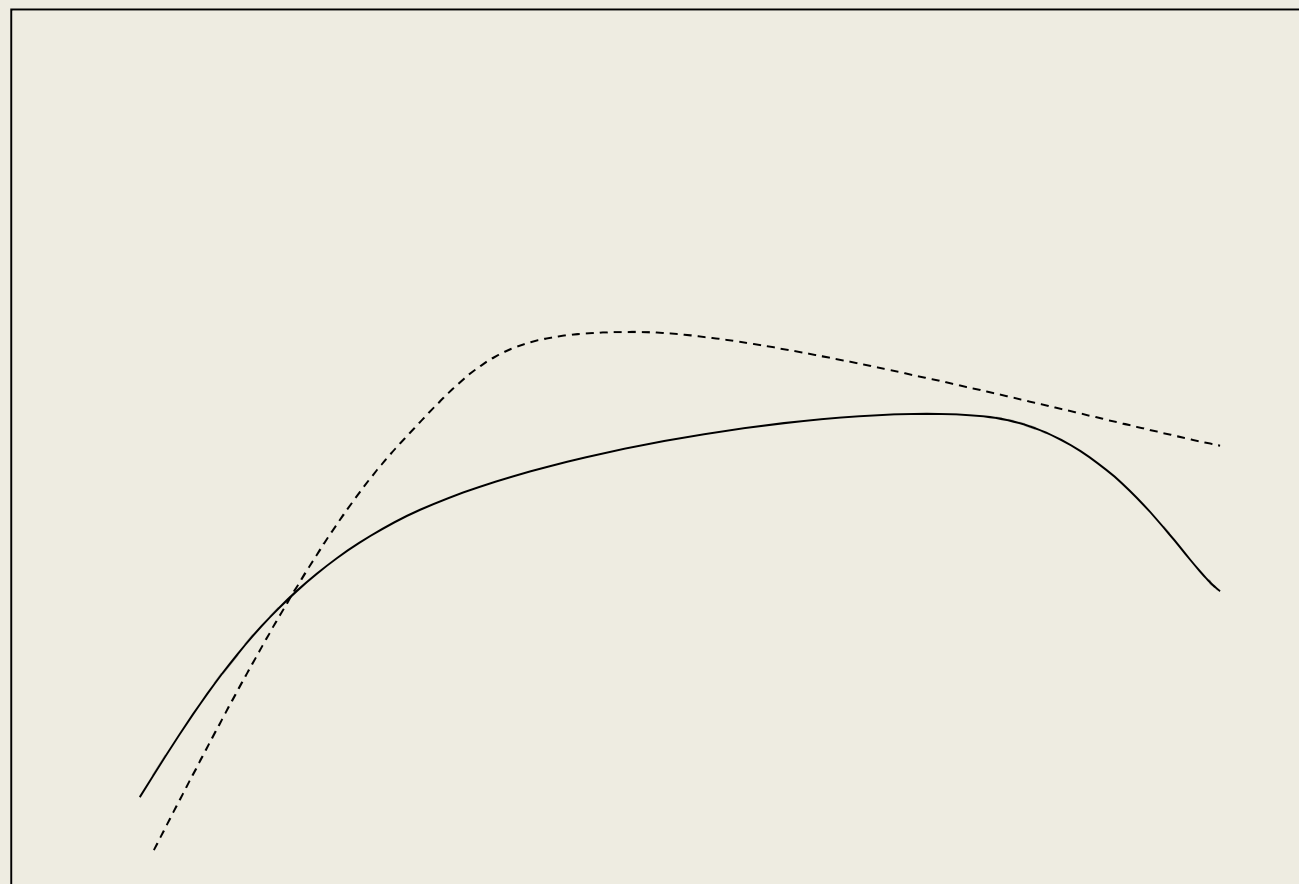
Does time stamp of H correlate with time stamp of landmark?

- Latency analysis:

Does the distance between H and landmark covary with duration of rime/syllable/word?

Pearson r's between H time stamp and time stamps of six landmarks (N=84)





Welby (2006)

Regression with H-latency from beginning of final syllable as dependent variable and duration of final syllable:

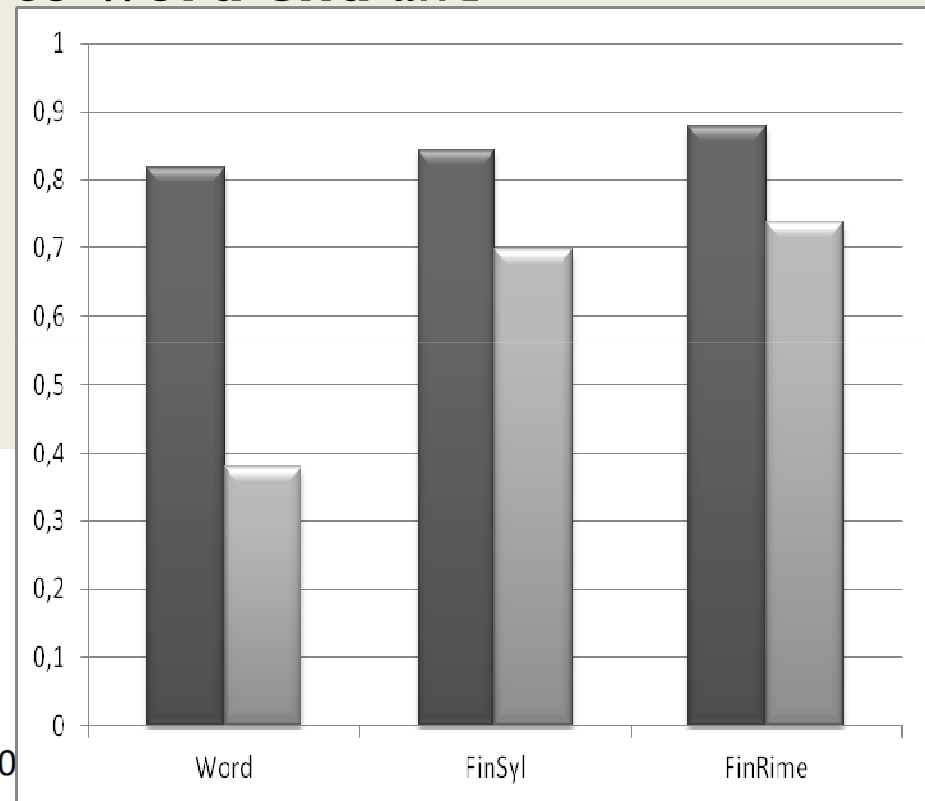
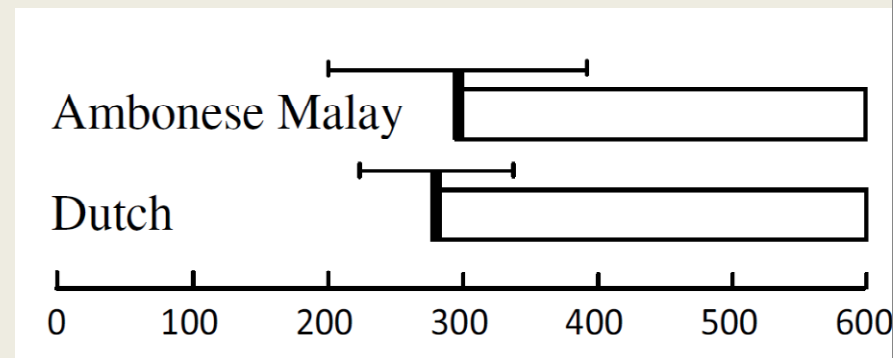
Together with a binary variable (LHLH vs Other), 74% explained variance.

Highly regular location, calculated from syllable beginning as a function of syllable duration.

H-location: 60 ms before start of syllable, with L following 10 ms after start of last syllable.

Regression with H-latency from beginning of final syllable as dependent variable and final syllable duration: 3%, with word duration added: 30%.

Pearson r 's between **H-Latency to word end** and duration of final constituent.

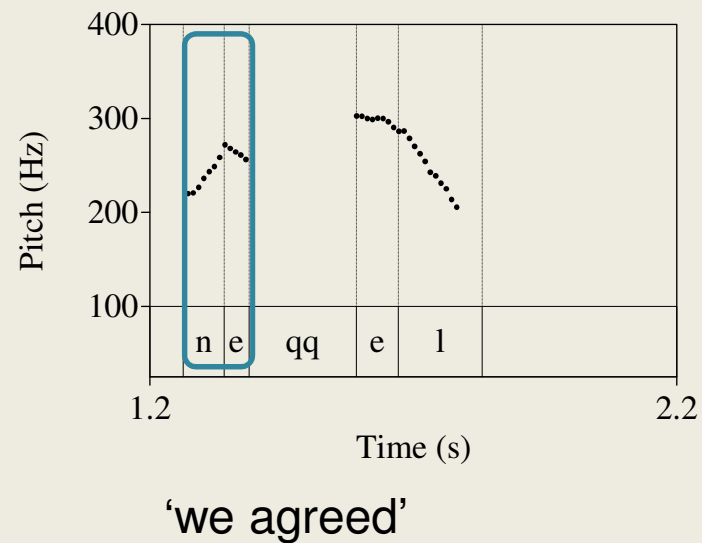
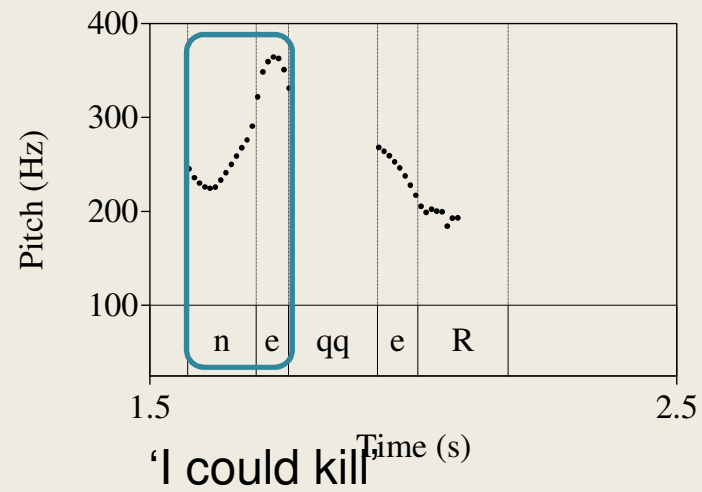


Conclusion Ambonese Malay

- Ambonese Malay places the pitch peak within the last word, with considerable variation in segmental alignment, relating it to the word end.
- Dutch aligns the pitch peak with the beginning of the stressed rime.
- Ambonese Malay has no stress, no pitch accent, no prosodic focus.
- It has *a-caduc*.

Zwara Tamazight (Libya)

Gussenhoven in prep. (TOPIQQ, Dobes)



Zwara segments

	Labial	Alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	b	t ɾ d ɖ		k g	q (q')		
Nasal	m ɱ	n ɳ					
Fricative	f	s ʃ z ʒ	ʃ ʒ		χ (χ') ʁ (ʁ')	ħ ʕ	ʕ
Approximant	w	r ɾ	j				
Lateral		l ɭ					

i ɪ/ə æ u
 ɨ ɘ/ɜ ɑ o

(C) V (C)(C) j V j C j C
 i V i C i C

No hiatus: VV VCV

Zwara stress

1. Penultimate
2. Final, e.g. in PAST verbs.
3. Pre-stressing negative and question suffixes.

jṃ. 'ma

‘he said’

jq. 'qar

‘he was reading’

'a.man

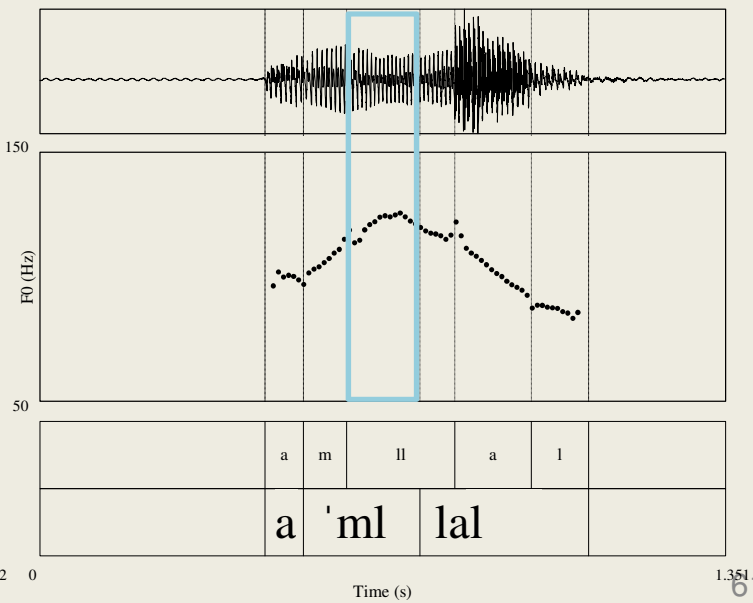
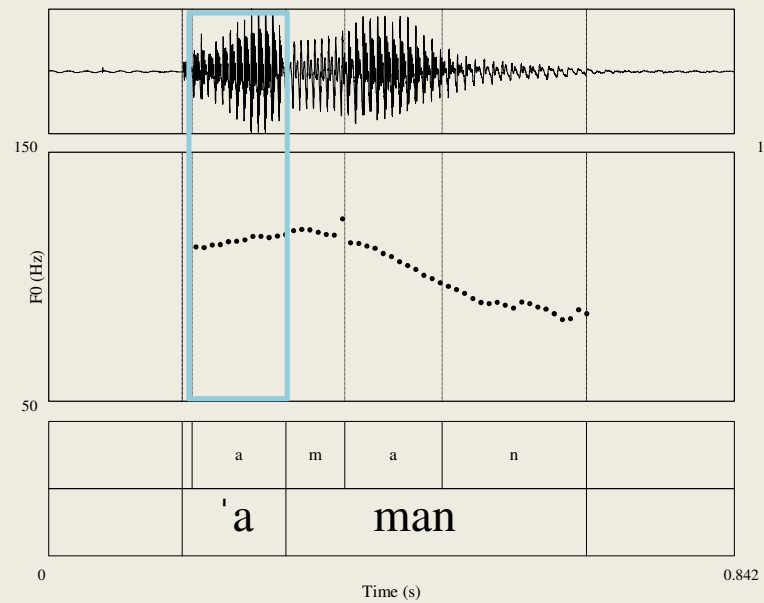
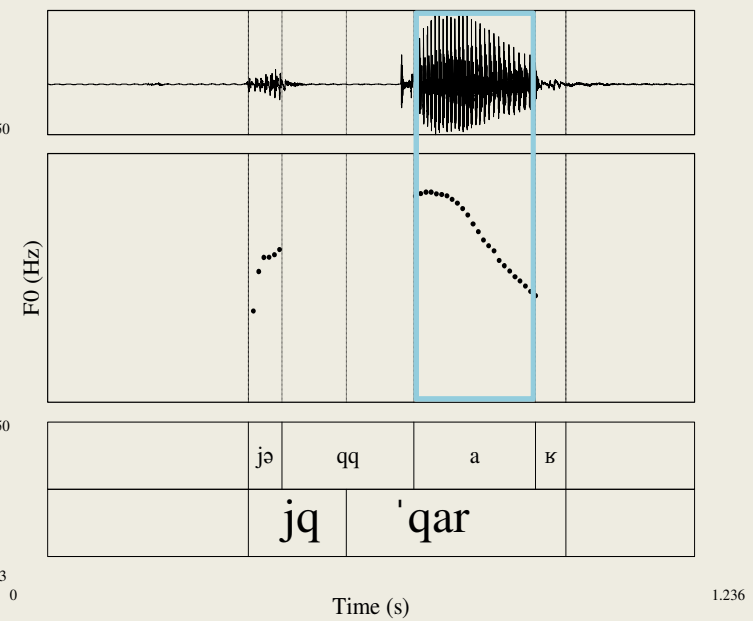
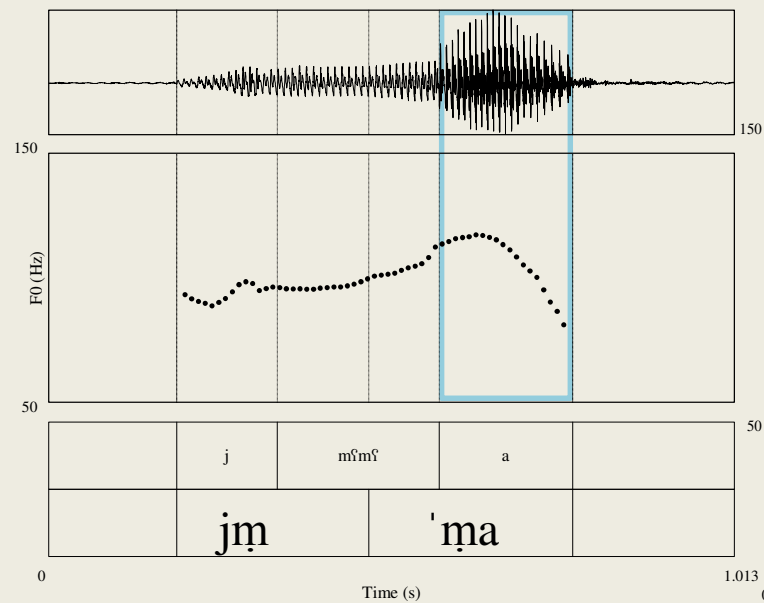
‘water’

a. 'ml.lal

‘white’

'ə.wtt

‘hit-IMP’



Zwara stress

a. 'bχ.χuʃ

‘insect’

a. 'df.fu

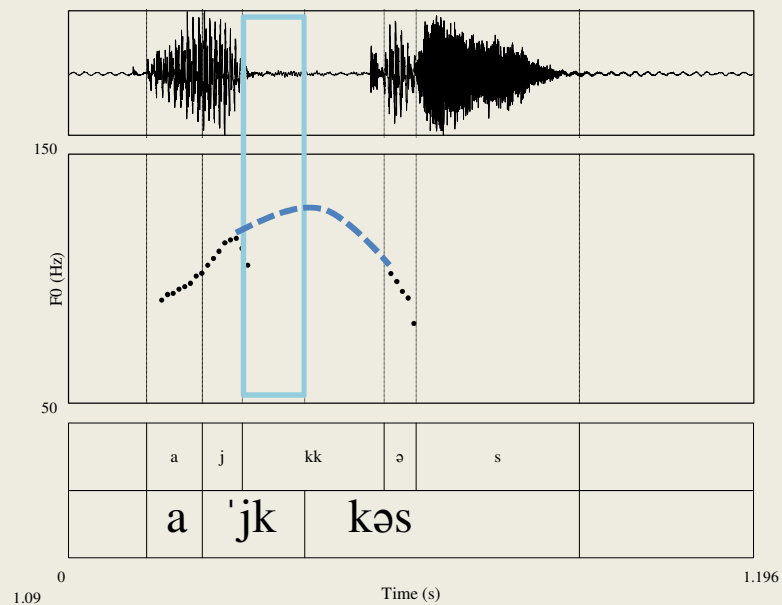
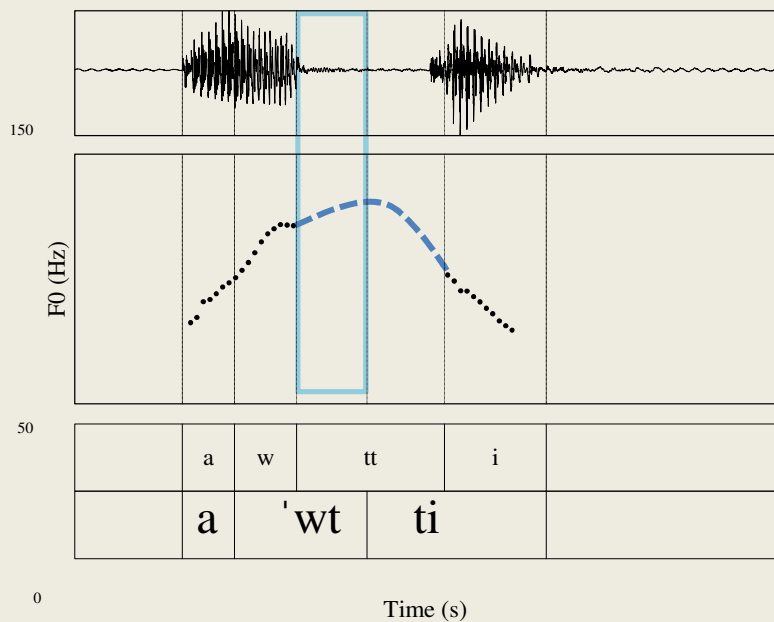
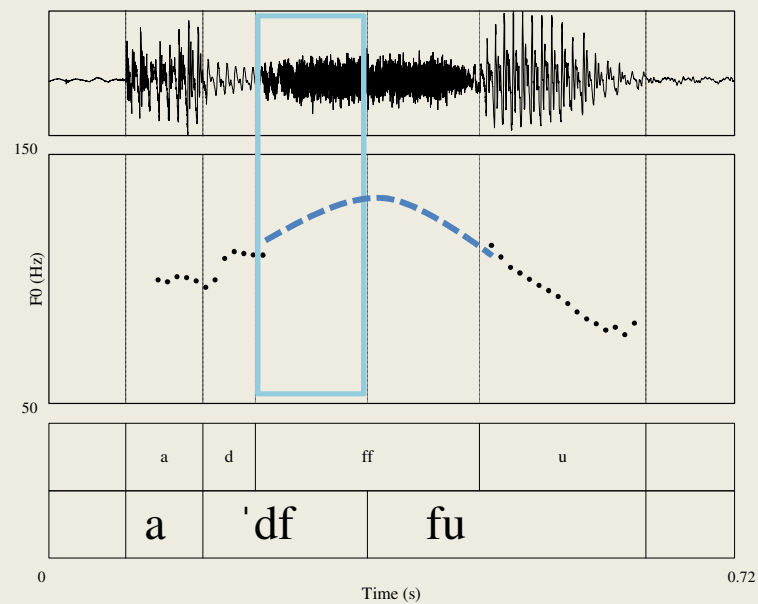
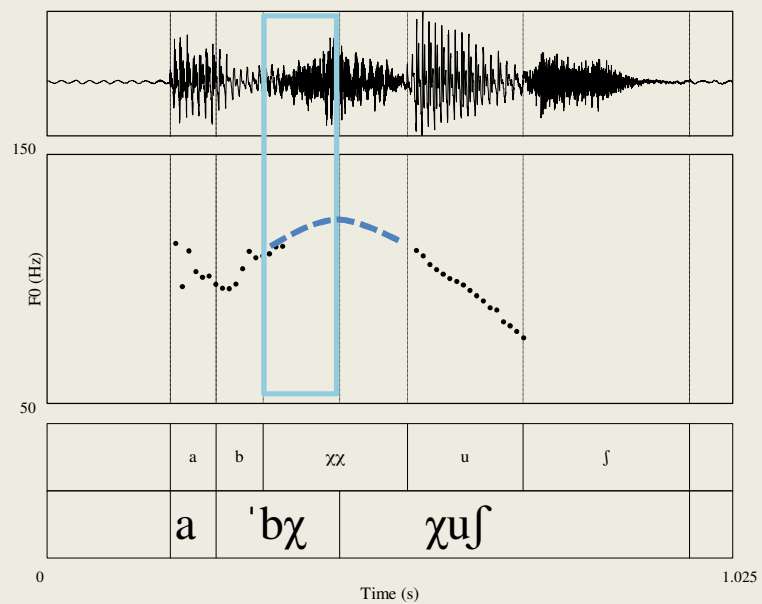
‘apple’

a. 'wt.ti

‘they are preparing’

a. 'jk.kəs

‘he will take off’



[[....] a] Polar question particle



a.'bl.bul

a.'df.fu

ta.'zu.da

jm.'ma

'jm.ma

a.bl.'bu.la

a.df.'fu.a

ta.zu.'da.a

jm.'ma.a

jm.'ma.a

‘An octopus?’

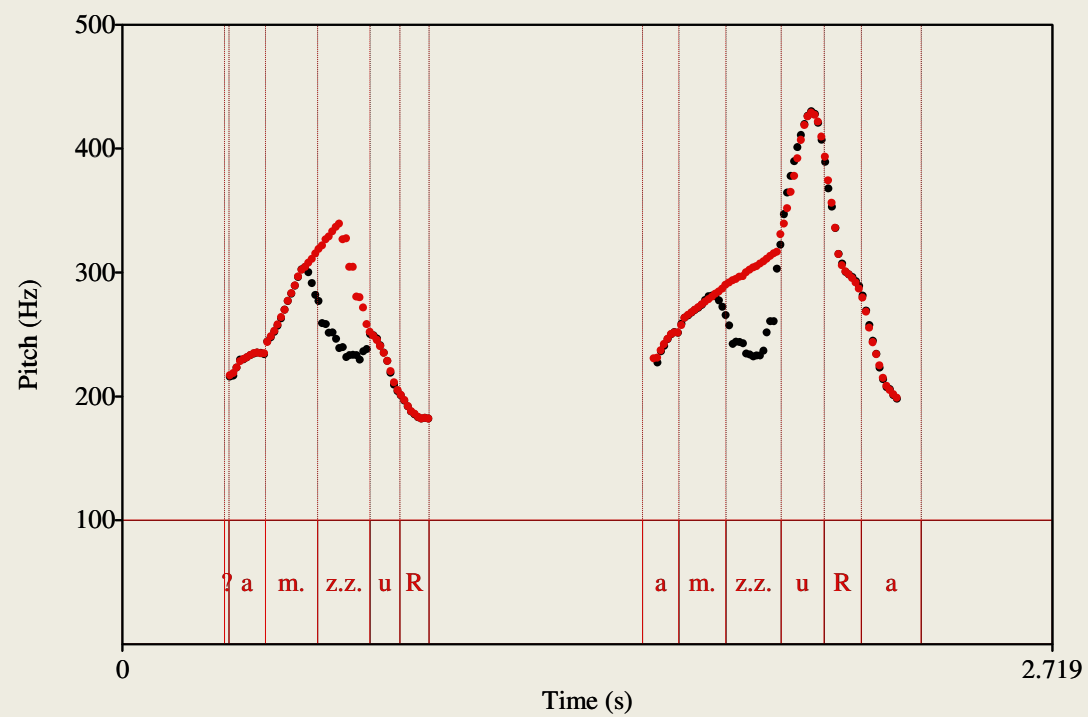
‘An apple?’

‘A plate?’

‘He said?’

‘My mother?’

F0: It's the thought that counts



Location for pitch accents

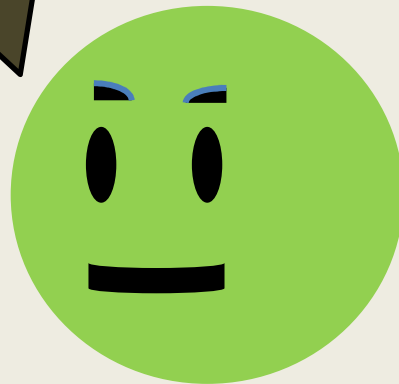
Say X? Why should I say X? I just said X

/jXs/ 'he wants to'

jXs	HLH	LH	HL
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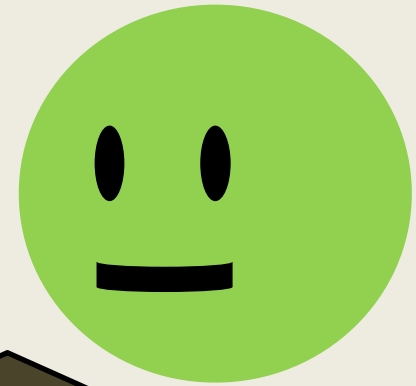
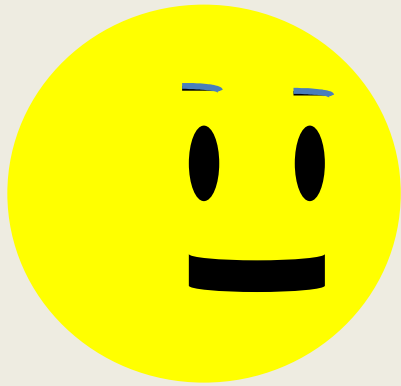
。[米米:4 ?



Σ[。++。[米米:4 ??

。[米米:4

。[米米:4 ?



。+OO。◎ !

Location for pitch accents

Did I say X? No! (I didn't say X!) I said Y.

/jm.'mʒa/ 'he said'

/'jm.ma/ 'my mother'

HLH	HL	HL
'jm.ma		jm.'mʒa
jm.'mʒa	jm.'mʒa	'jm.ma



Conclusion Zuara Tamazight

- Penultimate and final stress.
- Consonants and vowels can be the nucleus of a syllable.
- Stress can occur on silent closure phase of voiceless plosive.
- Stress is location for intonational pitch accent.

Persian word accent

(Abolhasanizadeh, Bijankhan & Gussenhoven 2011)

- Persian words have H-tone on final syllable.
Ignore clitics: *tób-esh-e* ‘it is his swing’
tobésh-e ‘it is light’.
- Morphological accent rules.
- No phonetic stress.
- Are speakers of Persian ‘stress deaf’?

(Peperkamp & Dupoux 2002 and following work)

Testing Persian word accent in stress deafness paradigm

(Rahmani, Rietveld & Gussenhoven, in prep.)

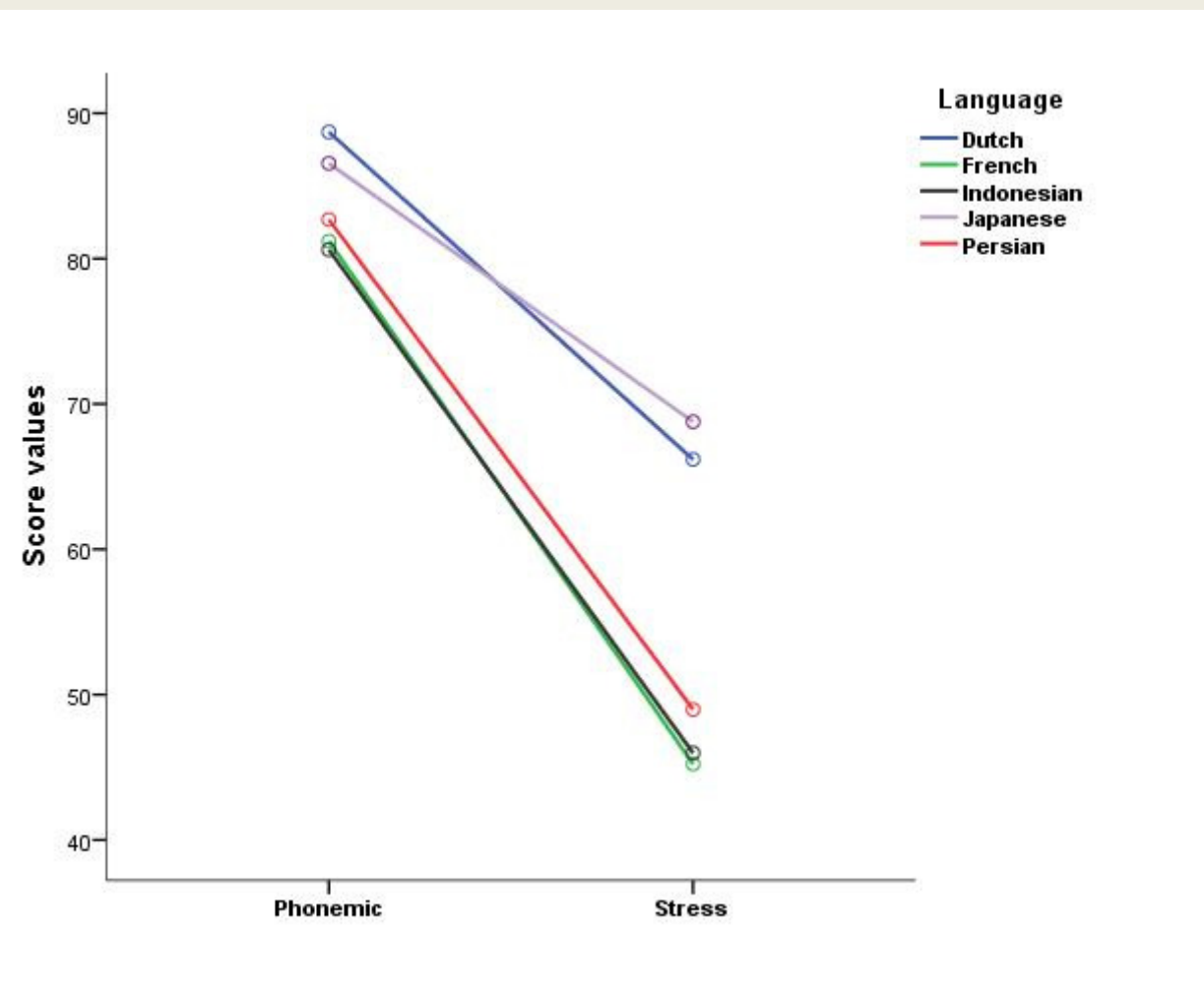
- Lower stress deafness baselines: *French, Indonesian*.
- Upper stress deafness baselines: *Dutch, Japanese*.
- Disyllabic stimuli for ‘stress’ and ‘phoneme’ distinctions:
númi-numí; múnu – múku.
- 3-, 4-, and 5-sequence strings.

Testing Persian word accent in stress deafness paradigm

Rahmani, Rietveld & Gussenhoven (in prep.)

- What's the position of *Persian*?

5 languages, 20 participants per language.



Testing Persian word accent in stress deafness paradigm

Rahmani, Rietveld & Gussenhoven (in prep.)

- Persian is like French and Indonesian, Dutch is like Japanese: two groups of languages.
- Conclusion: success in this test is based on presence of stress/accent marking in lexical stems.
- Persian phonological words are postlexical: clitics are prepositions, auxiliaries, pronouns.
- Verbal accent morphology is exceptionless.

Conclusions

- ‘Stress’ (a) structural (obligatory, culminative)
(b) phonetic realization (non-f0)
(c) lexically marked stress/tone
- Typology is about classifying linguistic features/phenomena (Hyman, *passim*)

Features

	Phonetic stress	Tone	Obligatory	Culminative	Stem marking
Nigerian English	Yes	Yes	Yes		Initial/ peninitial
Ambonese Malay					
Zwara Tamazight	Yes		Yes	Yes	Loan words
Persian		Yes	Yes	Yes	

Thank you!

Abolhasanizadeh, Vahideh, Mahmood Bijankhan, Carlos Gussenhoven (2012). The Persian pitch accent and its retention after the focus. *Lingua* 122, 1380-1394.

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Bowern, Claire & Erich Round (in prep.) . Yidiny stress, length and truncation revisited.

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