Tones and intonation in Gizey

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0. Introduction

This paper investigates the role of intonation in Gizey, a tonal language classified as a Chadic language - one of the four families of the Afro-Asiatic phylum (Ajello & Karyo & Melis & Dobio 2001; De Dominicis 2007; Melis 1999, 2002, 2007). Gizey belongs to the Biu-Mandara or the Masa cluster, which includes two branches: Masa (Masa, Gizey) and Musey (Musey, Ham, Marba-Lew, Monogoy). According to Seignobos's census (Seignobos & Iyebi-Mandjek 2000), Gizey is spoken in the south of Chad and in the north of Cameroon by about 12,000 speakers. It has not been described yet and it is not included in the *Ethnologue* archive (Grimes & Grimes 1996). In the present study, a dialogue (recorded on January 7, 2004) between two native speakers (both males, 20 years of age) living in Djougoumta – a little village in the North-East of Cameroon – has been analysed. Their conversation concerns local methods of building houses.

As a tonal language, Gizey should attribute to F0 dynamics the expression of both lexical tones and sentence intonation contour. But many contexts show a more complex tonal perturbation, in which the surface realisation is the expression of underlying syntactic functions and relations. Just as words sequences instantiate or repeat a given syntactic scheme and thus can be analysed in a *grid*, certain perturbation patterns mark their membership to the same syntactic function, sometimes even beyond the intonation phrase boundaries. In other words, in these cases, the similarity of the perturbation mechanisms establishes and endorses the syntax-intonation interface: at the surface level, the affected constituents mark the underlying identity of their syntactic function.

1. Tone and Intonation in tone languages

Intonation contours and lexical tones are both expressions of F0 dynamics. The differences lie in the extension of the constituents to which they are linked, and the kind of linguistic hierarchy they depend on. As for the former difference, intonation contours associate with major constituents (such as syntactic phrases), whereas the syllable is the main tone bearing unit. As for the latter difference, intonation relies upon the phonological hierarchy and tones on lexical (or morphological) one.

In tone languages tone and intonation interact even if their surface expression is the result of two distinct hierarchies and they are differently aligned to segmental units.

The organization of the phonological hierarchies surfaces through the emergence of prominences. Some depend also on lexical abstractions (e.g. the stress), but as a rule they are phonologically constrained (e.g. the syllabic nucleus, the strong syllable in a foot, the strong foot in a prosodic word). A particular case of prominence is the intonation nucleus or the tone associated with "sentence stress". It is the main cue to signal an Intonation Phrase (IP). The tight relation between phonetic prominence and nucleus plays also a crucial role in most of the literature concerning the interface between syntax and prosody and particularly between syntactic categories and intonation phrasing (Bing 1979; Selkirk 2005; Taglicht 1998).

The interfacing nature of intonation thickens through the interaction with lexical tones: the latter adds its effects to the former. We would call *additional* this direct relation between tone and intonation, inferring from Gussenhoven (2004).[1]

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[1] Yip (2002) gives a deeper specification to this "additional" model. She lists different ways of interaction of lexical tone and intonation. Some tone languages use sentence particles; boundary tones; different strategies to adjust the overall pitch register. Some tone languages add sentence-final particles, or at sentence-internal phrase boundaries [Vietnamese (Đo et al. 1998); Mandarin (Chao 1968); Cantonese (Law 1990)]. They are short, unstressed, and toneless, taking the pitch from the preceding syllable like any other toneless syllable.

Other tonal particles can add directly onto the last lexical item in a sentence, with no intervening segmental particle. In Cantonese (Law 1990) echo questions are formed by the addition of a high tone which starts on the pitch of the original tone and ends high. Gokana (Cross River, Hyman 1990) has WH-particle, /E/, which in conjoined questions can be shown to be a component of the intonational phrase.

Another type of interaction between lexical tones and intonation is the addition of a phrase-level tone: a type of particle that lacks segments, consisting solely of tone. In Hausa a low tone is optionally added to the end of a question, and is attached to the final lexical tone (Inkelas & Leben 1990). In Taiwanese (Peng 1997) a final high boundary tone is added at the end of the last lexical tone of an imperative. A third type of interaction tone-intonation is the pitch register adjustment such as

In this paper we wish to present evidences to a more complex model of the "additional" theory of the interaction between tone and intonation in tone languages and show that the intonation contour may not only induce an increase or a decrease of the F0 values issuing from the lexical tones (e.g. a phonologically motivated downdrift or upstep), but may also trigger more complex perturbations onto lexical tones: sometimes – for instance – a high lexical tone appears lowered (or a low tone raised) in order to mark the intonation phrasing and particularly the relation among the nucleus and the other parts of the IP. Our second aim is to emphasize the grid of multiple relations which bind together the constituents of a clause or sentence at syntactic and macrosyntactic level in a conversation. We will adopt the grid representation system by Claire Blanche-Benveniste and the *Groupe Aixois de Recherche en Syntaxe*. But we will use the *grids* device to represent both syntactic and intonation functions. So we will account for the recurrence of the same pattern of tonal perturbation over different constituents as well as the recurrence of a given set of syntactic functions on the same constituents. Moreover, these constituents share also some unexpected segmental alteration. So, the three levels (intonation, syntax and segmental realization) interface, conspiring in order to establish a set of relations that link some parts of the IPs, Clauses and Discourse. In these cases we assume that the position of adjacent tonal prominences depends mainly on the syntactic phrasing and that their shape and level is shared among them. These sets of prominences or nuclei will be called *rhyming prominences* or *rhyming nuclei*.

2. Methodology and analytic tools

As described in De Dominicis (2007), two phonological tones (L and H) are recognized in Gizey. The analysis is performed according to a certain number of methodological and descriptive accounts.

2.1. *Final* [ʔ]

Before pause, Gizey noun and verb roots, ending in vowel, add a glottal stop or the final vowel becomes creaky or unvoiced (De Dominicis 2007). This finding is supported by cross-linguistic studies

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declination: a gradual fall in the pitch of high-toned syllables, and sometimes also low-toned syllables, across an utterance. It signals phrasal boundaries.

Moreover we find overall lowering of the complete pitch register in Taiwanese (Peng 1997); overall raising is found in Hausa questions (Inkelas & Leben 1990); expansion of the pitch range is used for emphasis in Mandarin (Shih 1987).

of phonation type. It is suggested that glottal stops may be realized as creaky phonation on neighbouring sounds rather than with complete glottal gesture (Gordon & Ladefoged 2001).

At times, this phonotactic mark may occur somewhere in the conversation even out of context (i.e. after a root ending in consonant) or on the contrary, in the right contexts when it might be expected to appear, it doesn't (i.e. after a root ending in vowel). In these cases the mark or its absence is unexpected. And this may be explained if it is investigated in the light of a larger intonation analysis, as it complies with the location and the specific patterns of the nuclei or of the tonal perturbations in the IP.[2]

2.2. *Tonal perturbation*

In a tone language lexical tones and intonation contour interact so that the actual contour is the result of the F0 generated by lexical tones and sentence intonation. As a consequence, the lexical tones may be downstepped or upstepped regardless of phonological reasons. If a downdrift occurs after a low tone or an upstep after a high tone, then it could be phonologically motivated. But in absence of this contextual trigger the tonal perturbation of the lexical tone may be ascribed to the effect of the intonation contour. In this case it is called *tonal perturbation*.

2.3. *Segmental perturbations*

Sometimes the tonal perturbation matches segmental ones. That is to say that on the same constituents where tonal perturbations occur, we may also find some changes of phones, by insertion (final [ʔ]) or by substitution. These would be inexplicable without referring to the constraints of the intonation analysis.

2.4. *Syntactic grid*

The syntactic representation will be performed by means of a *grid*, which is a description of syntactic dependencies in a bidimensional diagram. This analytic tool has been elaborated by the *Groupe Aixois de Recherche en Syntaxe* (Blanche-Benveniste 1979; 1990; 1997; Blanche-Benveniste *et al.* 1979; 1990; Bilger 1982; Bilger *et al.* 1997) in order to represent data and to account for the development of the spoken language in a conversation. It explains the phenomena bound

[2] No account for pauses and their length is given (see the figures in attachment). Of course, they are markers both for syntax and intonation analysis, but in Gizey the final [ʔ] will run to signal the end of a word.

up with the construction of meaning and of grammatical functions. It is particularly useful to highlight the disfluencies and the fragmentary character of speech (false starts, hesitations, repetitions). In spoken language, linearity is often interrupted: a given sequence is actually not realized as a whole, but as consecutive waves which represent the process of construction. A grid is set up on two dimensions: the horizontal axis represents the sequence of syntagmatic positions or constituents; whereas if in a given position different paradigmatic realizations exist, then they are shown on the vertical axis. A *discourse configuration* is the sum of the syntagmatic construction and its paradigmatic fragments. The same configuration may recur at regular intervals, like a refrain or a rhyme, thus giving a specific architecture to the discourse.

In parallel with this syntactic approach we will arrange intonation data on a tonal grid. It is the same bidimensional diagram and it represents the tonal features of an IP, which may correspond to a Root Sentence or to a Clause. Like the syntactic grid, the tonal one highlights the recurrence of the same tonal pattern in different syntagmatic positions or on the paradigmatic set of constituents belonging to the same syntactic position. In both cases if a given tonal perturbation recurs, then each instance accounts for an occurrence of a *rhyming* intonation pattern. These rhyming intonations may act on the semantics of the sentence (case 2) but their main function is to ensure the conversational cohesion (case 1). Sometimes the rhyming intonation units occur on constituents located beyond the intonation phrase boundaries (cases 1, 5) or beyond the speech turns boundaries (cases 6, 7). In these cases the intonation architecture of the conversation and its rhyming patterns provide the support for the dialogue cooperation of the interlocutors.

2.5. *Syntax-intonation interface*

Sometimes (cf. cases 4, 5) certain shared perturbation patterns and rhyming intonations among word sequences signal their membership to the same syntactic function, sometimes even beyond the intonation phrase boundaries. In other words, in these cases, the similarity of the perturbation mechanisms establishes and endorses the syntax-intonation interface: at the surface level, the affected constituents mark the underlying identity of their syntactic function.

3. Study Cases

The data are organized as follows: in the first line the narrow IPA transcription, in the second line the broad (phonological) one, in the third the word-by-word English translation, in the fourth line the rough translation. As a rule, the data are gathered in clauses (C), and in Intonation Phrases (IP).

Eight cases will be drawn from the conversation, discussed and analysed. Each C will be represented by means of a syntactic grid. The corresponding description of the IP will be arranged into tonal grids.

The symbols "↓" / "↑" mean tonal downstep (or downdrift)[3] / upstep.

In order to account for the speech turns of two interlocutors, the two speakers will be referred to in the grids as "A" or "B". The intonation nucleus location is marked by an underlined word.

Case 1 (figg. 1-3)

<table>
<tr><td rowspan="9">C1
IP1</td><td colspan="7">kòʔ zìʔ zìʔ zìʔ zìʔ kj↓énʔ ínʔə́ʔ àʔ
kàjn zìɗá zìɗá zìɗá zìɗá kàjnì ínáʔ ...
so hut hut hut hut DEMONSTRATIVE <u>build-it</u> that is
so, the hut you <u>build it</u></td></tr>
<tr><td>1</td><td rowspan="8">A</td><td>kòʔ
so</td><td>zìʔ
hut</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td>zìʔ
hut</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td>zìʔ
hut</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td>zìʔ
hut</td><td>kj↓énʔ
DEMON.</td><td>ínʔə́ʔ
build-it</td><td>àʔ
that is</td></tr>
<tr><td></td><td>Adv.</td><td>N</td><td>Modif.</td><td>V</td><td>Adv.</td></tr>
<tr><td></td><td></td><td colspan="2">NP</td><td>VP</td><td></td></tr>
<tr><td></td><td>L</td><td>L</td><td>↓H</td><td>Nucleus (HH)</td><td>L</td></tr>
<tr><td></td><td>[ʔ]#</td><td>[ʔ]#</td><td>/a/ → [e]; C[ʔ]# !</td><td>/a/ → [ə]; [ʔ]#</td><td>[ʔ]#</td></tr>
</table>

<table>
<tr><td rowspan="7">C2
IP2</td><td colspan="7">↓ín↓é ʔ↓áʔ ↓ínʔ t↓í ʔ↓è g↓àl vò vàj k↓éjn↓íʔ
ínáʔ kàjnì ínáʔ tí gé gàl vò vàj kàjnì
<u>build-it</u> DEMONSTRATIVE build how side in-house our DEMONSTRATIVE
how do you <u>build it</u> in our (Gizey) country</td></tr>
<tr><td>1</td><td rowspan="6">A</td><td>↓ín↓é
build-it</td><td>ʔ↓áʔ
DEMON.</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>↓ínʔ
build [4]</td><td></td><td>t↓í ʔ↓è
how</td><td>g↓àl vò vàj
side in-house our</td><td>k↓éjn↓íʔ
DEMON.</td></tr>
<tr><td></td><td>V</td><td>Modif.</td><td>Adv.</td><td>PrepP</td><td>Modif.</td></tr>
<tr><td></td><td colspan="2">VP</td><td>Adv.</td><td colspan="2">PrepP</td></tr>
<tr><td></td><td>1: Nucleus (↓H↓H)
2: ↓H</td><td>↓H</td><td>↓H↓L</td><td>↓LLL</td><td>↓H↓H</td></tr>
<tr><td></td><td>1: /a/ → [e]; V# !
2: C[ʔ]# !</td><td>[ʔ]#</td><td>V# !</td><td>V# !</td><td>/a/ → [e];
[ʔ]#</td></tr>
</table>

[3] The distinction downdrift/downstep refers to the lowering of the second of two H tones separated by an intervening/non intervening L tone.

[4] There are some examples of VPs and NPs that are longer in the first occurrence (e.g. because of a modifier) than in the following ones (ex.: Case 1, C2: "build-it + demon. / build"). These cases are remarkable, as in similar contexts of European languages, the opposite occurs: a "poor" phrase is followed by the same "enriched" one (see also the Gizey conversation: Case 2, "place/ place round").

<table>
<tr><td rowspan="8">C3
IP3</td><td colspan="6">gꜜàl gìzèjn kꜜéjnꜜíʔ ꜜínéʔꜜéʔ ꜜín tꜜáʔ
gàl gìzèj kàjnì ínáʔ ínáʔ tì gè
side Gizey DEMONSTRATIVE <u>build-it</u> build how ?
at the Gizey how <u>do you build</u> ?</td></tr>
<tr><td>1</td><td rowspan="7">A</td><td>gꜜàl gìzèjn
side Gizey</td><td>kꜜéjnꜜíʔ
DEMON.</td><td>ꜜínéʔꜜéʔ
build-it</td><td></td></tr>
<tr><td>2</td><td></td><td></td><td>ꜜín
build</td><td>tꜜáʔ
how</td></tr>
<tr><td></td><td colspan="2">PrepP</td><td>V-PRO</td><td>interr. adv.</td></tr>
<tr><td></td><td colspan="2">PrepP</td><td>VP</td><td>interr. adv.</td></tr>
<tr><td></td><td>↓LLL</td><td>↓H↓H</td><td>1: Nucleus (↓HH↓H)
2: ↓H</td><td>↓H</td></tr>
<tr><td></td><td>C#</td><td>/a/ → [e];
[ʔ]#</td><td>1: /a/ → [e]; [ʔ]#
2: C#</td><td>/e/ → [a];
[ʔ]#</td></tr>
</table>

The three occurrences (in the three IPs) of the demonstrative particle shar the same tonal perturbation pattern (↓H). The same intonation rhyme occurs also on the final interrogative particle (“how”). Moreover, all occurrences of the demonstrative show the phonotactic mark of word-final position, even the first, where this mark should not appear. This way the first occurrence reveals its partnership with the following ones. Likewise, the first and the third nuclei show the phonotactic mark of word-final position [ʔ]#, the second one does not, whereas its repetition (in the same IP2) does show the mark, even if it is unexpected: this absence operates like an arrow aiming at its completion, that is at the two other nuclei (the ones in IP2 and IP3 share the same tonal perturbation). At the same time, all nuclei and all demonstrative particles also share some unexpected segmental perturbations. All the constituents bearing the nuclear position substitute the /a/ with [e] or [ə]. The same substitution occurs in the constituents of the demonstrative particle sharing the intonation rhyme; while the final interrogative particle (which shows an identical tonal perturbation) reverses the segmental substitution (/e/ → [a]). In short, the segmental substitution follows and amplifies the relation among constituents that are tied by their common intonation pattern. All these cues conspire in order to strengthen the discursive cohesion of the three clauses and IPs that constitute the speech turn.

Case 2 (fig. 4)

<table>
<tr><td rowspan="8">C1
IP1</td><td colspan="7">lꜛˋìjn lꜛˋìjn hꜛár gꜛàŋgꜛèʔ nèl tʃꜛòʔ
lìjn lìjn hár gàngì nàl tʃòw
<u>place</u> <u>place</u> <u>round</u> down so location
in this <u>circumference</u> over there</td></tr>
<tr><td>1</td><td rowspan="7">B</td><td>lꜛˋìjn
place</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>lꜛˋìjn
place</td><td>hꜛár
round</td><td>gꜛàŋgꜛèʔ
down</td><td>nèl
so</td><td>tʃꜛòʔ
location</td></tr>
<tr><td></td><td>N</td><td>Modif.</td><td>Prep</td><td>Adv.</td><td>N</td></tr>
<tr><td></td><td colspan="2">NP</td><td colspan="3">PrepP</td></tr>
<tr><td></td><td>Nucleus (↑L)</td><td>Nucleus (↑H)</td><td>↑L↑L</td><td>L</td><td>↑L</td></tr>
<tr><td></td><td>C#</td><td>C#</td><td>[ʔ]#</td><td>C#</td><td>[ʔ]#</td></tr>
</table>

The sentence consists in a noun phrase: the head noun is repeated. Both constituents are nuclei together with the dependent modifier (adjective) in the same NP. The three nuclei share the same tonal perturbation pattern (↑), which is motivated by their syntagmatic position at the beginning of the IP. The rhyming intonation pattern interfaces the discourse semantics: the *sum* of the three lexemes ("place", "place", "round") constructs the meaning "circumference", which does not exist in the Gizey lexicon.

Case 3 (figg. 5-7)

<table>
<tr><td rowspan="7">C1
IP1</td><td colspan="6">àwꜛà nꜛàm sꜛárʔ má
àwàʔ nàm sár máj
yes, it any <u>exists-neg</u>.
yes, <u>aren't</u> some</td></tr>
<tr><td>1</td><td rowspan="6">A</td><td>àwꜛà
yes</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td>nꜛàm
it</td><td>sꜛárʔ
any</td><td>má
exists-neg.</td></tr>
<tr><td></td><td>affir. particle</td><td>N</td><td>PRO</td><td>V NEG</td></tr>
<tr><td></td><td></td><td>NP</td><td colspan="2">VP</td></tr>
<tr><td></td><td>L↑L</td><td>↑L</td><td>↑H</td><td>Nucleus (H)</td></tr>
<tr><td></td><td>V# !</td><td>C#</td><td>C[ʔ]# !</td><td>V# !</td></tr>
</table>

<table>
<tr><td rowspan="8">C2
IP2</td><td colspan="5">hꜛòɓʔ hꜛòɓʔ nìgí
hòb hòb nìgín
<u>mould</u> <u>mould</u> clay
who <u>mould</u> the clay</td></tr>
<tr><td>1</td><td rowspan="7">A</td><td></td><td>hꜛòɓʔ
mould</td><td></td></tr>
<tr><td>2</td><td></td><td>hꜛòɓʔ
mould</td><td></td></tr>
<tr><td>3</td><td></td><td></td><td>nìgí
clay</td></tr>
<tr><td></td><td>(PRO)</td><td>V</td><td>NP</td></tr>
<tr><td></td><td>NP</td><td colspan="2">VP</td></tr>
<tr><td></td><td></td><td>Nucleus (↑L)</td><td>LH</td></tr>
<tr><td></td><td></td><td>/b/ → [ɓ]; C[ʔ]# !</td><td>V# !</td></tr>
</table>

<table>
<tr><td rowspan="6">C3
IP3</td><td colspan="9">nàw kꜜóʔ ínꜛím zꜛə́ʔ vꜜáʔ ʔꜜíʔ
hàw káw íním sí fáʔ ɗì
nothing also <u>build-it DIRECTION-CENTRIFUGAL</u> soon afterwards neg.?
and do not <u>build</u> at once ?</td></tr>
<tr><td>1</td><td rowspan="5">A</td><td></td><td>nàw
nothing</td><td>kꜜóʔ
also</td><td>ínꜛím
build it</td><td>zꜛə́ʔ
DIR.-CENTR.</td><td>vꜜáʔ
soon afterwards</td><td>ʔꜜíʔ
neg.</td></tr>
<tr><td></td><td>(PRO)</td><td>Adv.</td><td>Adv.</td><td>V-PRO</td><td>V</td><td>Adv.</td><td>NEG</td></tr>
<tr><td></td><td>NP</td><td></td><td></td><td colspan="2">VP</td><td></td><td></td></tr>
<tr><td></td><td></td><td>L</td><td>↓H</td><td>Nucleus
(H↑H)</td><td>Nucleus
(↑H)</td><td>↓H</td><td>↓H</td></tr>
<tr><td></td><td></td><td>C#</td><td>/a/ →
[o]; [ʔ]#</td><td>C#</td><td>/s/ → [z];
/i/ → [ə];
[ʔ]#</td><td>/f/ → [v]; [ʔ]#</td><td>/ɗ/ →
[ʔ]; [ʔ]#</td></tr>
</table>

The Root sentence is an interrogative negative cleft sentence. It governs two dependent relative clauses. The syntactic structure would have made us expect only one intonative nucleus, whereas four are detected and they are located on the three VPs. One of them (IP2) is repeated and both occurrences show a rhyming intonation pattern (↑L). Moreover, both show the unexpected phonotactic mark of word-final position [ʔ]# and the implosive realisation of the bilabial stop. In IP1 and IP2 the retrieval of the nucleus is aided by the phonotactic mark of word-final position which is unexpected on the nucleus of IP2 and is missing in the following part of IP2 where it would be grammatical. The uneven distribution of [ʔ]# along IP2 emphasizes the prominence of the nucleus on the other constituents of IP. Something similar (but reversed) happens in IP1, where the nucleus lacks the expected [ʔ]# and the immediately previous constituent ("any") does have it, even if it should not. Furthermore, the final negative particle in IP3 should be realized as L, but it is ↓H. This way it rhymes with the H tone of the negation in IP1, where the H springs from the merging of [má] "exists" and [ɗì] "negation". Moreover the first negation (IP1) lacks the expected phonotactic mark [ʔ]#, while this occurs at the end of the final negation in IP3. And the substitution /ɗ/ → [ʔ] on the same constituent (IP3) strengthens the role of the second negation in filling in its textual partnership with the first one.

All these segmental and suprasegmental perturbations may be accounted for in the light of a larger intonation analysis, as they comply with the location and the specific patterns of the nuclei.

Case 4 (fig. 8)

<table>
<tr><td rowspan="9">C1
IP1</td><td colspan="6">k↓áj n↓àm ɣ↓ájnʔ (fá hè) g↓ú péɗ↑àk↓íʔ kòjɗùmù (ɗijani haa) k↑òjɗ↑ùmùʔ [5]
kàjn nàm kàjn kú páɗàkí kòjdùmù kòjdùmù
DEM. it DEMONS. [?] REVERS. clear easy [?] <u>easy</u>
this is <u>easy</u></td></tr>
<tr><td>1</td><td rowspan="8">B</td><td>k↓áj
DEMONSTRATIVE</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>ɣ↓ájnʔ
DEMONSTRATIVE</td><td>n↓àm
it</td><td>g↓ú
REVERSIVE [6]</td><td>péɗ↑àk↓íʔ
clear</td></tr>
<tr><td>3</td><td></td><td></td><td></td><td>kòjɗùmù
easy</td></tr>
<tr><td>4</td><td></td><td></td><td></td><td>k↑òjɗ↑ùmùʔ
easy</td></tr>
<tr><td></td><td>Modif.</td><td>N</td><td colspan="2">V (+NP)</td></tr>
<tr><td></td><td colspan="2">NP</td><td colspan="2">VP</td></tr>
<tr><td></td><td>↓H</td><td>↓L</td><td>↓H</td><td>2: H↑L↓H
3: LLL
4: Nucleus (↑L↑LL)</td></tr>
<tr><td></td><td>2: /k/ → [ɣ]; C[ʔ]# !</td><td>C#</td><td>/k/ → [g];
V# !</td><td>2: /a/ → [e]; [ʔ]#
3: /d/ → [ɗ]; V# !
4: /d/ → [ɗ]; [ʔ]#</td></tr>
</table>

[5] [kòjdùmù] is a Fulfulde word.

[6] The reversive (or inversive) morpheme indicates an entire reversal of an action.

The nucleus is located at the end of the IP, on the second occurrence of the adjective “easy”. The NP branching from the VP is constituted by the repetition of the adjective.[7] The first (“clear”) and the third occurrences (“easy”) of the adjective are intonationally rhyming: their lexical tone skeleton differs in the first and in the third syllable, but in the second one the same L tone is realized as ↑L. So, the only lexical tone they share shows the same tonal perturbation. This is phonologically motivated by the upstep induced by the preceding tone (H or ↑L). Moreover, the second and the third occurrence of the adjective show a same segmental realization of the alveolar stop as an implosive; the first and the last occurrence of the adjective share the phonotactic mark of word-final position [ʔ]#. They encircle the second occurrence of the nucleus that lacks that phonotactic mark, even if it would be expected. The same mark of word-final position appears (but unexpected) on the second item of the two occurrences of the demonstrative particle at the beginning of the IP: they also share the same tonal perturbation pattern (↓H), which is not phonologically motivated as this downstep occurs at the beginning of the IP, where on the contrary one would expect a tonal upward reset. This way the beginning and the end of the IP are tightly bound: the constituents at the beginning - as long as the constituents at the end - of the IP are intonationally rhyming each other; additionally the former and the latter are reciprocally related by the distribution of expected and unexpected [ʔ]#. In conclusion, two syntactic constituents are repeated (the demonstrative and the adjectives); this repetition signals their membership to the same syntactic function. Similarly, they share the same tonal perturbation patterns and the same expected/unexpected phonotactic marks. In other words, the similarity of the perturbation mechanisms establishes and endorses the syntax-intonation interface: at the surface level, the affected constituents mark the underlying identity of their syntactic function.

Case 5 (figg. 9-10)

<table>
<tr><td rowspan="6">S1a
IP1</td><td colspan="6">br↑ìk↑í kéŋ ɗí l↓áʔ
brìkí kàjn ɗí lá
<u>bricks</u> DEMONSTRATIVE says that
that means that with the <u>bricks</u></td></tr>
<tr><td>1</td><td rowspan="5">A</td><td>br↑ìk↑í
bricks</td><td>kéŋ
DEMONSTRATIVE</td><td>ɗí
says</td><td>l↓áʔ
that</td></tr>
<tr><td></td><td>N</td><td>PRO</td><td>V</td><td>Compl.</td></tr>
<tr><td></td><td colspan="2">PrepP</td><td colspan="2">VP</td></tr>
<tr><td></td><td>Nucleus (↑L↑H)</td><td>H</td><td>H</td><td>↓H</td></tr>
<tr><td></td><td>V# !</td><td>/a/ → [e]; C#</td><td>V# !</td><td>[ʔ]#</td></tr>
</table>

[7] The adjectival construction is functionally equivalent to a VP.

<table>
<tr><td rowspan="9">S1b
IP2</td><td colspan="11">kóʔ bꜛùr dèw kꜜóʔ nꜜàŋ nꜜàŋ dàlàʔ zìʔ mꜜàŋꜜə́ dòlà zìʔ mꜜàŋꜜí goʔ
kó bùr dèw ków nàŋ nàŋ dàlàr zìjʔ màŋgí dàlàr zìjʔ màŋgí gu
even if day one also you you complete house for you complete house <u>for you</u> REVERSIVE
even in one day you complete <u>your</u> hut</td></tr>
<tr><td>1</td><td rowspan="8">A</td><td>kóʔ
even if</td><td>bꜛùr
day</td><td>dèw
one</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>kꜜóʔ
also</td><td></td><td></td><td>nꜜàŋ
you</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td><td>nꜜàŋ
you</td><td>dàlàʔ
complete</td><td>zìʔ
house</td><td>mꜜà
for</td><td>ŋꜜə́
you</td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td><td></td><td>dòlà
complete</td><td>zìʔ
house</td><td>mꜜà
for</td><td>ŋꜜí
you</td><td>goʔ
REVERSIVE</td></tr>
<tr><td></td><td>Adv.</td><td>N</td><td>Num.</td><td>PRO</td><td>V</td><td>NP</td><td>Prep</td><td>PRO</td><td>V</td></tr>
<tr><td></td><td></td><td colspan="2">PrepP</td><td>NP</td><td colspan="2">VP</td><td colspan="2">PrepP</td><td>VP</td></tr>
<tr><td></td><td>1:Reset
(↑H)
2: ↓H</td><td>↑L</td><td>L</td><td>↓L</td><td>LL</td><td>L</td><td>3: ↓L
4:Nucleus
(↓L)</td><td>3: ↓H
4:Nucleus
(↓H)</td><td>-</td></tr>
<tr><td></td><td>[ʔ]#</td><td>C#</td><td>C#</td><td>C#</td><td>4:/a/→[o];
V# !</td><td>[ʔ]#</td><td colspan="2">V# !</td><td>/u/→[o];
[ʔ]#</td></tr>
</table>

Syntactically this is a single sentence, but for typographic reasons, it is represented here through two separated grids (S1a and S1b). While it includes two IPs (IP1 and IP2). The first intonation nucleus is located on the Noun of the Prepositional Phrase[8] ("bricks"), where the upsteps on both L and H are not phonologically motivated (the preceding lexical tone is L). The second (double) nucleus occurs on the second item of the repeated Prepositional Phrase ("for you"), where the downstep is liable to a phonological motivation (the preceding lexical tone is L). Both nuclei miss a mark of word-final position [ʔ], even if it would be expected. Moreover, both nuclei fall on a PrepP. The same unexpected absence of the mark of word-final position is detected also on the verbs of both S1a and S1b. So, even if the nuclei are not rhyming, nevertheless they share a phonotactic feature which occurs only on two other locations, the verbs of both S1a and S1b. So the nuclear constituents establish a mutual connection and relate to the V nodes by means of the same connection. The effect is to strengthen the textual cohesion interfacing syntactic and prosodic categories.

[8] The preposition is skipped. The construction is prepositional (like an absolute construction).

Case 6 (fig. 11)

<table>
<tr><td rowspan="8">C1
IP1</td><td colspan="5">tʃꜜápà kꜜáʔ blꜜá tʃꜜá ŋòlꜜòʔ
tʃápı̀ ká báláẃí ká ŋòl
help <u>exists</u> much <u>exists</u> much
<u>there were</u> a lot of help, a lot</td></tr>
<tr><td>1</td><td rowspan="2">B</td><td>tʃꜜápà
help</td><td>kꜜáʔ
exists</td><td>blꜜá
much</td></tr>
<tr><td>2</td><td></td><td>tʃꜜá
exists</td><td></td></tr>
<tr><td>3</td><td>A</td><td></td><td></td><td>ŋòlꜜòʔ
much</td></tr>
<tr><td></td><td rowspan="4"></td><td>N</td><td>V</td><td>N</td></tr>
<tr><td></td><td>NP</td><td colspan="2">VP</td></tr>
<tr><td></td><td>↓HL</td><td>Nucleus (↓H)</td><td>↓H
L↓L</td></tr>
<tr><td></td><td>/i/ → [a]; V# !</td><td>1: [ʔ]#
2: /k/ → [tʃ]; V# !</td><td>1: V# !
3: [ʔ]#</td></tr>
</table>

Two speech turns (or better two speakers) cooperate in the completion of the sentence and the IP. The VP is repeated: both occurrences of the verb set up the rhyming intonation nucleus of the sentence. The rhyming downstep (↓H) is phonologically motivated by the preceding L or ↓H tones. As a very interesting point, the completion of the speaker A has recourse to a different lexical item to express the meaning "much". In order to explain the choice, a piece of evidence to be considered is the different tonal skeleton of [ŋòlꜜòʔ]: L↓L. Its L tones allow marking the end of IP, and so the item is selected by A to wellform the end of the IP. A repetition of [báláẃí] or [blꜜá], with H tones (even if downstepped), would not allow the speaker to perform the same task. Moreover, a mark of word-final position [ʔ]# occurs on the first item of the verb "exists" but does not on the second one (even if it should be expected and concludes the speech turn of B)[9] and the same mark occurs on the second item of "much" uttered by A in order to complete the sentence, while the first "much" (uttered by B) lacks this mark, even if it should be expected. Briefly, both the rhyming nuclei, the choice of lexical items belonging to the two speech turns and the distribution of the phonotactic markers conspire to leave the structure of the IP open to be completed by the intervention of the second speaker: an evidence of the existence of cooperative patterns at the interface between syntax and intonation.

[9] A fact of lenition also differentiates the second and the first items of the verb "exists": in the second one a palatal affricate consonant substitutes the velar stop.

Case 7 (fig. 12)

<table>
<tr><td rowspan="7">C1
IP1</td><td colspan="9">grꜜóʔ nàl tꜜáʔ kꜜóʔ grꜜóʔ tʃꜜúlꜜúm vꜜáʔ ɗꜜíʔ
gráwt nàltá kóʔ gráwt tʃúrúm fáɗ ɗì
morning so there also morning <u>early</u> soon neg.
also in the morning, but not immediately <u>early</u> in the morning</td></tr>
<tr><td>1</td><td>B</td><td>grꜜóʔ
morning</td><td>nàl
so</td><td>tꜜáʔ
there</td><td>kꜜóʔ
also</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>A</td><td>grꜜóʔ
morning</td><td></td><td></td><td></td><td>tʃꜜúlꜜúm
early</td><td>vꜜáʔ
soon</td><td>ɗꜜíʔ
neg.</td></tr>
<tr><td></td><td rowspan="4"></td><td>N</td><td>Adv.</td><td>Adv.</td><td>Adv.</td><td>Adv.</td><td>Adv.</td><td>NEG</td></tr>
<tr><td></td><td colspan="4">NP</td><td colspan="3">NP</td></tr>
<tr><td></td><td>↓H</td><td colspan="2">L↓H</td><td>↓H</td><td>Nucleus (↓H↓H)</td><td>↓H</td><td>↓H</td></tr>
<tr><td></td><td>/a/ → [o]; [ʔ]#</td><td colspan="2">[ʔ]#</td><td>[ʔ]#</td><td>/r/ → [l]; C#</td><td>/f/ → [v]; [ʔ]#</td><td>[ʔ]#</td></tr>
</table>

It is a nominal phrase but it is split up into two speech turns. Speaker A takes up the N again with the same intonation pattern (↓H). He also provides the intonation nucleus (on “early”), that lacks on the B’s speech turn. The same tonal perturbation recurs also on the nucleus and on the final negative particle, which should be realized as L, but it is ↓H. Moreover, the phonotactic mark of word-final position ([ʔ]#) occurs on every constituent of the sentence (both for the first and the second speech turn). In short, the distribution of phonotactic marks all over the sentence, the rhyming intonation patterns among repeated constituents, nucleus and final negation, and particularly the lack of the nucleus on the first speech turn are cues calling for a discursive completion. The second speech turn fulfils this function of discursive cohesion and conversational cooperation, supplying the nucleus and the rhyming intonation pattern.

4. Conclusions

The analysis of the syntactic grids compared with intonation ones gave the following results:

- The interaction between lexical tones and intonation may give rise to complex perturbations.
- The explanation of the patterns of perturbation relates to the syntax-intonation interface.
- The tonal perturbations may also generate intonation prominences.
- Some prominences share the same tonal pattern perturbation. In this case, they will be called rhyming prominences or nuclei.

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FIGURES

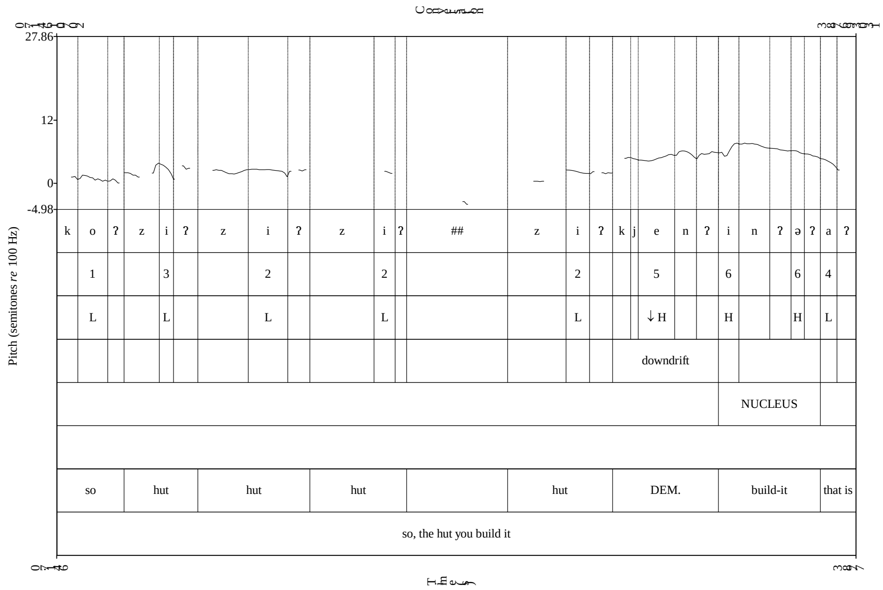

Figure 1. Case 1: first clause (F0 in semitones)

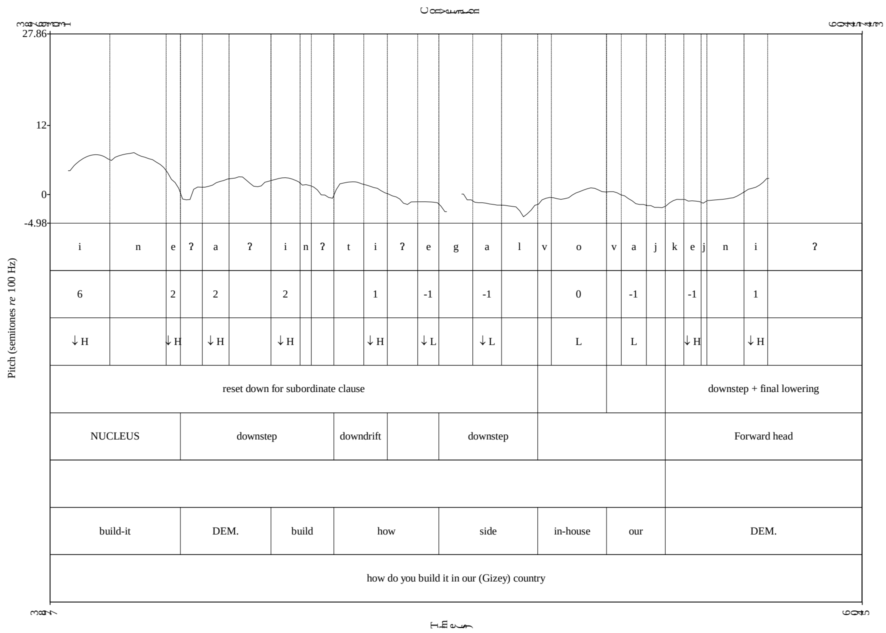

Figure 2. Case 1: second clause (F0 in semitones)

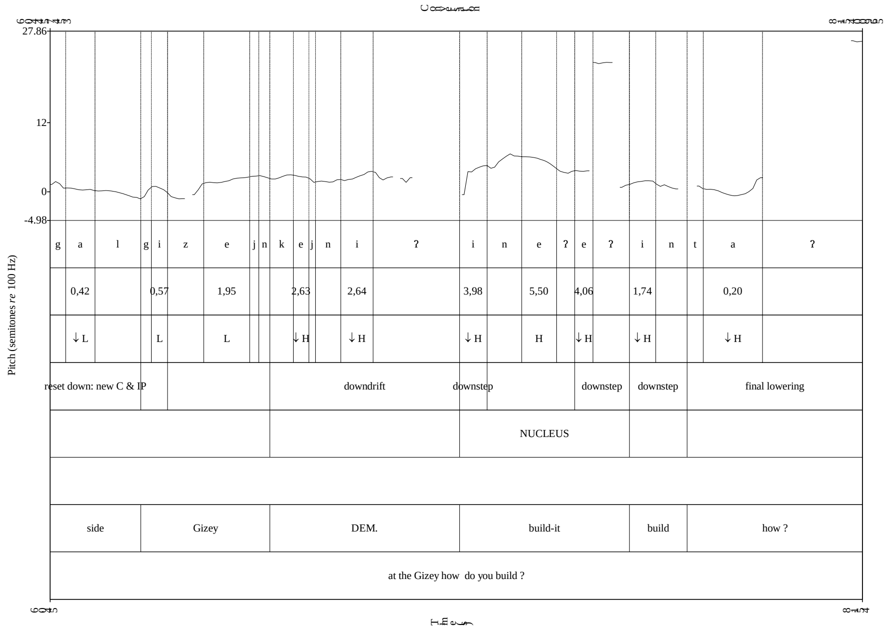

Figure 3. Case 1: third clause (F0 in semitones)

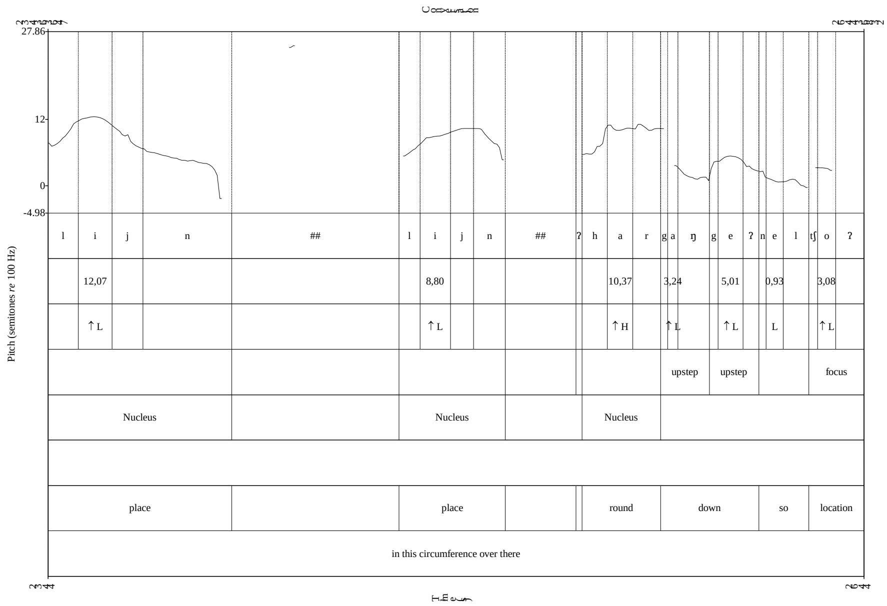

Figure 4. Case 2 (F0 in semitones)

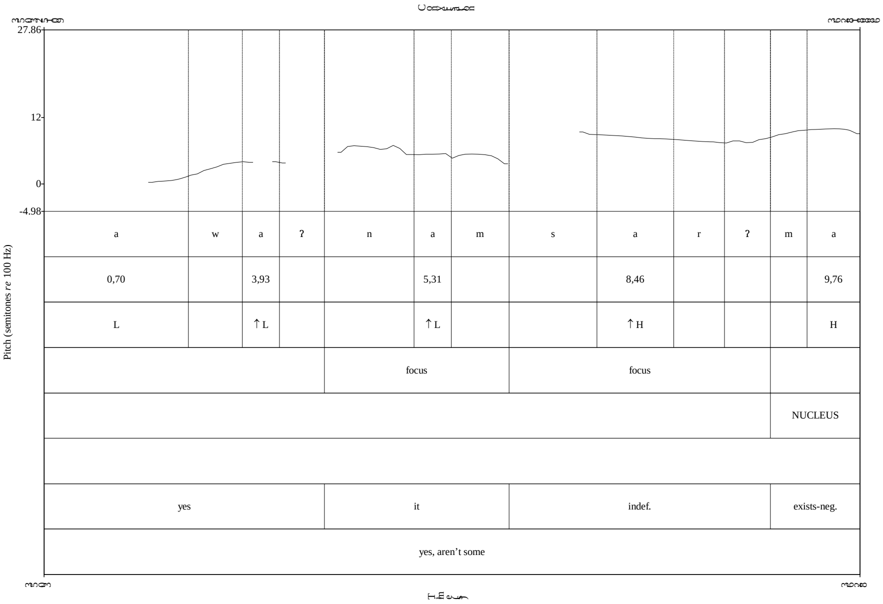

Figure 5. Case 3: first clause (F0 in semitones)

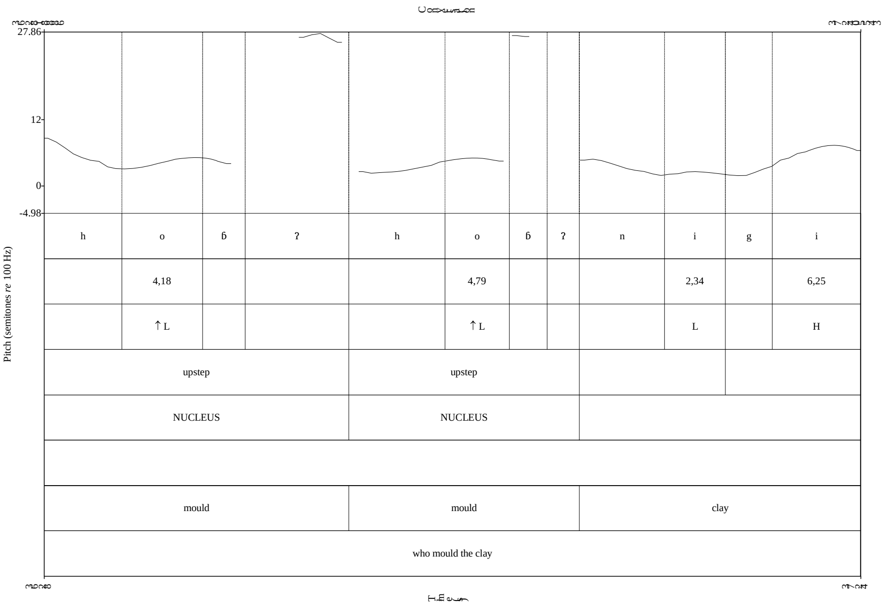

Figure 6. Case 3: second clause (F0 in semitones)

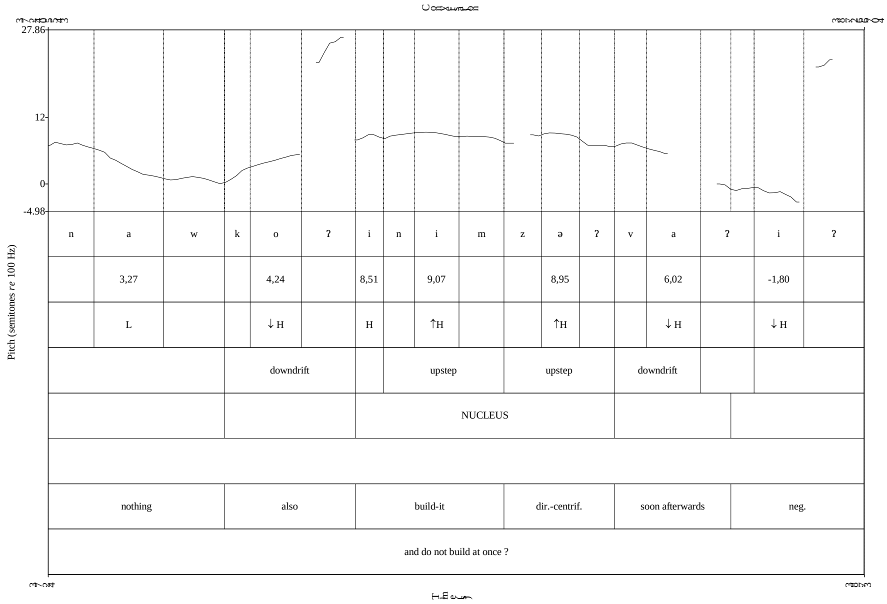

Figure 7. Case 3: third clause (F0 in semitones)

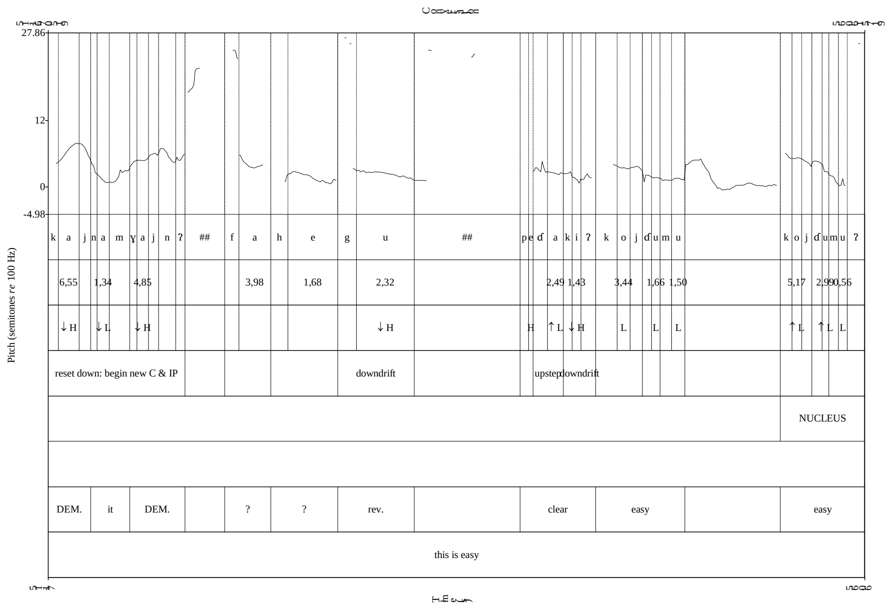

Figure 8. Case 4 (F0 in semitones)

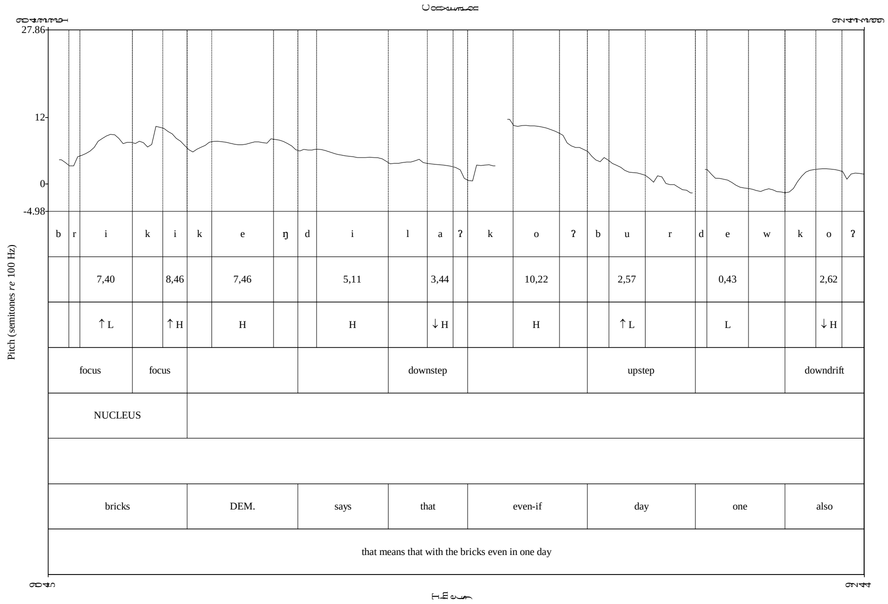

Figure 9. Case 5: first part (F0 in semitones)

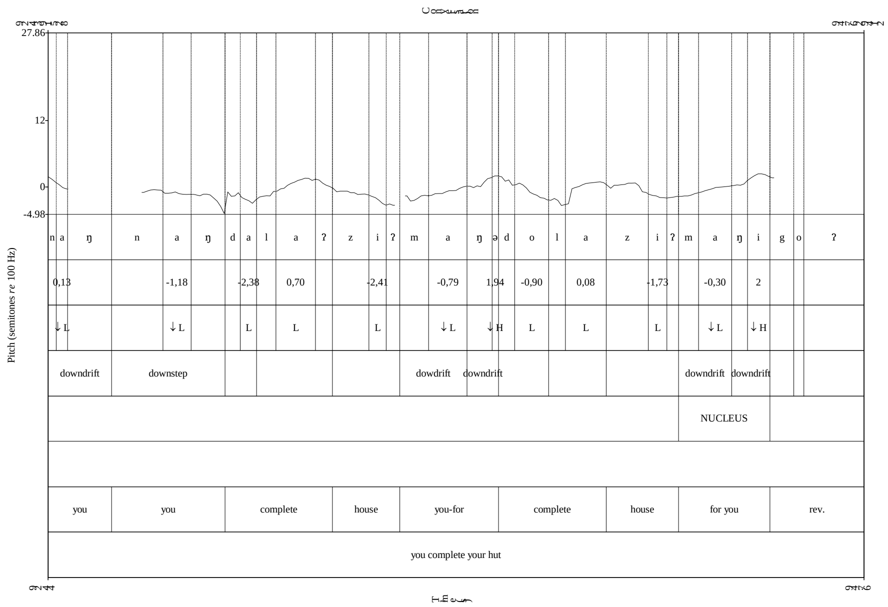

Figure 10. Case 5: second part (F0 in semitones)

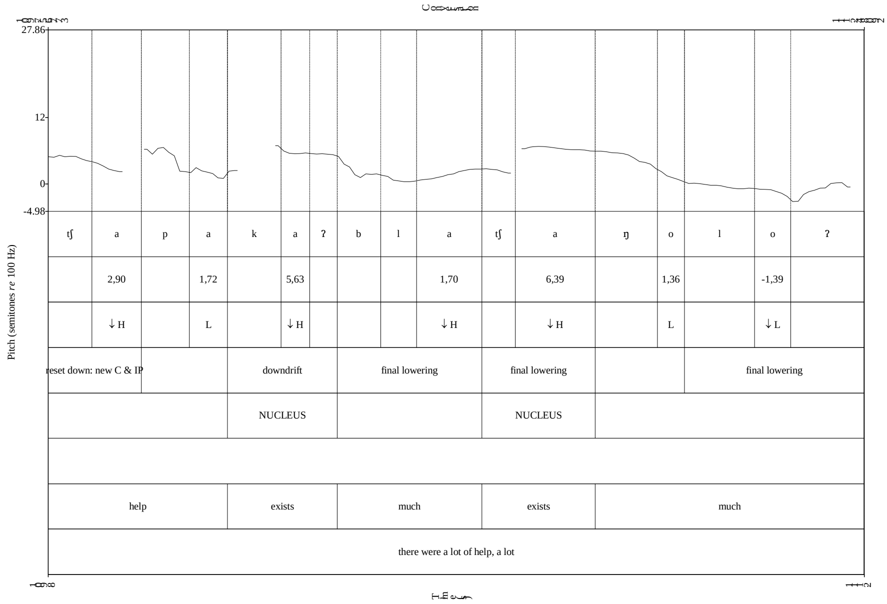

Figure 11. Case 6 (F0 in semitones)

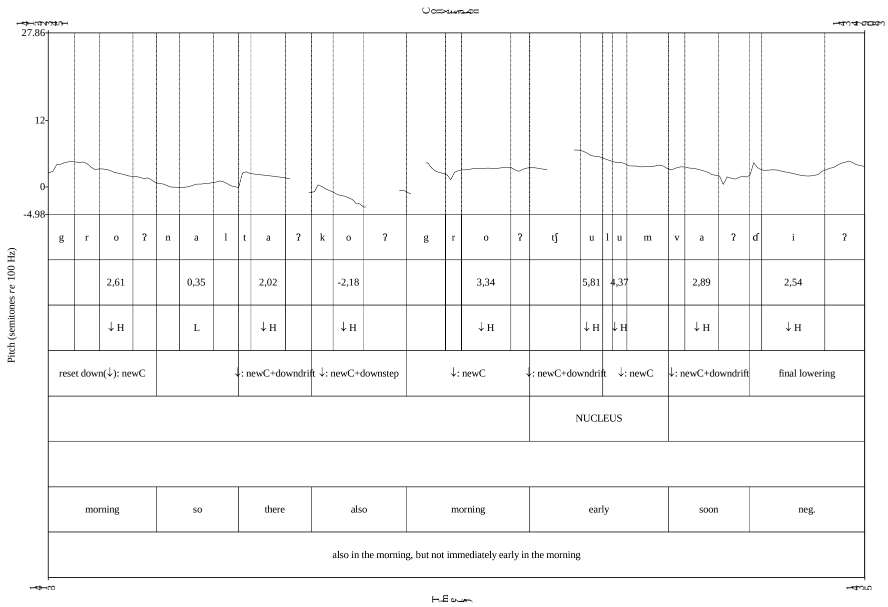

Figure 12. Case 7 (F0 in semitones)

RÉSUMÉ

Parmi les nombreuses études sur l'intonation de phrase, qui traitent des langues tonales ou à accent tonal, peu concernent les langues africaines; elles sont souvent consacrées aux langues asiatiques.

Ces études confirment la thèse d'après laquelle l'intonation de phrase dans une langue tonale ou à accent tonal est le résultat de la somme des effets des tons lexicaux des mots dans la phrase et des effets supplémentaires de la variation mélodique qui est déclenchée par des facteurs syntactiques, pragmatiques et textuels. Donc - par exemple - un ton lexical haut à la fin d'une phrase interrogative donnerait un contour plus haut que prévu; mais le même ton lexical situé à la fin d'une phrase affirmative donnerait une montée finale du contour, qui - dans ce cas - serait entièrement inattendue.

Dans cet article, nous analysons quelques processus phonologiques de perturbation tonale qui sont provoqués par l'interaction entre tons lexicaux et intonation. L'analyse sera portée à l'interface entre intonation et tons lexicaux. Elle sera basée sur une conversation en gizey.

Le gizey est une langue tonale non écrite et, jusqu'à présent, non décrite. Elle est classifiée dans la famille de langues tchadiques, l'une des quatre familles du groupe afro-asiatique.