

Day 4-Lexical Tone, Grammatical Tone and Orthography

Lecture 1

Orthography Seminar given at Bibles International, Grand Rapids, MI, July 6-9, 2010

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Presentation Plan

1. Characteristics of Tone Languages
2. Overview of Tone and Orthography
3. Lexical Tone Solution
4. Grammatical Tone Solution
5. Optimal Tone Orthography

Quick Read

Read the following text as quickly as possible.

Text -1

- *“The offense in this whole thing is that the offense did not play offense and the defense did not play defense. There is absolutely no defense for this loss.” Koffi (2007)*

Discussion-1

- What problems did you encounter?
What problems is a novice reader likely to encounter?

Text -2

- *“Every Sunday I read the weekend paper faithfully with my morning coffee until an unscrupulous reporter misquoted me in a story,”* Koffi (2007)


Discussion-2

- When did you realize that <read> should be pronounced [rɛd] instead of [ri:d]?

Homographs-1

- **Observation:** When reading homographs [out loud] in English, one must rely on contextual, morphological, and syntactic cues in order to assign the correct pronunciation. Sometimes, one may have to wait until much later in the sentence to find the cue. This causes the reading to lack fluidity.


Homographs-2

- **Observation:** If diacritics are not used to indicate tones, many words which are otherwise tonally contrasted appear in the orthography as homographs (homonyms).
-  In such cases, readers are forced to read the whole context before deciding which tone they should use of the words in question.

Homographs-3

- **Overabundance of Homographs:** Orthographies that do not represent tones have an overabundance of homographs. Homographs compound reading difficulties. If no tones are written, the following Anyi sentences are hard to read:
 - <ɔ'a yɪ yɪ yɪ> or
 - <ɔ ba ba>

Homographs-4

- **Observation:** Contextual cues are necessary to read homographs accurately. To understand the whole context, one must often read the whole sentence before one can discern how to accurately pronounce certain words.
-  Rereading is common when tone is not indicated.

Toneless Orthographies: Before the 1970s

Genesis of Toneless Orthographies-1

- **Tonophobia:** Tone was not marked in most of the orthographies designed before the 1960s because, according to Welmers, there was a widespread tonophobia among missionary linguists. He tells the following story to underscore the fear of tones ...

Genesis of Toneless Orthographies-2

- ... “A missionary candidate and his wife admitted that, when they learned that the language that their African field was a tone language, **they seriously questioned whether the Lord had actually called them to missionary service,**” Welmers (1973:77). *African Language Structures*.

Neglect

- **Neglect:** “Writers of grammars have commonly neglected to describe and write distinctions in tone on the theory that ‘tone can be learned only by observation and practice.’ Leonard Bloomfield aptly commented on this (1942), “such a statement is nothing less than downright swindle, for of course observation and practice are the only way anything can be learned.” Welmers (p. 77) ...

Dismissal

- **Dismissal:** Others **dismiss** the entire topic of tone with only a brief statement of this sort: “Tone is important, as will be seen from the following examples [two or three examples follow]; however, tone will not be marked in this grammar.

Appendix

- **Gifted and Talented:** “One grammar does discuss tone fairly fully but relegates it to an appendix explicitly added for the benefit of those who are particularly interested and who consider themselves especially gifted.”

Omission

- **Silence:** “Many more grammars – more than half of over a hundred grammars of African languages examined – omit all mention of tone; some go so far as to assert that the language being treated is definitely not a tone language, though a little investigation readily proves that it is.”

Esoteric Phenomenon-1

- **Dispensable:** “A shocking number of people concerned with African languages still seem to think of tone as a species of esoteric, inscrutable, and utterly unfortunate accretion characteristic of underprivileged languages – a sort of cancerous malignancy afflicting an otherwise normal linguistic organism. ..

Esoteric Phenomenon-2

- ... Since there is thought to be no cure – or even reliable diagnosis – for this regrettable malady, the usual treatment is to ignore it, in hope that it will go away of itself.”

Reading and Toneless Orthographies

Reading Failure-1

- “An intelligent, educated native speaker of a tone language of West Africa was asked to read a page from a primer in his own language. **He remained staring at the page without speaking for so long** that the people around him became embarrassed. Finally they said, ‘Never mind. It's quite all right if you don't want to read it.’ The African replied, ‘Oh, no,

Reading Failure-2

- ... no. I'll be ready in a minute. It's just that I haven't figured out yet what it is supposed to say, **so I don't know what tone to read it with,**” Gudschinsky (1970:23)

Reading Failure-3

- “It is because of tone that I've had to go back and reread several times what I wrote the day before in order to know what I meant on this translation work I've been doing. We all have to do something about it. **What shall we do?**”
Lucht (1978:26)

The Decade of 1970s: Selective Tone Marking Era

Methodology and Criticisms-1

- **Selective Tone Marking:** Tone was marked contrastively in the text where the lack of tonal diacritics was likely to cause reading failure.
- **Criticisms 1:** Smalley (1964:41) rejects selective tone marking because "it represents the speech system of the language in such an inconsistent way, it compounds the learning problem ..."

Methodology and Criticisms-2

- ...seriously and, in many cases, means that the reader never learns to use the tone symbols at all because he meets them in such an inconsistent fashion."

Smalley (1964:41)

- **Criticism 2:** "It should be mentioned here that a system which marks tone where it is minimally different in ...

Methodology and Criticisms-3

... individual words is not a good system. In such a system, for each individual word one must learn whether it carries a tone mark or not. To mark low tones only on words where there is a minimal tone pair makes the teaching of tone a matter of memory, rather than a matter of rules linked to pronunciation.”

Wiesemann (1989:16)

Methodology and Criticisms-4

- **Criticism 3:** “Writing tone only on minimal pairs presupposes that one has already made a list of all the words in the language to see which ones are minimal pairs. Such a claim is pretentious since most newly written language to do not have good dictionaries.”

Longacre (1964:133)

Close of the 1970s

- **Concluding Remarks about the 1970s:**
The 1970s come to a close with uncertainties still hanging on how to mark tones in the orthography of African languages.

The Decade of 1980s: The Full Tone Marking Era

Deeper Understanding of Tones-

1

- **The Emergence of Autosegmental Phonology:** Goldsmith's work at Indiana University on the tone phonology of African languages paid huge dividends and helped to understand the behavior of tone. Here are some important insights:
 1. Tone is not suprasegmental; it is autosegmental. The segment can be deleted but the tone remains: "floating tone."

Deeper Understanding of Tones-

2

2. **Contour Tones:** Contour tones are found only on long vowels.
3. **The Obligatory Contour Principle (OCP):** Long vowels with contour tones are treated as the combination of two identical vowels, each with its own tone.
4. **Tone Universals:** Low tones are more numerous than high tones worldwide.

Deeper Understanding of Tones-

3

5. **Tone Economy Principle:** For the sake of economy, only the least frequent tone is to be indicated in the orthography.
6. **Full Tone Marking:** For many languages, this means that the high tone should be marked on every tone bearing unit.
7. **Tone Burden:** Full tone marking was burdensome practically and cognitively.

Evaluation and Proposal in the 1990s

Bird's Analysis and Proposal

Methodology and Criticisms-1

- **Criticism 1: Full tone marking reduces fluency, Bird (1998)**

#	Orthography Type	Tone Density	Reading Results	Spelling Results
1.	Stable (phonemic tone)	35%	90%	63%
2.	Basic (Verbs and Nouns)	57%	62%	63%
3.	Surface (all words except affixes)	62%	57%	35%

Methodology and Criticisms-2

- **Criticism 2:** “Although each of the three experiments uses different methods, different kinds of subjects and different languages, *all agree that full surface tone marking is not optimal*. The high tone density which results from surface tone marking imposes too great a cognitive load on readers, and they are unable to use the information conveyed by the tone marks effectively. (Emphasis added) Bird (2001:6)

Methodology and Criticisms-3

- **Bird's Solution to Dschang:** Return to Toneless orthography!
- **Reaction to Bird's Proposal:** “The literacy workers opposed the orthographic changes proposed by the author, claiming that the changes were too radical. They were unpersuaded by ...

Methodology and Criticisms-3


- ...the experimental findings. Having mastered such a complex tone orthography, it was not in their interest to make the task easier for others. Perhaps they thought that their status was at risk, or that the skill on which their livelihood depended was under threat.”

Bird (2001:18-20)

Evaluation and Proposal in the 1990s and 2000s

Optimal Tone Marking


Homograph Avoidance

- Undifferentiated lexical item in tone languages lead to homographs.
-  “Homograph avoidance is an orthographic feature which is exploited widely in the interest of direct lexical access.” Coulmas (1989:173)
- **Homograph Avoidance Principle (HAP)**
Avoid homographs, if possible, Koffi (2008)

Homographs in Toneless Orthographies

- **Lexical Minimal Pairs:**

<ɔ'a yɪ yɪ yɪ>

- This sentence is hard to read because of the presence of three homographs. At least one tone must be indicated before this sentence is readable.
- Solution:  < ɔ'a yɪ yɪ **yí**>

Homograph Avoidance in Spanish

- **Spanish Orthography:** Spanish uses the accent diacritic to distinguish between
 1. lexical minimal pairs such as: **<sí>** (yes) vs. **<si>** (if)
 2. grammatical minimal pairs such as: **<cómo>** (how) vs. **<comó>** (he/she ate) vs. **<como>** (as, like)

Good News about Lexical Minimal Pairs

- **Unexpected Findings about Lexical Minimal Pairs:** As it turns out, for many African languages, lexical minimal pairs are much fewer than scholars had anticipated. In some languages, i.e., Baoule, it is hard to come up with more than a dozen lexical minimal pairs, Bird (1998a:17) and Welmers (1973:117)

Good News about Grammatical Tones

- **Functional Load mostly on Verbs and Pronouns:** “... By grammatical assignment of tone, I mean the morphological placement of a tone on a particular word or morpheme as the marker of a particular grammatical meaning. **Many languages differentiate verb tenses/aspects in this way.**” Tone Rules In *Tone: A Linguistic Survey*, pp. 221-256

The Building Blocks of Optimal Tone Marking

Optimal Tone Marking-1

- **Optimal Tone Marking:** This approach consists in marking tone **sparingly** but **systematically**:
 1. On Lexical Minimal Pairs
 2. On Contrastive Grammatical Constructions
- 📌 By adopting this simple but elegant approach, much of the tone-induced reading difficulties can be minimized.

Illustration from Anyi

Prolegomena to the Analysis of Tones-1

- **Tonal Characteristics of Anyi:** Anyi is a tonal language spoken in Côte d'Ivoire, W. Africa. It belongs to the Akan family of languages. It has the following tonal properties:
 1. **Contrastive Lexical Tones:** About **70** minimal pairs have been identified to date.
 2. **Contrastive Grammatical Tones:** **3** grammatical structures are differentiated by tone alone.

Anyi Grammatical Tones

1. Simple (Habitual) present
2. The Intentional (Future/Progressive)
3. The Injunctive mood

Reading Difficulties-1

- 1. Confusion 1:** Quaireau (1981:300) has noted that if tone is not written, there will be a confusion between the constative (simple present) and the injunctive:

< ɔ tie >

He listens

vs. < ɔ tie >

He should listen

Reading Difficulties-2

- 2. Confusion 2:** If the lengthening is not indicated on the pronoun, there is a risk of confusion between the intentional (progressive) and the constative (simple present) in the Morofou dialect, (Quaireau 1981:300).

< ɔ tie > vs. < ɔ tie >

He wants to listen He listens

The Data-1

- **The Data consist of the following language sample:**
 1. All 6 Anyi subject pronouns are said in their citation forms.
 2. Anyi verbs are said in their citation forms
 3. Anyi nouns are said in their citation forms

The Data-2

4. A combination of the above in various sentences
5. The sentence <*ò kó sùkúlù*> has been taken as the sample sentence to illustrate general patterns.

Tones and Pronouns

- **Overview of Tone of Pronouns:** Anyi has 6 subject pronouns.
- The phonemic tone of pronouns is low.
- The pronoun /ámò/ is probably not historically a pronoun. It behaves like a lexical NP.

N0.	Pronouns	Glosses
1.	/m̀/ = 116Hz	“I/me”
2.	/ɛ̀/ = 115Hz	“You”
3.	/ò/ = 105 Hz	“He/she,” “him/her”
4.	/yɛ̀/= 110Hz	“we/us”
5.	/ámò/=129Hz and 98 Hz	“You”
6.	/bɛ̀/=104Hz	“They”

Simple (Habitual) Present

Simple (Habitual) Present

- **Morphological Characteristics:** Tone is the primary mean to signal the presence of the constative aspect. The subject pronoun in the constative has a **low tone**:

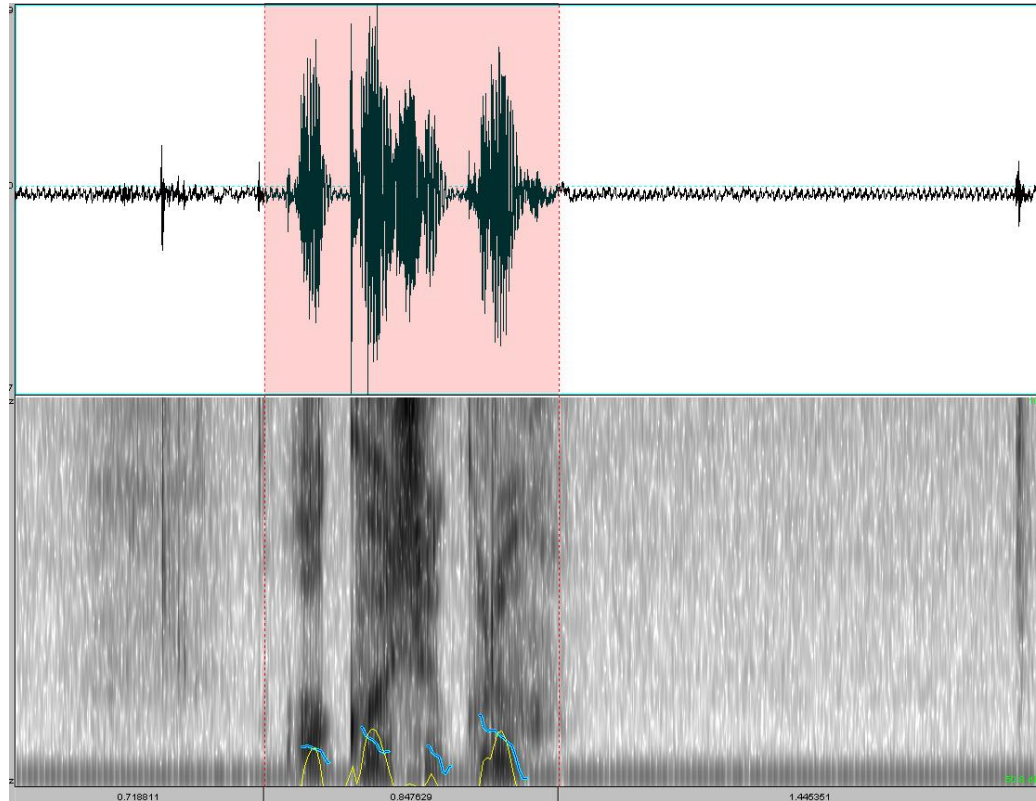
1. **Constative Aspect**

/ò kó sùkùlù/

she/he go school

She/he goes to school

Spectrograph Analysis of /ɔ̃/ kó sùkúlù/



Acoustic Analysis of the Simple(Habitual) Present

N0.	Category	Pitch	Duration	Amplitude
1.	Bè dí	111Hz 127Hz	99 ms 96ms	56dB 55dB
2.	ò kó sùkúlù	113 Hz 123Hz	94ms 91ms	52 dB 55dB
3.	Bè tié	98Hz 114Hz	104ms 201ms	58dB 66dB

Focus on the Intentional (Future/Progressive)

Focus on the Intentional

- **Morphological Characteristics:**

1. The tone of the subject pronoun is high, (Quaireau 1981: 305).
2. **Duration and Dialect Variations:** In the Morofou dialect, the subject pronoun is lengthened to High-Low. Quaireau (1981:300) seems to indicate that this is not the case of the Ndenie and Bona dialects.

Sample Sentence

1. The Intentional Mood

/óò

she/he

She/he

kó

go

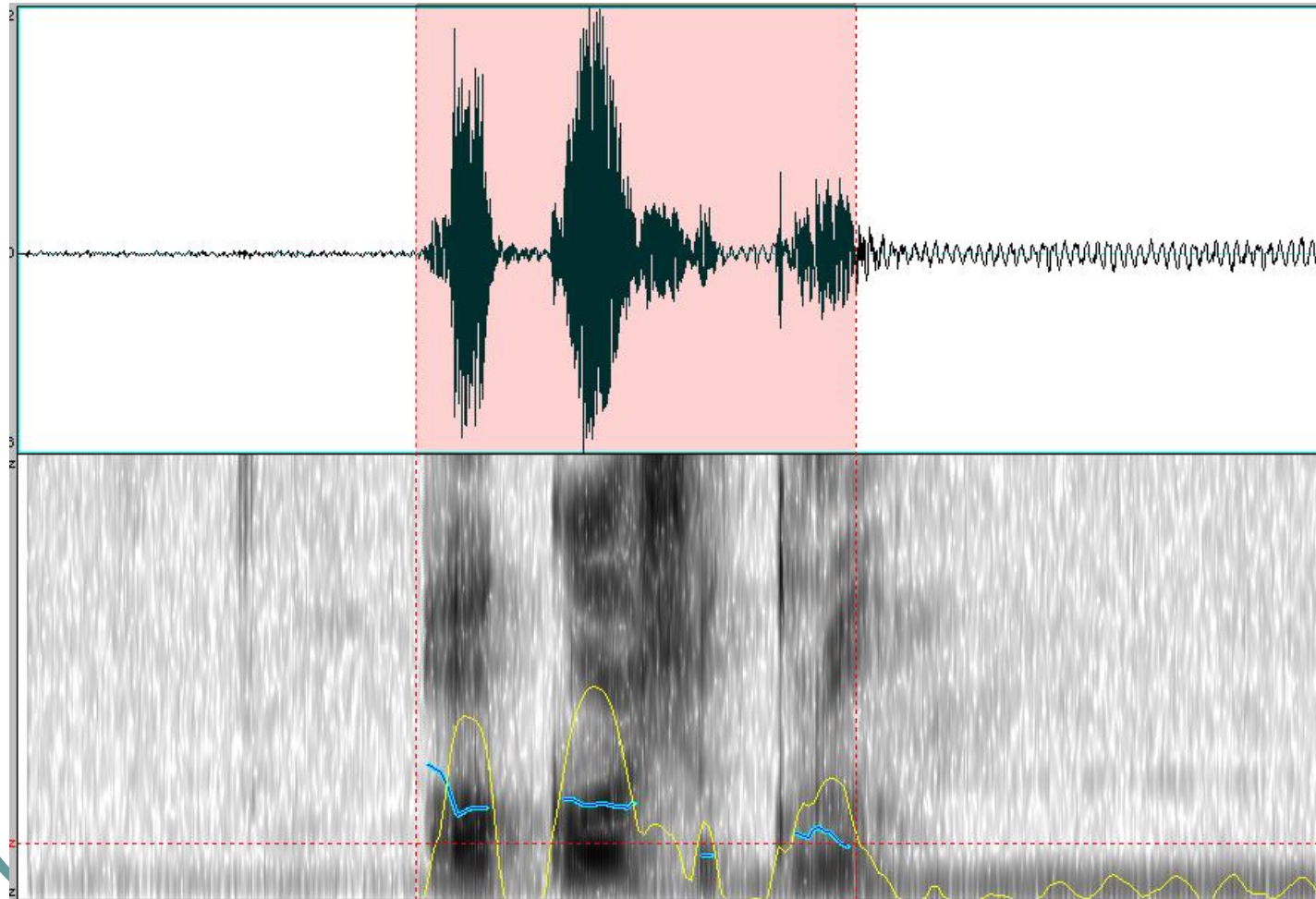
is going to

sùkúlù /

school

school.

Spectrograph Analysis of /óó kó sùkùlù/



Acoustic Analysis of the Intentional /óò kó sùkúlù /

N0.	Category	Pitch	Duration	Amplitude
1.	béè dí	122Hz 127Hz	154ms 122ms	64dB 61dB
2.	óò kó sùkúlù	174 Hz 166Hz	116 ms 135ms	67dB 71dB
3.	Béè tié	132Hz 98Hz	176ms 119ms	69dB 64dB

Focus on the Injunctive

Focus on the Injunctive-1

- **Semantic Characteristics:**

1. The injunctive is not an aspect. It is a mood. It corresponds both to the jussive and the cohortative.

- **Morphological Characteristics:**

1. The subject pronoun has a phonemically low tone. However, it rises to mid as a result of a regressive assimilation rule caused by the high tone of the verb.

Focus on the Injunctive-2

- 2. Tone Reversal Rule:** There is a tone reversal rule on the verb. Disyllabic CVV or CVCV verbs have a phonemic low high tonal pattern. However, in the injunctive, the tonal pattern is reversed. The first syllable has a high tone and the second syllable has a low tone:
/jɛ́sú/ → [jɛ́sú]

Focus on the Injunctive-3

- 3. Dialectal Variation:** In the Morofou dialect, the tone of the subject pronoun is almost high. However, others have noted that it is low. Carteron (1966:25) remarks that in the Baoule dialect of Bocanda, the tone of the subject pronoun is high. The Morofou dialect used in this analysis is closely related to the Baoule dialect studied by Carteron. The acoustic measurements suggest that the tone of this pronoun is almost high in my dialect, see the next slide.

Sample Sentence

1. Injunctive Mood

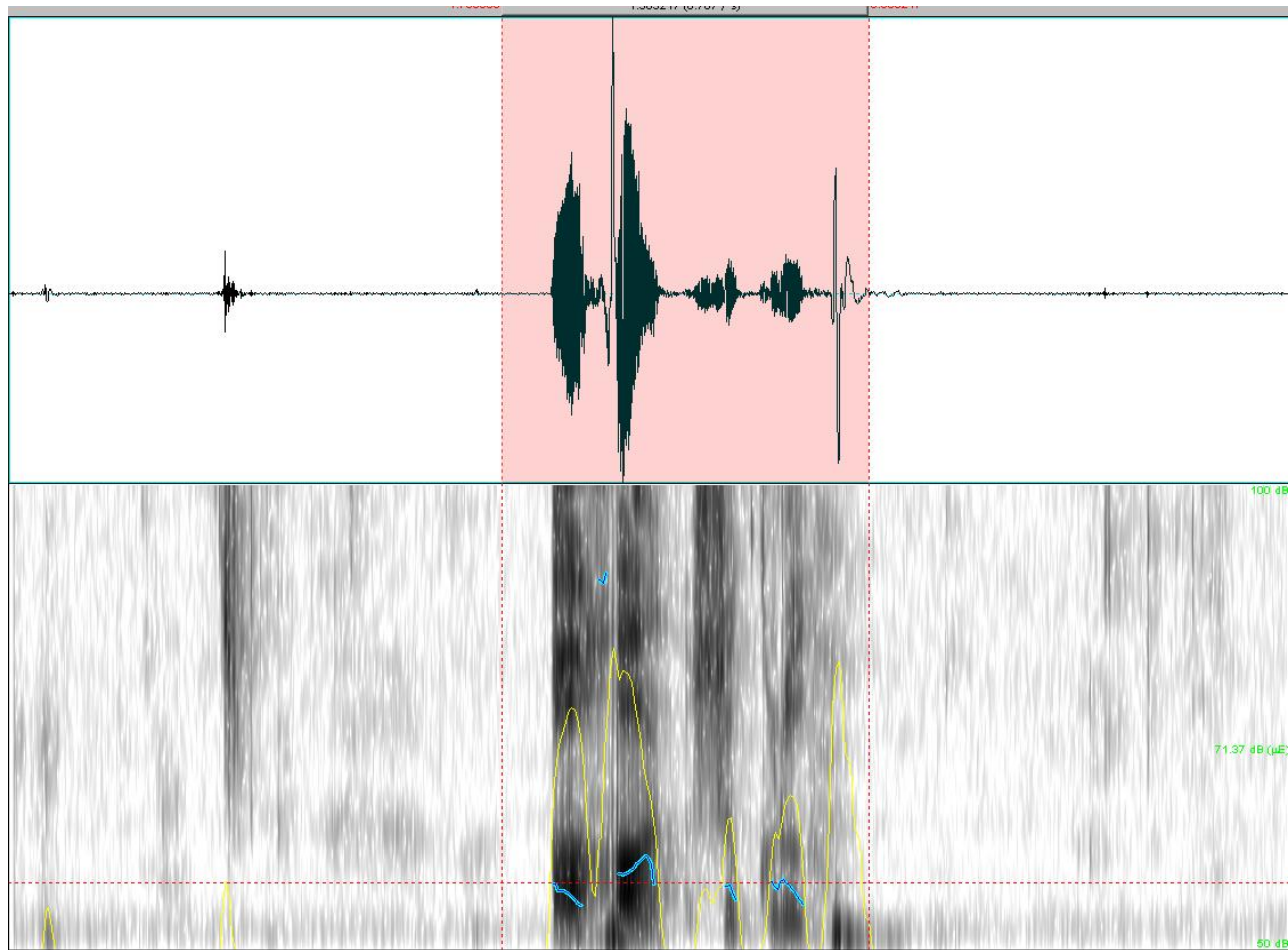
/ò hó sùkúlù/

she/he go school

Let him (may he) go to school

Let her (may she) go to school

Spectrograph Analysis of /ò hó sùkúlù/



Acoustic Analysis of the Injunctive

N0.	Category	Pitch	Duration	Amplitude
1.	Bè lí	118Hz 139Hz	84ms 104ms	67dB 64dB
2.	ò hó sùkúlù	119Hz 148Hz	97 ms 120ms	75dB 71dB
3.	Bè tíè	120Hz 136Hz	66ms 143ms	51dB 65dB

Summary of Acoustic Values

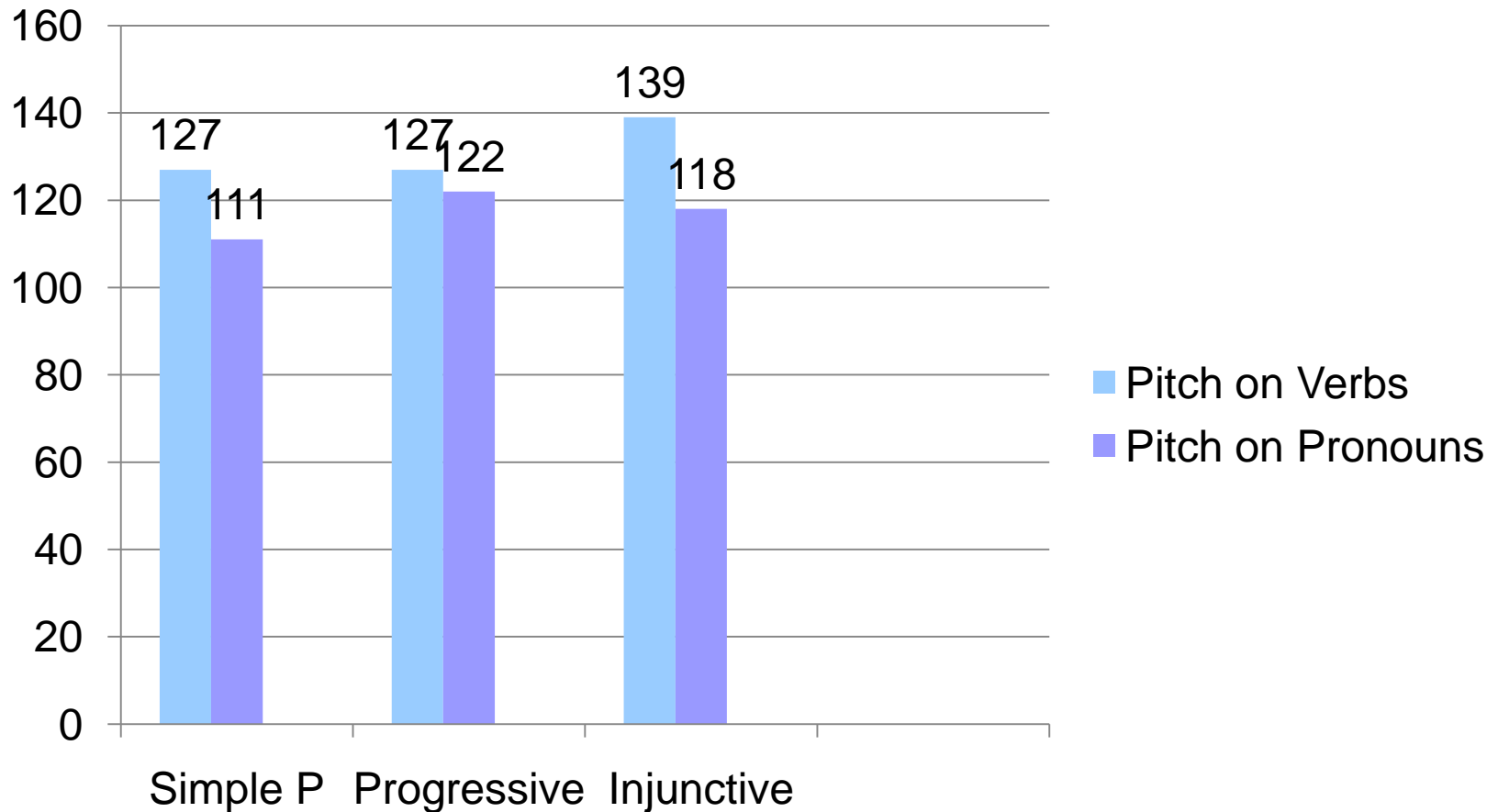
Summary of Acoustic Values-1

Category	Simple Present		Intentional (Future, Progressive)		Injunctive	
Pronoun & Verb	Bè	dí	B'éè	dí	bè	lí
Pitch	111Hz	127Hz	122Hz	127Hz	118 Hz	139Hz
Duration	199 ms	096ms	154ms	122ms	184ms	104ms
Amplitude	56dB	55dB	64dB	61dB	67dB	64dB

Summary of Acoustic Values-2

Category	Simple Present		Intentional (Future, Progressive)		Injunctive	
Pronoun & Verb	ò	kó	óò	kó	ò	hó
Pitch	118Hz	129Hz	147Hz	143Hz	123 Hz	148Hz
Duration	063ms	082ms	107ms	111ms	094ms	126ms
Amplitude	61dB	68dB	71dB	69dB	68dB	69dB

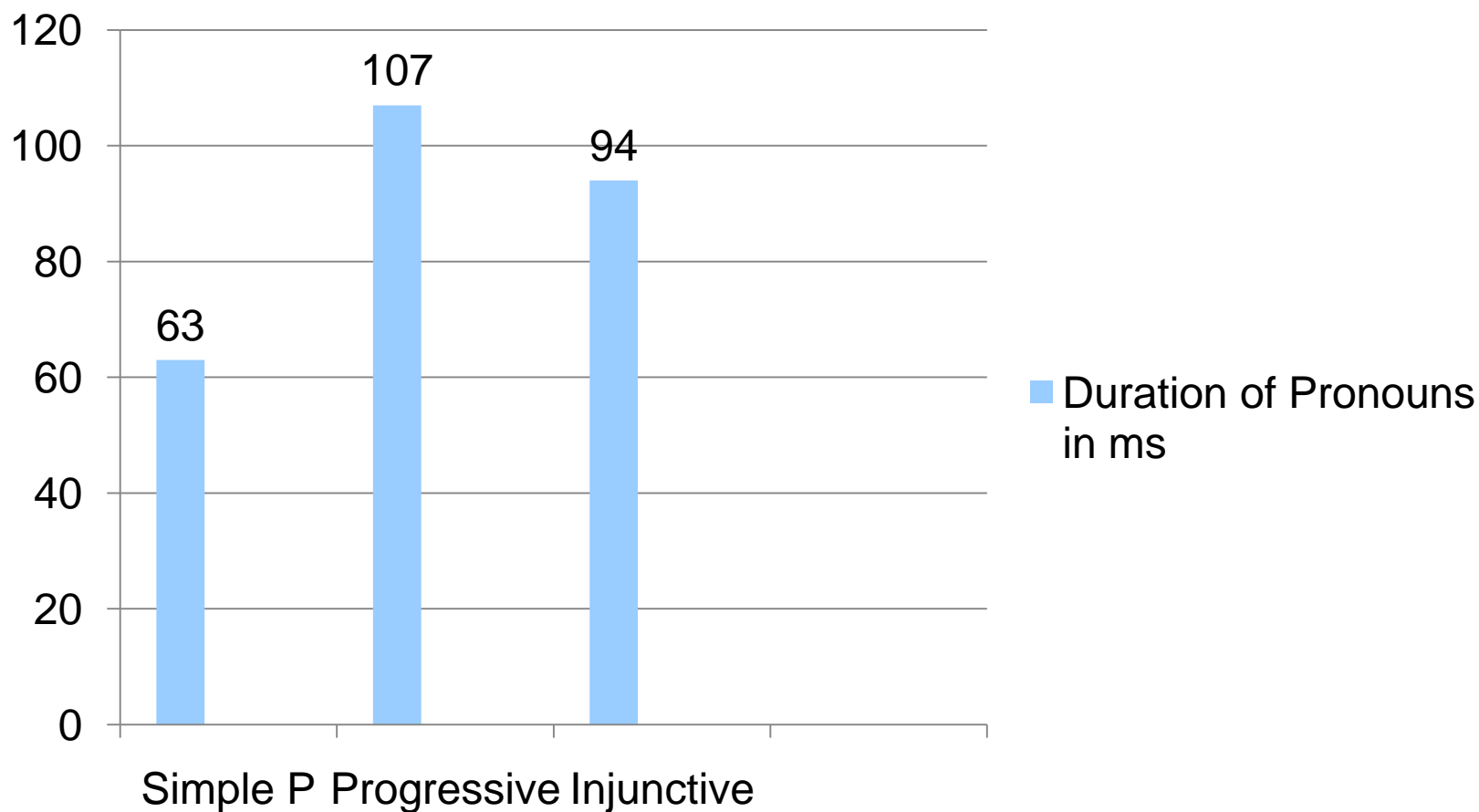
Bar Graphs of Tone Pitch on Verbs



Tone Marking on Anyi Verbs

- **Verbs:** The high tone is indicated only on the **injunctive** form of the verb. The simple present and the progressive have essentially the same pitch.

Bar Graphs of Pronoun Duration



Tone Marking on Anyi Pronouns

- **Pronouns:** The lengthening of the vowel of pronouns is indicated only on the **progressive**. A high tone is indicated on the first vowel. The second vowel has a low tone. The latter is unmarked.

Tone Marking and Sentence Phonology

Prolegomena to the Analysis of Tones-2

1. **Level Tones:** Anyi has two level tones
2. **Tone Assimilation:** Various tone assimilation rules apply. Both **downdrift** and **downstep** rules also apply. It is important to understand these two rules. However, we will not focus on them.
3. **Sentence Phonology and Orthography:** Generally post-lexical phonology rules are not taken into account in designing orthographies.

Conclusion: An Elegant Solution!

Conclusion: An Elegant Solution

- **Optimal Tone Marking is an elegant solution:** because:
 1. It does not overcrowd the text with tonal diacritics.
 2. It sufficiently discriminates between lexical minimal pairs which are based solely on tone.
 3. It sufficiently discriminates between grammatical constructions which are based solely on tone.

Homework

Exercise 1A

- Assessment:
 1. Does/do your language(s) have tone? How many level tones? How many contour tones?
 2. Is tone written in the orthography of your language(s)? If not, why not?
 3. If tone is marked, which tone(s) is/are marked?

Exercise 1B

4. What orthographic principle guided tone marking in your language?
5. Do people experience difficulty reading your language(s)?
6. Do people experience difficulty writing tone in your language(s)?

Exercise 2

- **Lexical Minimal Pair Analysis:** Write down as many tonal lexical minimal pairs as you can find in your language(s).
- **Note:** A week of concentrated efforts will be enough to list the most common ones.

Exercise 3

- **Grammatical Tone Analysis:**
Grammatical tones are often limited to one or two parts of speech. Which part(s) of speech seem to carry grammatical tone in your language(s)?
- **Note:** A week of concentrated efforts will be enough to list the most common ones.

Selected References

Selected References-1

1. Bird, Stephen. 1998a. Strategies for Representing Tone in African Writing Systems: A Critical Review.
2. Bird, Stephen. 1998b. When Tone Marking Reduces Fluency: An Orthography.
3. Bird, Stephen. 2001. Orthography and Identity in Cameroon.

All these articles are available online at:

www.orthographyclearinghouse.org

Selected References-2

4. Gudschinsky, Sarah C. 1970. More on Formulating Efficient Orthographies. *The Bible Translator*, vol. 21, No. 1. 21-5.

5. Koffi, Ettien. 2008. *Towards an Optimal Representation of Tones in the Orthographies of African Languages*. Available online at:
www.orthographyclearinghouse.org

Selected References-3

6. Koffi, Ettien. 2007. *The Acoustic and Orthographic Analyses of Anyi Grammatical Tones*. Paper Presented at the Linguistic Colloquium at the University of Minnesota on 30 November. Available online at: www.orthographyclearinghouse.org
7. Koffi, Ettien N. 1994. Koffi, Ettien N. 1994. The representation of tones in the orthography. *Notes on Literacy* 20(3): 51-59.

Selected References-4

8. Longacre, Robert E. 1964. Tone Orthography in Trique. *Orthography Studies: Articles on New Writing Systems*. Amsterdam: The United Bible Societies and the North-Holland Publishing Company.
9. Lucht, Ramona. 1978. Siane tone orthography. *Notes on Literacy*, 24, 25–8.

Selected References-5

10. Smalley, William. 1964. Writing Systems and their Characteristics. *Orthography Studies: Articles on New Writing Systems*. Amsterdam: The United Bible Societies and the North-Holland Publishing Company.
11. Wiesemann, Ursula. 1989. Orthography Matters. *Notes on Literacy*, No 57.14-21.