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An Autosegmental-Metrical analysis of Georgian intonation*

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6.1 Introduction

Georgian, also known as *Kartuli ena*, is the national language of Georgia, a country located in the Caucasus. It is a member of the South Caucasian language group, and is spoken by over four million people (Hewitt 1995). It is considered a free word-order language, and clausal constituents may appear in any word order (Hewitt 1995). The default word order places subjects clause initially and verbs clause finally (SOV order), although, it is not uncommon for objects to appear clause finally and verbs to appear clause medially (SVO order; Skopeteas et al. 2009).

Georgian is well known for its complex morphology and segmental properties, but not much is known about its intonation. There has been some research into the prosodic system of Georgian (Alkhazishvili 1959; Zhghenti 1963; Tevdoradze 1978; Kiziria 1987), but this research has only been written up in Georgian, and thus, is inaccessible to the larger linguistic community. Much of this research, as well as more accessible research (Robin & Waterson 1952; Aronson 1990), is concerned with stress. More recent studies have probed the intonational system of Georgian, focusing largely on question intonation (Bush 1999; Müller 2005) and effects of focus (Skopeteus et al. 2008).

Our study investigates the intonation of Georgian under the framework of the Autosegmental-Metrical (AM) model of intonation (e.g. Pierrehumbert 1980; Beckman & Pierrehumbert 1986; Ladd 1996). We attempt to provide the first full investigation of Georgian intonation by examining various sentence types in both

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broad and narrow focus contexts and endeavor to lay the groundwork for an eventual full, ToBI-style model of Georgian prosody. This study should be taken as a preliminary, qualitative investigation of Georgian. Many of the observations made in this paper need to be confirmed with quantitative experimental data.

We propose that Georgian has three levels of phrasing—the Accentual Phrase (AP), the Intermediate Phrase (ip) and the Intonational Phrase (IP). Each of these phrases is marked by a final boundary tone. Within the accentual phrase, two additional types of tonal markings can be observed—Pitch Accents, which are associated with the phrase-initial stressed syllable, and Phrase Accents, which are associated with the antepenultimate syllable. Evidence for these tonal units will be given throughout the paper. This paper is organized as follows: Section 6.2 introduces our method of data collection; Section 6.3 reports our analysis and discusses typical tonal patterns observed for each sentence type. Lastly, Section 6.4 provides the summary of the tonal inventory and the prosodic structure of Georgian.

6.2 General methods

Data for this study was gathered from two primary consultants, speakers MB and ND, both female, in their 50s, and from Tbilisi, Georgia. Speaker MB's production was collected through twenty weeks of fieldwork (January–June 2007), one hour per week, in a quiet classroom or office at UCLA. Speaker ND joined MB for recording sessions for an additional ten weeks (October–December 2007). Additional data was gathered from five more speakers, four female and one male. Sentence types produced include declaratives, yes/no questions, wh-questions, and focus sentences. Focus was elicited either by asking wh-questions or by providing the context for corrective focus (*not A but B*).

Subjects wore a head-mounted microphone connected to a laptop computer. Utterances were recorded, using *PitchWorks* (Scicon R&D), directly into a laptop computer at 11 or 22 kHz sampling rate, in a quiet room. Speakers were prompted to spontaneously translate different utterances into Georgian. Once the speakers had settled on a natural translation, the sentences were recorded. During the middle of the fieldwork (June 2007), a number of sentences were collected into a script and given to the five additional speakers to record.

Target sentences were extracted from the original session recording. Pitch tracks were created using *PitchWorks*, and word boundaries and the gloss of each word were labeled on two tiers (words and glosses). Pitch tracks were analyzed by examining the location of Fo peak/valley and the timing of each pitch target. Tones were added on the “Tones” tier after discussion. Some tokens, in particular those eliciting focus, were played back to the consultants to ensure the correct pragmatic meaning was achieved.

6.3 Results

6.3.1 Stress

Much of the previous research into Georgian prosody has focused on stress. Researchers do not agree on the existence or location of stress in Georgian. For example, Robin & Waterson (1952) examined “word in isolation” data from one speaker, and proposed the rules in (1) for stress assignment. They added that stress is weak in Georgian and is realized through high pitch. Slightly different stress assignment rules were proposed in Aronson (1990), laid out in (2).

- | | | |
|-----|------------------------------------|-------------------------------------|
| (1) | <u>Number of syllables in word</u> | <u>Location of stress</u> |
| | 2 | 1st syllable |
| | 3 | 1st or 2nd syllable |
| | 4 | 2nd or on 1st & 3rd syllables |
| | 5 | 1st & 3rd or on 2nd & 4th syllables |
| | 6 + | 1st & antepenult (primary stress) |
| (2) | <u>Number of syllables in word</u> | <u>Location of stress</u> |
| | 4 or fewer | 1st or antepenult syllable |
| | 5 or more | 1st & antepenult syllables |

Other studies on Georgian stress include Alkhazishvili (1959), Zhghenti (1963), Tevdoradze (1978), and Kiziria (1987). While there is not total agreement, as summarized by Skopeteas et al. (2009), a majority of researchers assume initial stress and that pitch-accent assignment applies at a post-lexical level.

Our observations support this notion. The first syllable of a word is often prominent, produced with stronger amplitude and slightly longer duration. This suggests that the first syllable of a word is stressed in Georgian. The first syllable of a word was also often host to an intonational target. Because this tonal target aligns with a stressed syllable, we denote it a Pitch Accent. We observed four possible pitch accents: a simple low (L*), a simple high (H*), an early rise, located entirely within the first syllable (LH*), and a late rise, where the pitch peak is not reached until the following syllable (L+H*).

Contrary to the proposals in Robin & Waterson (1952) and Aronson (1990), we found little evidence of stress on the antepenultimate syllables of words. The antepenult did not show stronger amplitude or longer duration.¹ However, it was

¹ To provide support for our observation that the first syllable of a word is stressed, we performed a small pilot experiment. Four speakers of Georgian read a list of words in a carrier phrase, *sit'q'va XXX davts'ere*, “I wrote the word XXX.” Target words varied in syllable length, from two to five syllables, and every syllable within the word shared the same vowel. For example, words read included *dabana*, “washed,” and *gagalamaza*, “to make beautiful.” Four three-syllable words, three two-syllable words, and one five-syllable word were read twice by each speaker.

occasionally marked tonally. When the antepenultimate syllable had tonal marking, it always showed a high tone which immediately fell to a low tone on the penultimate syllable.

As will be shown in examples later, this H+L was not confined to single words, but instead appeared on the antepenult-penultimate syllables of an accentual phrase. Thus, this fall could appear across a word boundary, word initially, or on the final two syllables of a word. This implies that the antepenultimate syllable of a word is not stressed at the lexical level, as Robin & Waterson (1952) and Aronson (1990) suggest. Because this H+L fall is not linked to a stressed syllable like a pitch accent would be, we call the H+L tone an AP Phrase Accent.

6.3.2 *Prosodic structure and declarative intonation*

In general, each content word in Georgian is marked by a regular tonal pattern. In declaratives, this pattern is realized as a rise over the entire word, beginning with a low target on the stressed syllable—a L^* pitch accent—and ending in a high target on or at the end of the final syllable of the word. Since this tonally marked unit is on the scale of a single lexical word, we call it an Accentual Phrase (AP), as proposed in other languages (e.g. Japanese (Beckman & Pierrehumbert 1986), Korean (Jun 1993, 1998), French (Jun & Fougeron 1995, 2000, 2002), Farsi (Jun 2005c; Arbisi-Kelm 2007; Esposito & Barjam 2007; Scarborough 2007; Sadat-Tehrani 2007, 2008), and Bengali (Khan 2007, 2008)). We term the final high tonal target an accentual phrase boundary tone, (Ha). Simple declarative sentences in Georgian are realized with a sequence of rising APs, [L^* Ha]. Fig. 6.1 shows a pitch track of an example declarative sentence, *Manana is washing the very beautiful soldier*. It should be observed that the pitch range declines over the course of the sentence, such that no high AP boundary tone is as high as the AP preceding it.

The final word in Fig. 6.1 differs from all preceding words in the sentence—it does not show the same rising pattern. Instead, the pitch starts low and falls lower to the end of the sentence. We view this final low target as a boundary tone to a larger phrase. Because this larger unit encompasses the entire utterance, we term it the Intonational Phrase (IP). The IP-final boundary tone in declarative sentences is L%. A L% overrides and replaces the expected Ha of the final AP, giving the last AP a low

Syllable durations and nucleic vowel durations for every syllable were measured, as well as peak intensity for every syllable. For every word with a CV syllable structure, the first syllable, and the vowel nucleus inside, had longer duration than any following syllable or nucleus vowel. The first syllable also showed higher intensity than all later syllables. As a group, the first syllable had significantly greater duration and intensity than all following syllables, by a paired t-test (duration: $t(79) = 11.120$, $p < 0.001$; intensity: $t(79) = 9.596$, $p < 0.001$). For the one five-syllable word, the antepenultimate syllable was not stronger than the syllable immediately preceding it. Speakers were also asked to read wug words, which were created to get words of lengths greater than three syllables. Speakers failed to read these artificial words naturally.

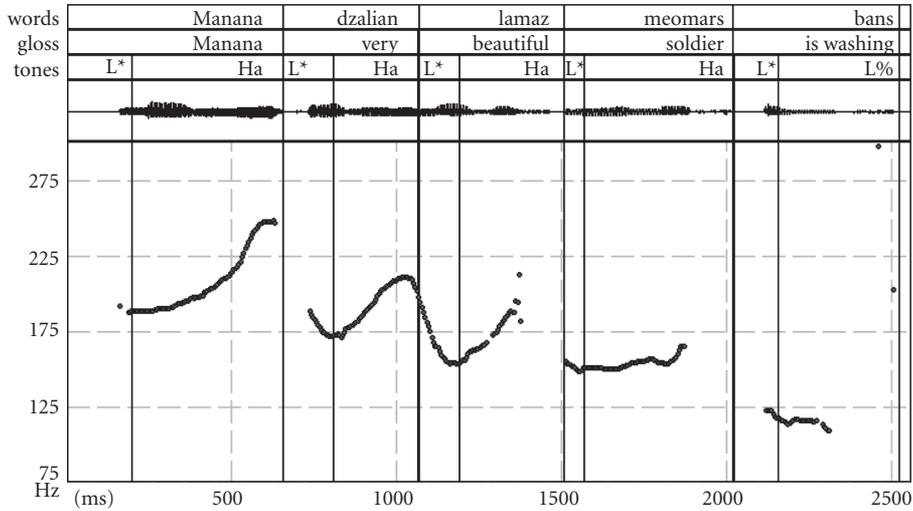


FIGURE 6.1 An example pitch track of a sentence, *Manana is washing the very beautiful soldier*. Each word forms one AP [L* Ha], and the last AP ends with L%, a common IP-boundary tone for a declarative sentence.

flat or falling pattern, [L* L%]. The two boundary tones do not combine, as in English. L% boundary tones are often produced with creaky, irregular phonation.

Occasionally, longer words exhibit a more complex tonal pattern. Instead of a simple rise, they show a low-high-low-high pattern. The initial rise begins on the first syllable of the word and reaches a pitch peak on the second syllable. Then the pitch falls until the penultimate syllable where it begins to rise again, reaching a second peak on the final syllable. We labeled this different contour with a different pitch accent, a L*+H, and a different boundary tone, a L+Ha. Accentual phrases showing this contour are labeled as [L*+H L+Ha]. Fig. 6.2 provides an example of this pattern for the sentence, *Mary washed the soldier*.²

This rise-fall-rise tonal pattern is not a property of the specific word, *Miriam*. Fig. 6.3 shows the same word in a similar sentence, but with a simple rise, [L* Ha]. It is unclear if and what the difference is between these two tonal patterns. We observed that the more complex LHLH pattern is most commonly seen on the first word of a sentence.

In a pilot experiment, we re-synthesized, in *Praat*, the intonational contour on the first word of the sentence in Fig. 6.2 to show several patterns:

² The second word in Fig. 6.2 may appear as if it has an identical tonal pattern as the first word, but with a compressed pitch range. This is an illusion caused by the effects of microprosody from the [m]. The only tonal targets that can be perceived are the initial low and phrase-final high.

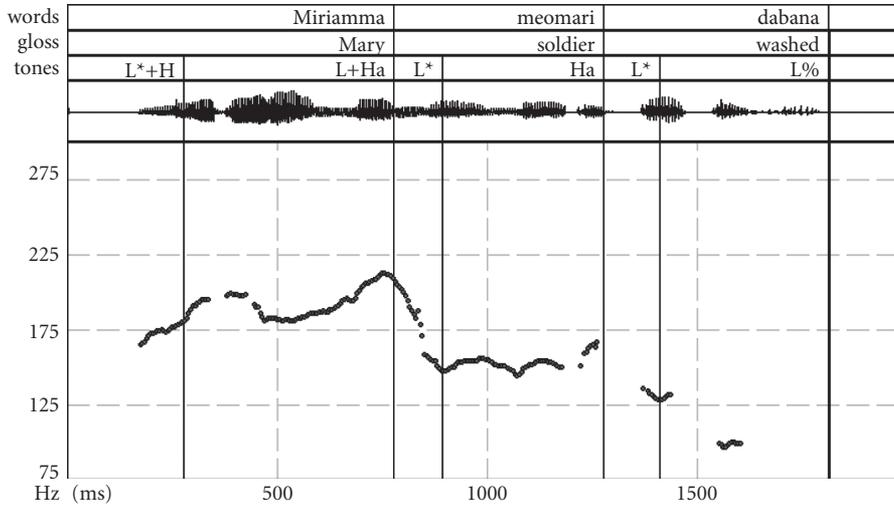


FIGURE 6.2 An example pitch track of a sentence, *Mary washed the soldier*. The first word shows a [L*+H L+Ha] AP pattern.

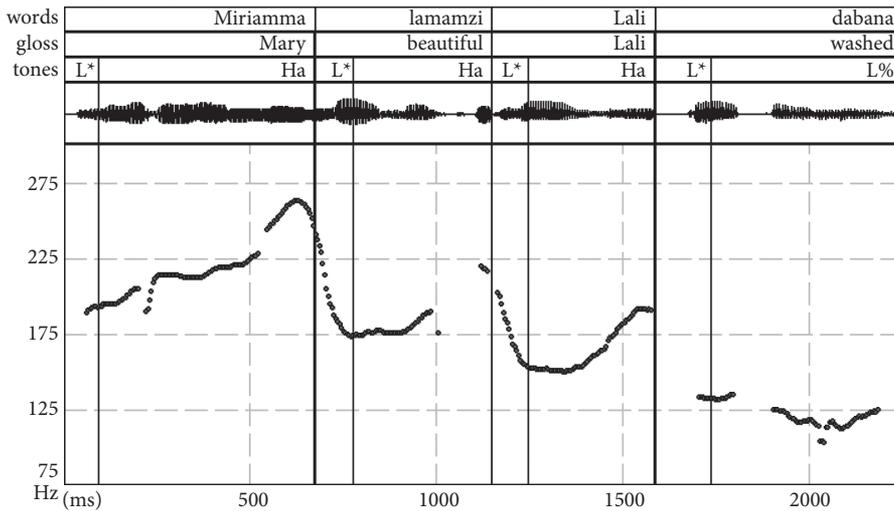


FIGURE 6.3 An example pitch track of a sentence, *Mary washed beautiful Lali*. Unlike Fig. 6.2, *Miriamma* does not show a [L*+H L+Ha] tonal pattern, but a more typical [L* Ha] pattern instead.

- the original pattern (labeled as L*+H L+Ha)
- an exaggerated version of the original pattern, with increased pitch range
- a simple rise (labeled as L* Ha)
- a Low-Low-High late rise (labeled as L* L+Ha)
- a Low-High rise with a high plateau (L*+H Ha)
- a version of focus intonation (LH* Ha; see later in this section)

We presented these sentences two at a time, in an AX-type paradigm, to four native speakers of Georgian over headphones in a quiet room and asked if they could find any difference between the two stimuli, and if they could, whether or not this difference was meaningful.

None of the four listeners could detect any difference between any of the stimuli except between the original and the focus intonation version. For these two tokens, the listeners could detect a subtle difference in intonation, but only one said the difference was meaningful—that the focus intonation version sounded emphasized. None of the four listeners seemed to be able to perceive a difference between the simple rise (L* Ha) and the LHLH pattern (L*+H L+Ha) at all. This may indicate that there is no phonological difference between the two patterns. The more complex pattern may be an allotone of the simple rise.

Other languages, such as Korean and French, show a similar type of variation. In these languages, the underlying tonal pattern for an accentual phrase is LHLH, but it can be realized phonetically as LH or LLH or LHH, etc. (Jun 2000; Jun & Fougeron 1995, 2000). Listeners treat these different phonetic patterns as the same, presumably because they're all outputs of the same underlying phonological pattern. It is possible that Georgian is structured in a similar way, with a single underlying pattern that can either be realized as (L*+H L+Ha) or as (L* Ha). Additional research is required to see if the rise-fall-rise pattern is motivated by a particular context, if it invokes a different interpretation in the mind of the Georgian listener, or if the two patterns are truly interchangeable.

Fig. 6.3 also shows an occasional curiosity concerning the L% boundary tone. Instead of a final fall, the final syllable of the sentence sometimes shows a very slight rise. A number of declarative sentences we collected show this slight rise, which contrasts against the sharp final rise seen in questions. In the pilot experiment mentioned, we also attempted to determine if there was any meaning associated with this slight rise. We played re-synthesized versions of another sentence with a subtle final rise to our four listeners. One had the original final slight rise, and the second showed a typical final fall. While they could detect the difference between these two stimuli, all listeners agreed that this difference was meaningless. For this reason, we have chosen to consider this optional slight rise in IP-final position as an allotone of the normal L%. This slight final rise has apparently appeared in recent years in the speech of urban Georgians, notably young women (Féry p.c.). However,

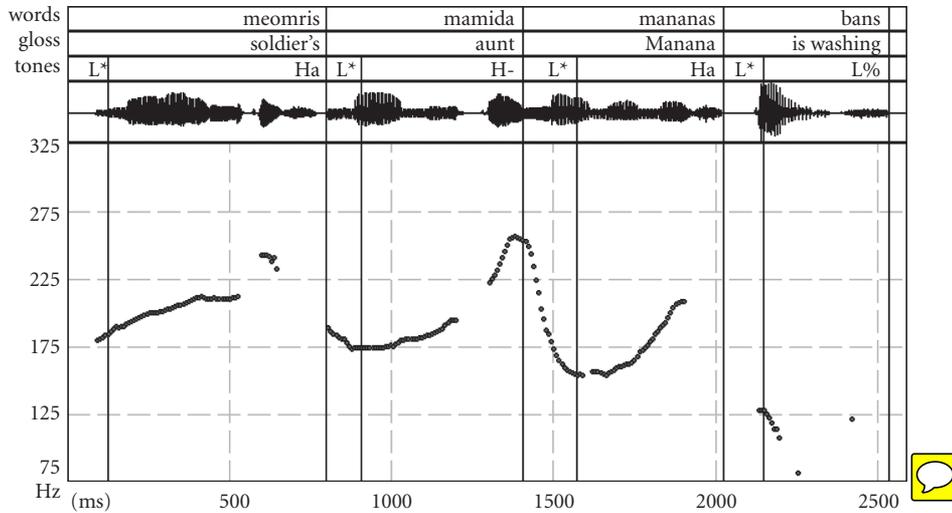


FIGURE 6.4 An example pitch track of a sentence with a complex NP subject, *The soldier's aunt is washing Manana*. The subject, [meomris mamida], forms an ip, marked with a H- boundary tone that breaks the declining pitch pattern normally seen in declaratives composed of only APs.

our consultants are middle aged women who have lived in the United States for 15–30 years, so it is unclear if this is characteristic of the same dialect.

When adjacent words are semantically linked or form a larger constituent, such as heavy noun phrases, they are often associated into one prosodic unit. This unit is larger than the AP, but smaller than the IP. Thus, we call it an Intermediate Phrase (ip). Fig. 6.4 shows an example using the sentence, *The soldier's aunt is washing Manana*. In this example, the ip is marked by a H- boundary tone. Like IP boundary tones, the ip-final H- overrides and replaces the expected Ha AP boundary tone. A H- ip boundary tone is the most common boundary tone for this type of phrase and is seen in both declaratives and questions. The pitch peak in this tone reaches higher than a Ha AP boundary tone, breaking the natural declination of pitch over the course of the utterance. Compare this to Fig. 6.5, which shows the same sentence, but the subject does not form its own ip. ip boundaries are also often marked with some phrase final lengthening. Because of this lengthening, the word, *aunt* in Fig. 6.4 is longer than that in Fig. 6.5, relative to the other words in the sentence.

The subject ip in Fig. 6.4 is composed of two APs, the first of which shows the common rising pattern. This was not frequent in our data. Typically, APs that group together in a larger unit and that are non-final in the unit are marked with falling tonal patterns. We label these AP patterns with a H* pitch accent and La boundary tone, [H* La], (here, “a” refers to an AP). For example, Fig. 6.6 shows a sentence, *Manana dropped the very big sour cherry*, with a heavy object NP that is contained in

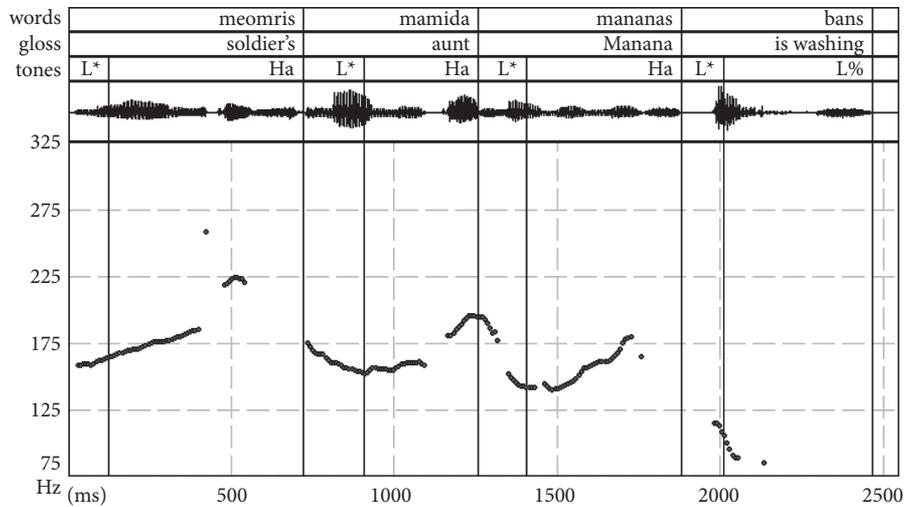


FIGURE 6.5 An example pitch track of a sentence with a complex NP subject, *The soldier's aunt is washing Manana*. Here, the subject, [meomris mamida], does not form an ip. Instead, the sentence shows a sequence of simple rising APs, with declining pitch over the course of the utterance.

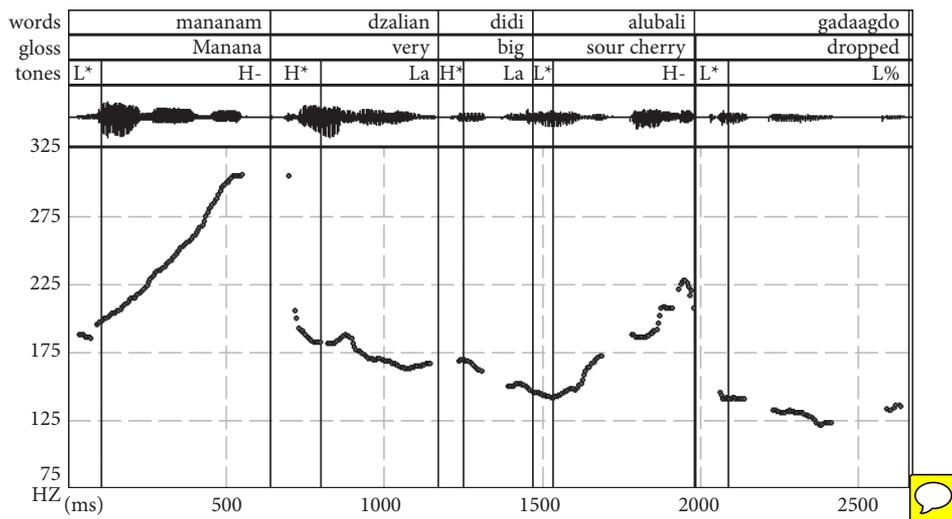


FIGURE 6.6 An example pitch track of a sentence, *Manana dropped the very big sour cherry*, with a complex NP object [dzalian didi alubali]. All the AP constituents of the object ip show a falling [H* La] tonal pattern, except for the final AP, which reverts to the more standard rise, [L* H-].

its own ip. Each of the APs in this phrase shows the falling tonal pattern except for the last one, which shows the more typical rising pattern.

Notice that the sentence in Fig. 6.6 is divided up into three intermediate phrases, corresponding to the subject, object, and final verb. Although it has the same rising pattern of a typical declarative AP, we consider the subject to be in its own ip because it is followed by a pitch reset. The pitch range resets after the subject ip and reduces, causing the H* pitch accents in the object phrase to be very low and not very different from the La boundary tones. However, despite the reduced pitch range of the phrase, the second H- boundary tone still reaches quite high in pitch. H- boundary tones break the normal declination of highs across an utterance and ignore reduced pitch ranges. H- boundary tones often rise twice as high above a preceding low target than would a Ha boundary tone. So, for a female speaker, while a Ha may be around 50 Hz higher than a preceding L*, a H- boundary tone will often be around 100 Hz higher. We acknowledge that the evidence for an intermediate phrase is not as obvious as the evidence for the accentual phrase or the intonational phrase. We hope to support the existence of the Georgian ip with future research.

The data also suggests that the La boundary tone marks semantic/syntactic relatedness to the following AP whether or not the two phrases form their own unique ip. For example, in Fig. 6.7, the main predicate of the sentence, *The monkey*

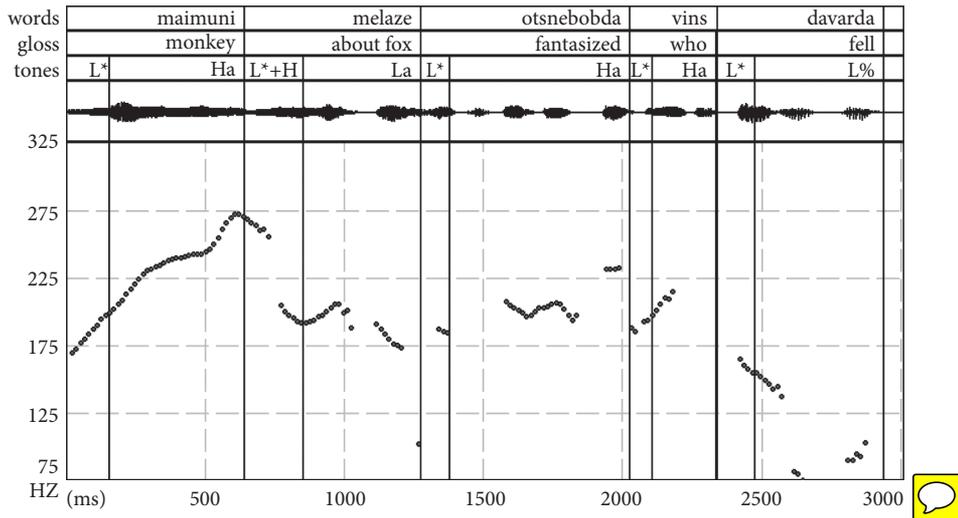


FIGURE 6.7 An example pitch track of a sentence, *The monkey fantasized about the fox who fell.* The object, [melaze], forms an AP with a La boundary tone, indicating a semantic/syntactic link with the following AP, the verb, [otsnebobda].

fantasized about the fox who fell, is composed of two APs. The first, *melaze* (“about the fox”), ends in a La boundary tone, but the high boundary tone on the following verb is a Ha rather than a H-. This boundary tone does not break the declination of high tones across the utterance, nor rises far above the preceding low pitch accent. But, despite not forming an ip, we still observe the La boundary tone.

6.3.3 *Wh-questions*

Wh-questions in Georgian are marked with specific word order. The wh-phrase always immediately precedes the main verb, and it is default for the wh-phrase and verb to appear at the beginning of the sentence, as in the question in (3a). It is also acceptable, although less preferred, for the wh-phrase and verb to appear in a sentence medial position, (3b). However, the wh-phrase and main verb cannot be separated and remain grammatical, as in (3c).

- (3) (a) *vistvis q'idulobs medole naq'ins?*
 for.whom bought drummer ice.cream
 “Who did the drummer buy ice cream for?”
- (b) *medole vistvis q'idulobs naq'ins?*
- (c) **vistvis medole q'idulobs naq'ins?*

Intonationally, the verb and preceding wh-phrase are typically grouped into a single phrase and are marked with a high-low-high pattern. Fig. 6.8 provides an example with the question, *Who is making Lali happy?* The pitch accents and boundary tones that we observed for declarative sentences are not enough to explain the high-low-high pattern found in questions. Specifically, the middle low target can either be attributed to a new pitch accent (a hypothetical H*+L) or a new boundary tone (a hypothetical L+Ha or L+H-). As is clear from Fig. 6.8, the low target is well separated from the preceding high associated with the initial stressed syllable. Thus, the low cannot be associated with a pitch accent. Bush (1999), who did a preliminary study on Georgian yes/no questions, suggests this pattern is indicative of a complex boundary tone. Indeed, we always observe the low target to be on the penultimate syllable of the phrase, which is what is predicted for a L+Ha or L+H-boundary tone. However, we also observe long stretches of high pitch between the preceding, phrase-initial high pitch accent and the penultimate low target. As can be seen in Fig. 6.8, this high plateau stretches from the first syllable to the antepenultimate syllable, before falling sharply to the low target on the penult.

If the phrase consisted of only a high pitch accent and a L+H boundary tone, we would expect direct interpolation, thus falling pitch, between the H pitch accent and the following L tonal targets. That is, we would not expect the pitch to remain high until the antepenultimate syllable. Therefore, we propose that there are two pitch targets towards the end of the phrase: a high on the antepenultimate syllable and

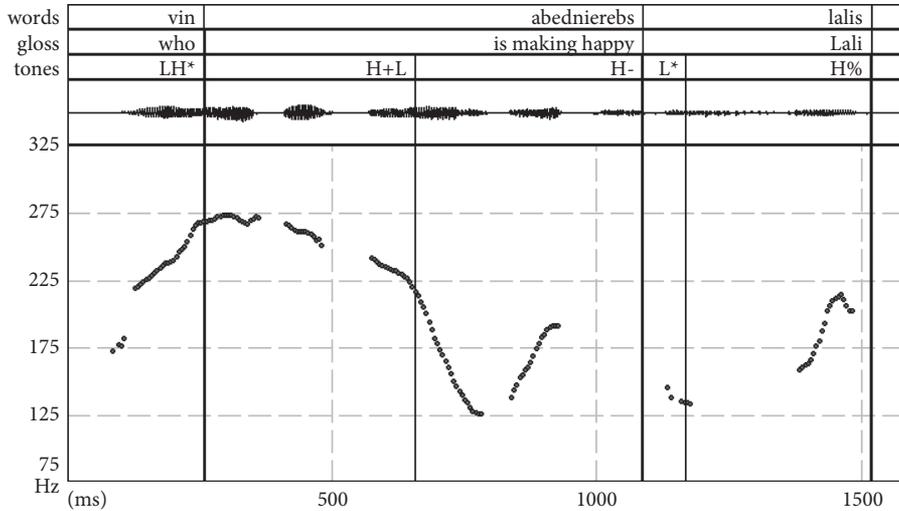


FIGURE 6.8 An example pitch track of a question, *Who is making Lali happy?*. The wh-phrase, *vin*, and the verb, *abednierebs*, are grouped into a single phrase. The first syllable shows a LH* pitch accent and the antepenultimate syllable shows a H+L phrase accent. A H- ip boundary tone appears at the end of the verb. A H% IP boundary tone appears at the end of the sentence.

a low on the penult. Rather than proposing a H+L+H boundary tone, we suggest that this pattern is composed of a H+L phrase accent and a H boundary tone, either Ha or H-.

The pitch accent that appears on the initial phrase in Fig. 6.8 is a rising accent that is located entirely on the first syllable. We label this as a LH* rather than a L+H* to indicate this difference in timing. The H+L phrase accent appears on the second word, which, together with the first word, forms one intermediate phrase.³ Unlike a declarative sentence, the question ends in a high pitch. We attribute this to a H% IP boundary tone. This is the most common IP boundary tone observed in questions.

While it is common for the wh-phrase and verb to appear in a single AP, this is not obligatory. Fig. 6.9 shows the same question as Fig. 6.8, but in this repetition, the wh-phrase and verb are separated into two APs, though still forming one ip. Otherwise, the same basic tonal pattern is observed. On the other hand, the wh-phrase and verb can remain grouped into a single AP even when the multiword sequence becomes

³ We have chosen to label this phrase as an intermediate phrase (ip) rather than an AP because we perceive a strong break and phrase final lengthening. We acknowledge that this H- boundary tone does not follow the criteria for ip boundaries laid out in the paper—namely, it does not break the utterance-wide declination pattern for high pitch. We cannot use the pitch range criteria here because it is not possible to tell if the pitch range is reduced after this boundary tone or not. Again, more research is needed to confirm the existence and properties of intermediate phrases in Georgian.

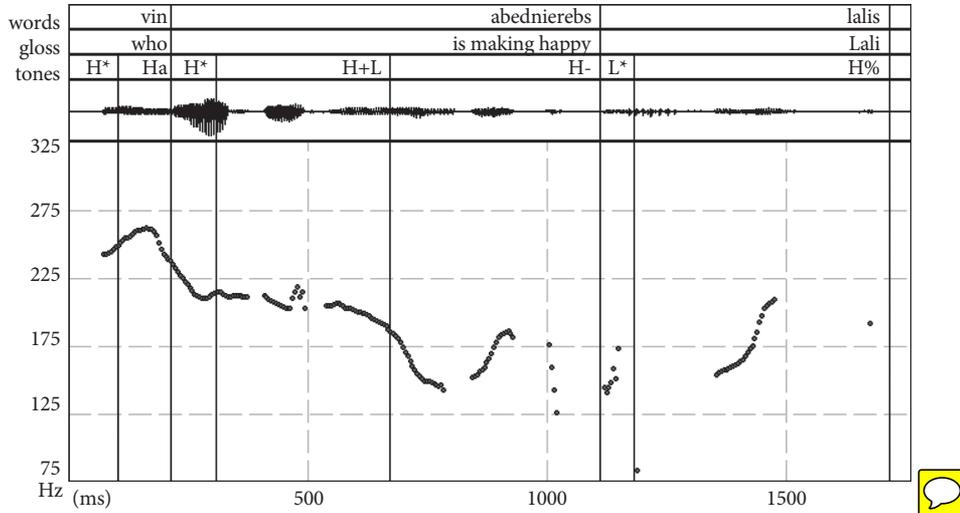


FIGURE 6.9 An example pitch track of a question, *Who is making Lali happy?*. Unlike in Fig. 6.8, the wh-phrase and the verb exist in separate phrases.

quite long. Fig. 6.10 provides an example with the question, *Which investigator made the beautiful soldier happy?* In this example, the wh-phrase and verb form a single AP that is three words and fifteen syllables long.

The final word in Fig. 6.8 and Fig. 6.9, *lalis*, is only two syllables long and shows a [L* H%] rising pattern. When the word or phrase is longer, three syllables or more, we often observe the same high-low-high pattern that can be seen on the wh-phrase and verb. This can be seen in Fig. 6.10.⁴ The pitch range of the postverbal material is quite reduced, except for the H% IP boundary tone. The pitch of the H% IP boundary tone is much higher than the pitch accents, phrase accents, and smaller boundary tones that immediately precede it. Like intermediate phrase boundary tones, IP boundary tones are unaffected by the reduced pitch range.

In our data, the ip boundary tone that follows the verb in questions is typically H-. However, in wh-questions, we observed a second alternative—a L- ip boundary tone. In Fig. 6.11, *Where did the soldier wash the nightingale?*, the verb, *dabana* (“washed”), shows a L- boundary tone. Like with other ip boundaries, we observe reduced pitch range following the L-. Again, the post verbal material shows the same tonal pattern that appears on the verb. In this case, *meomarma* (“soldier”) shows the

⁴ The low tone of the final high-low-high contour of Fig. 6.10 falls into creaky voicing, which is observable on the waveform, but does not register in the pitch track.

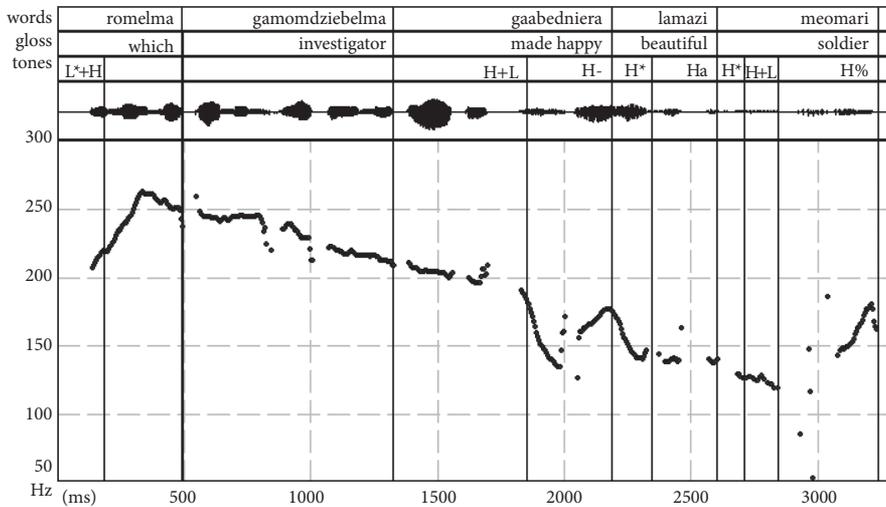


FIGURE 6.10 An example pitch track of a question, *Which investigator made the beautiful soldier happy?* The wh-phrase, *romelma gamomdziebelma*, and the verb, *gaabedniera*, form a single phrase that is fifteen syllables long. The material following the verb shows the same high-low-high contour seen on the verb, but in a reduced pitch range (The Low tone target is not visible due to creaky voicing).

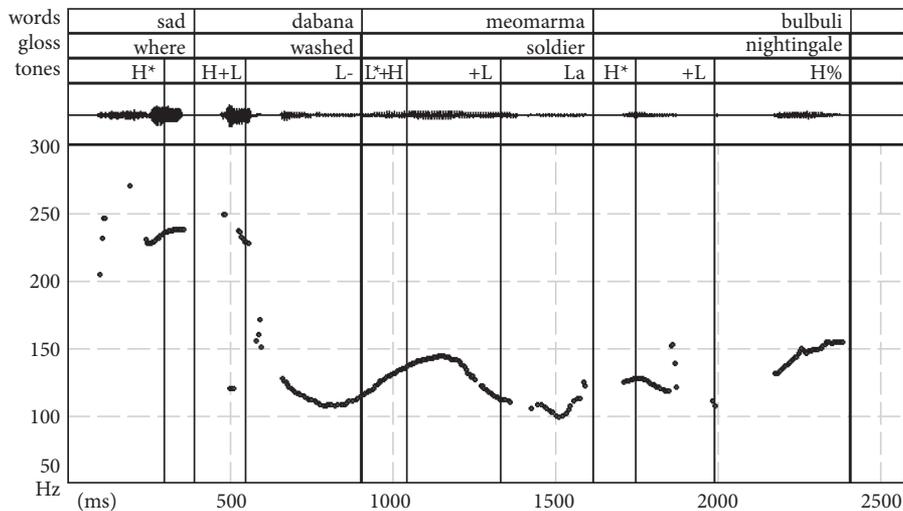


FIGURE 6.11 An example pitch track of a question, *Where did the soldier wash the nightingale?* The verb shows a H+L phrase accent followed by a L- ip boundary tone, an uncommon, but possible intonation pattern for wh-questions.

same high-low-low pattern, but *bulbuli* (“nightingale”) shows a high-low-high pattern due to the H% boundary tone.

When the verb is less than four syllables long, the high tone associated with the pitch accent and the high tone associated with the H+L phrase accent can overlap and appear on the same syllable, as is the case in Fig. 6.11 and Figs. 6.12–14. In Fig. 6.11, the verb is only three syllables long. If the verb is shorter than three syllables, it is often lengthened in order to host all three tonal targets. An extreme case is shown in Fig. 6.15 with the question, *Is Ia washing Lali?* Here, the monosyllabic verb, *bans* (“is washing”), is lengthened in order to host all three tonal targets. In cases where the pitch accent and phrase accent overlap, we label the phrase accent with only a +L, indicating that the high tone exists on the same syllable as the H*.

H% was the most commonly seen IP boundary tone for wh-questions, although other boundary tones were also observed. Fig. 6.12, *Who washed the scoundrel?*, shows a question with an L% IP boundary tone, which we normally observe in declarative sentences. Fig. 6.13, *Who is looking after the slow owl*, shows a question with a HL% boundary tone, a short fall located entirely on the final syllable. Bush (1999) observed a similar final pitch contour in his study on yes/no questions, which he points out, is characteristic of polite questions. Because we have boundary tones of higher prosodic phrases replacing the boundary tones of lower phrases, we cannot attribute this final fall to a sequence of boundary tones as Bush does (in

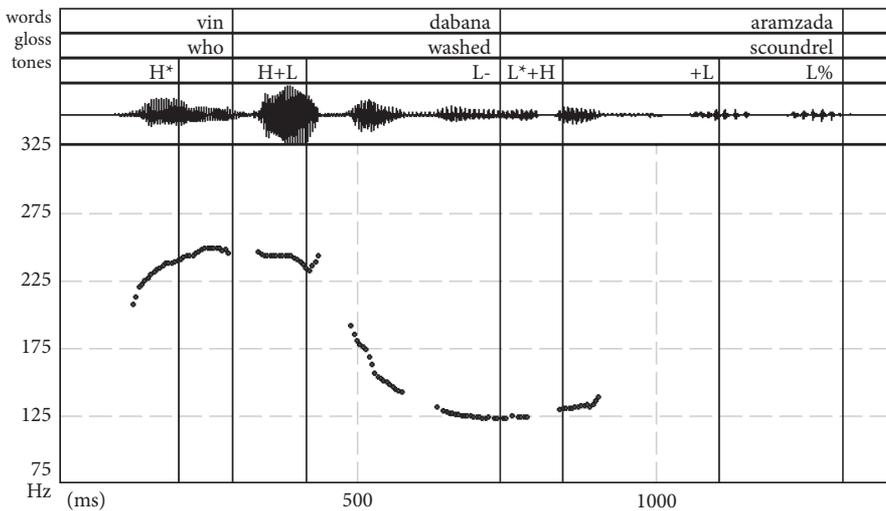


FIGURE 6.12 An example pitch track of a question, *Who washed the scoundrel?*. The question ends in a L% boundary tone.

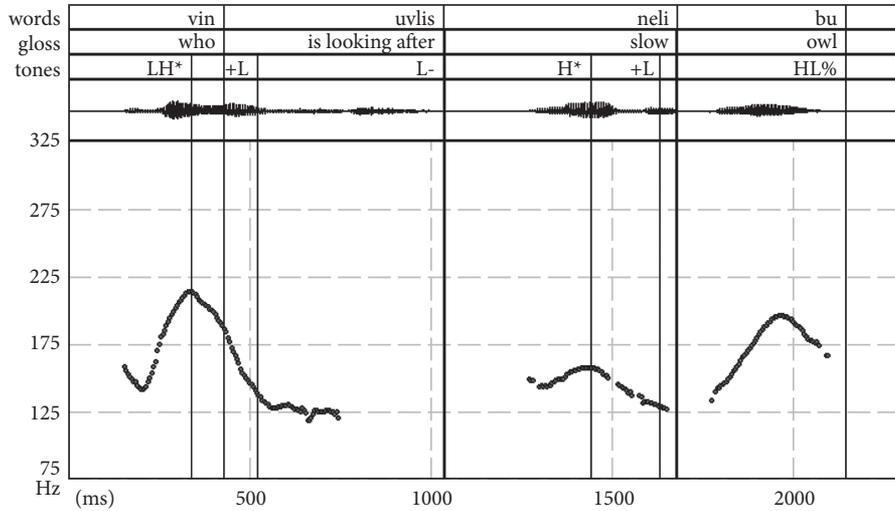


FIGURE 6.13 An example pitch track of a question, *Who is looking after the slow owl?*. The question ends in a HL% boundary tone.

his analysis, this pattern is L+H- L%). Recall in declaratives, the IP-final L% replaces the otherwise expected AP-final Ha. Therefore, we attribute this final fall to a single IP boundary tone.

6.3.4 Yes-no questions

Yes-no questions in Georgian are marked through intonation and word order. In declaratives, the most common word order is SOV. In yes-no questions, the verb is often fronted, to either a verb-medial or verb-initial word order. Fig. 6.14 shows an example with the question, *Did the inventor hide the wheel?*, and Fig. 6.15 shows an example with the question, *Is Ia washing Lali?*. We observe the same high-low-high tonal pattern in yes-no questions that we find in wh-questions. We analyze this contour in the same way: a high pitch accent, the H+L phrase accent, and a H- ip boundary tone. In Fig. 6.14, we label the pitch accent as H*, but a LH* pitch accent can also appear, as in wh-questions.

However, when the verb is sentence medial, all three tonal targets need not be crammed together. Another option is available. The word preceding the verb (typically the subject) can be grouped with the verb into a single phrase. In this case, the pitch accent will appear on the first syllable of the first word and the H+L phrase accent will appear on the antepenultimate syllable of the two word sequence. This is

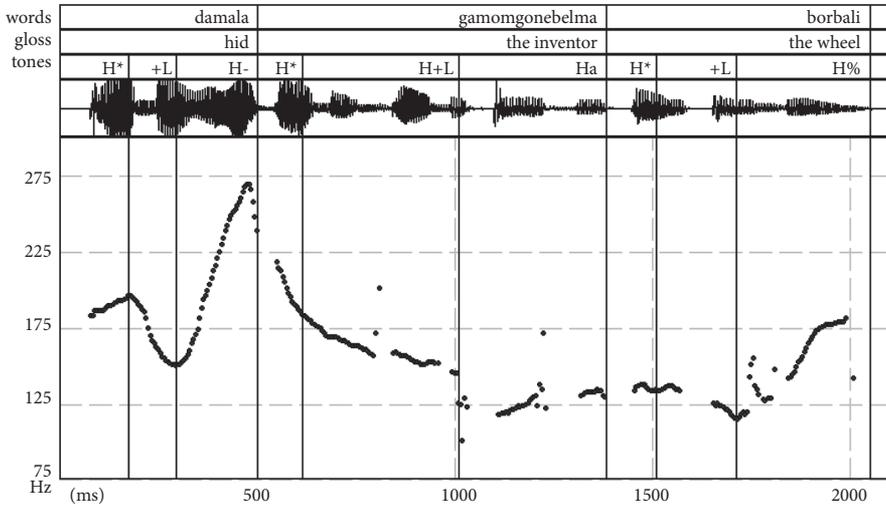


FIGURE 6.14 An example pitch track of a question, *Did the inventor hide the wheel?* The verb is in a sentence initial position and shows a high-low-high pattern, made of a H* pitch accent, a H+L phrase accent and a H- ip boundary tone. When the high target of the phrase accent overlaps with the high target of the pitch accent, the phrase accent is labeled with only a +L.

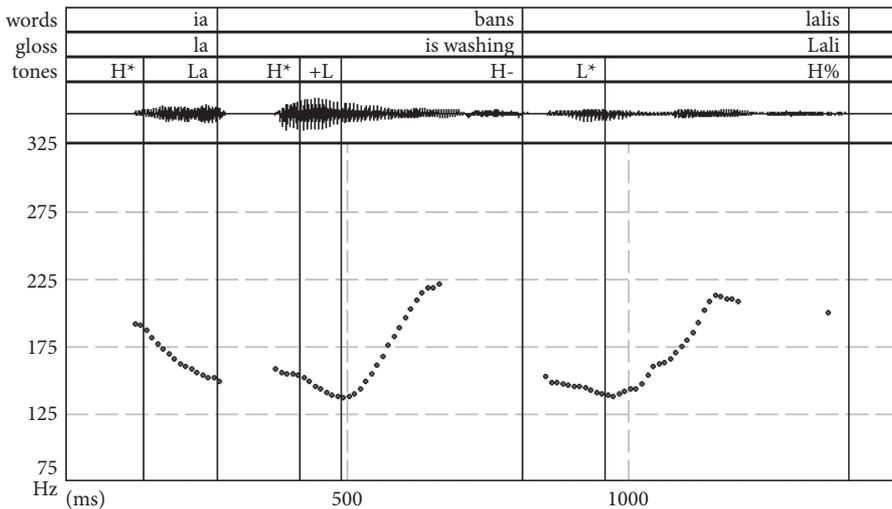


FIGURE 6.15 An example pitch track of a question, *Is Ia washing Lali?* The monosyllabic verb is in a sentence medial position and is lengthened in order to host a pitch accent, bi-tonal phrase accent and boundary tone.

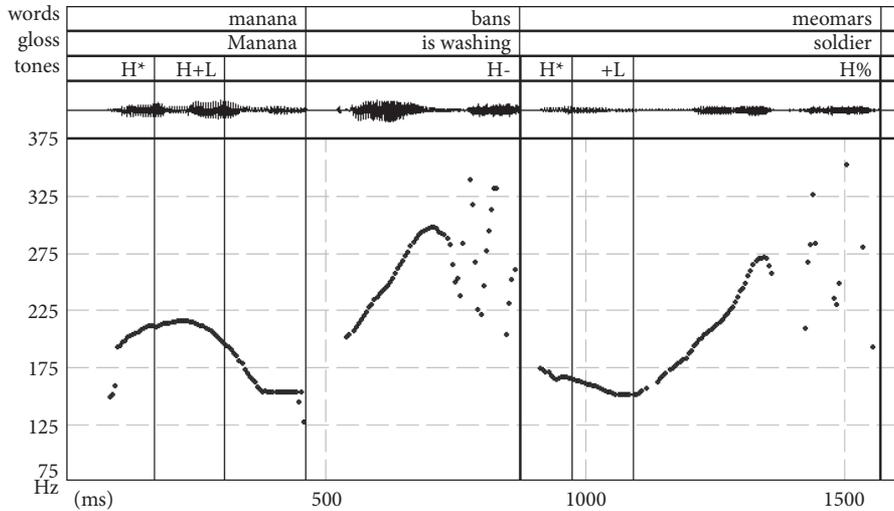


FIGURE 6.16 An example pitch track of a question, *Is Manana washing the soldier?*. The subject and verb, [Manana bans] form a single AP with a H+L phrase accent. An ip break appears following the verb, marked with a H- boundary tone. The question ends with a H% IP boundary tone.

illustrated in Fig. 6.16 with the question, *Is Manana washing the soldier?*. In this example, the subject, *Manana*, is grouped with the verb, *bans*, into a single phrase. A H* pitch accent appears on the first syllable of the subject and the H+L phrase accent appears on the second syllable of the subject, which is the antepenultimate syllable of the four syllable phrase. In this case, the verb receives no tone except for the H- boundary tone.

This same strategy is also available when the verb appears in a sentence final position, as in Fig. 6.17, *Is the fisherman who washed Lali meeting Manana?*. In this example, the object, *Manana*, is grouped with the verb, *shekhvda* (“is meeting”), into a single AP. Again, a H* pitch accent appears on the first syllable. The high target of the phrase accent appears on the last syllable of *Manana*, i.e. the antepenultimate syllable of the five-syllable sequence. The low target appears on the first syllable of the verb, *shekhvda*, i.e. the penultimate syllable of the five-syllable sequence. These examples make it clear that the H+L phrase accent is not associated with a stressed syllable, but rather marks a specific location in the post-lexical prosodic phrase. In Fig. 6.17, the H- ip boundary tone that would normally appear at the end of the verb is replaced by a HL% IP boundary tone. All preceding phrases end in a La. This is common for material preceding the verb AP in yes-no questions.

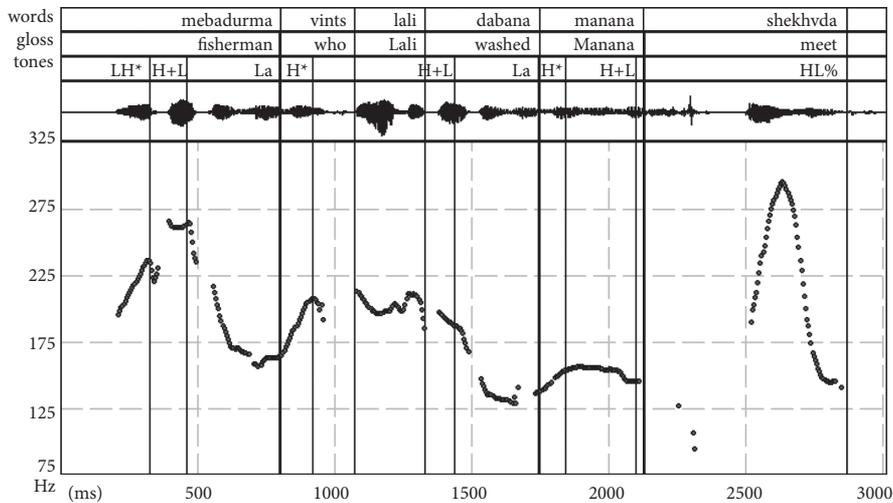


FIGURE 6.17 An example pitch track of a question, *Is the fisherman who washed Lali meeting Manana?* The object and verb, [Manana shekhvda], form a single AP with a H+L phrase accent. All preceding phrases end in an La boundary tone.

As will be discussed, the H+L phrase accent is thought to be associated with focus. The fact that the verb receives a H+L phrase accent in both yes-no and wh-questions suggests that the verb is receiving some level of focus. Yes-no questions are questions of polarity, which is embedded in the verb. Thus, it is reasonable for the verbs to receive focus in these cases. Wh-questions, on the other hand, target the wh-phrase. It is not clear why the verb still seems to receive focus in these cases, rather than the wh-phrase. We suspect it is because the wh-words (at least, *vin* and *sad*) are treated as prosodically weak, and almost like clitics to the following verb. Thus, the focus is carried by the prosodically stronger verb rather than the clitic-like wh-phrase.

This association with focus is further supported by the reduced pitch range used for all material following the verb. However, although material following the verb in a yes-no question shows reduced pitch range, it is not deaccented. Like in wh-questions, the high-low-high pattern that appears on the verb is often repeated on material following the verb. This can be seen in Fig. 6.14. In this example, both the subject, *gamomgonebelma* (“the inventor”), and the object, *borbali* (“the wheel”), show the high-low-high pattern. Both arguments receive a H* pitch accent and the H+L phrase accent. Because the subject is long, these two tones are well separated, but because the object is only three syllables, the H* pitch accent and the H from the phrase accent overlap and appear on the same syllable, similar to the verb. For the subject, the boundary tone is a Ha. The object receives a H% IP boundary tone.

Much like wh-questions, many types of IP boundary tones can appear in yes-no questions—H%, which is seen in Figs. 6.14–16, L%, which can be seen in Fig. 6.18, *Is the drummer looking after the vicious monkey?*, and HL%, which can be seen in Figs. 6.17 and 6.19. Fig. 6.19 shows the question, *Is Miriam washing the soldier?*. The high IP boundary tone was the most common in our data.

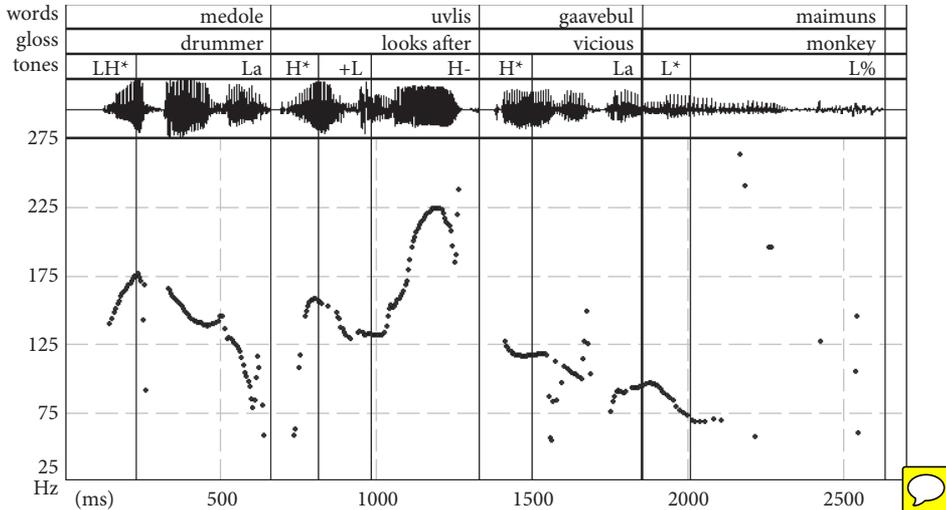


FIGURE 6.18 An example pitch track of a question, *Is the drummer looking after the vicious monkey?*. The sentence ends in a L% IP boundary tone.

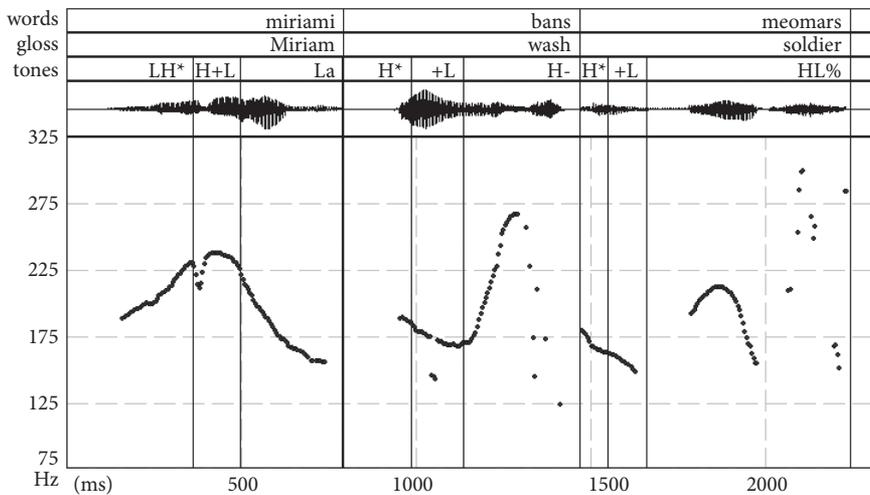


FIGURE 6.19 An example pitch track of a question, *Is Miriam washing the soldier?*. Both tones of the HL% IP boundary tone appear on the final syllable.

6.3.5 *Focus*

6.3.5.1 *Word order* Focus is partially realized in Georgian through word order. When a clause is focused, it tends to take a preverbal position (Asatiani 2007; Skopeteas & Fanselow 2008; Skopeteas et al. 2009). Focused constituents may also appear in a postverbal position, though this position seems to be less preferred than the preverbal position. Skopeteas & Fanselow (2008) tested four word orders under different wh-question focus conditions. In default sentences, subjects reported a word order ranking of SIDV > IDSV > DSVI > VSID (subject (S), verb (V), direct object (D) and indirect object (I)), where SIDV was considered the best ordering and VSID was considered the worst, or most marked. They also found that when constituents were focused, the order that had the focused constituent in the preverbal position was considered best.

For this study, five Georgian speakers were asked to fill out a questionnaire asking for judgments on question/answer pairs that varied word order. All pairs consisted of variations of the sentence, *medole q'idulobs mananastvis naq'ins*, 'The drummer bought ice cream for Manana.' Preferences were elicited for declaratives with no focus, subject focus, focus on one of the two objects, or focus on the verb. Orders that were judged good were given a value of 1. Orders judged bad were given a value of 0. Orders that were judged acceptable, but not optimal, were given a value of 0.5. Judgments were then averaged over the five participants. Their compiled results are presented in Table 6.1. Not every word order tested was asked for each type of focus as some orders were ruled out as bad by our primary consultants before the creation of the questionnaire.

In neutral focus sentences with two objects, participants judged SVID and SVDI orders the best. Recall that in simple transitive sentences, the default word order is SOV. Thus, we might expect that an order like SIDV would also be highly rated, like it was in Skopeteas et al. (2009). Order SIDV was viewed as acceptable, but not optimal. In ditransitive sentences, Georgian speakers clearly prefer to keep both object arguments postverbal. For focus on the verb phrase, the question 'What did the drummer do?' was asked. For this question, preferred responses matched quite closely to the preferred responses for neutral focus.

For subject focus questions, two word orders were tested—S(?)VID and S(?)VDI (where the question mark indicates that the preceding argument contains the wh-phrase). For both question types, the answer that was judged most appropriate had matched word order. The answers with the object arguments reversed were judged as acceptable, but not optimal. In all of these cases, the focused constituent, the subject, is located in a position immediately preceding the verb, a position of focus identified by Asatiani (2007), Skopeteas & Fanselow (2008), and Skopeteas et al. (2009). However, other orders which also placed the subject in a preverbal position were ranked relatively poorly. In these orders, the subject appears sentence medially.

TABLE 6.1 Average native speaker judgments on word order for various question (Q-types)/answer(A-types) pairs. Questions placed focus on either the subject (S), direct object (D), indirect object (I), or verb (V). The argument containing the wh-phrase is indicated by a following (?). Judgments scale from good (1), to bad (0). Orders judged as okay have value 0.5. The average judgment scores higher than 0.5 are shaded

Q-type \ A-type	Q-type						
	No Focus	Subject Focus S(?)VDI	Subject Focus S(?)VID	Direct Object Focus D(?)VSI	Indirect Object Focus SI(?)VD	Indirect Object Focus I(?)VSD	Verb Focus
SVID	0.8	0.4	0.9	0.3	0.4	0.5	0.7
SVDI	0.7	0.9	0.5	0.4	0.5	0.7	0.7
SIDV	0.4	0.6	0.2	0.3	0.3	0.4	0.6
IDSV	0.2	0.3	0.2			0.2	
DSVI	0.1	0.1			0.2	0.1	
VSDI	0						
SDVI	0.2	0.4	0.5	0.9	0.3	0.6	0.4
SIVD	0.2	0.6	0.3	0.5	0.8	0.5	0.4
DVSI				0.2			
DISV		0.2		0.1		0.2	
ISVD		0.2	0.3	0.3		0.25	
IVSD		0		0		0.5	

Some other word orders were also rated as acceptable for subject focus, but the subject appeared in neither a preverbal or postverbal position. For the S(?)VDI question, the answer order SIVD was judged to be relatively good and for the S(?)VID question, the answer order SDVI was judged to be relatively good. In both of these cases, the subject appears sentence initially, which seems to be the least marked position for the subject argument in Georgian. Also, in each case, the

argument that appeared in a postverbal position in the question appeared in that same position in the well-ranked answer. In addition, the answer order SIDV was judged as acceptable for the S(?)VDI question order, but not for the S(?)VID question order. Again, the subject is sentence initial and the object argument that appears in the postverbal position in the question appears in a preverbal position in the answer. It is possible that the objects in these questions are viewed as having some level of focus, due to their position relative to the verb. Answers that keep these same arguments in a focused position, and the subject sentence initially, are treated as acceptable responses to a subject focus question.

For direct object questions, D(?)VSI order, the most preferred answer order was SDVI, where the direct object appears in a preverbal position. However, other orders which also placed the direct object in a preverbal position were ranked relatively poorly. One order, DVSI, places the focused constituent at the beginning of the sentence. Its low ranking is surprising, considering the most preferred word order in questions places the *wh*-phrase sentence initially, but may be explained by the fact that the subject is in a sentence medial, postverbal position—a marked location for the subject. Another order, SIDV, where the direct object appears in a preverbal position, was also ranked poorly, but it is unclear why. Two orders, SIVD and SVDI, where the direct object appears in a postverbal position were judged as acceptable.

Two question word orders were tested for indirect object focus—SI(?)VD and I(?)VSD. For SI(?)VD, the answer with matching word order with the question was most highly ranked. In this case, the indirect object is preverbal. The two neutral word orders, SVDI and SVID, were also rated as acceptable, though SVDI, where the direct object comes immediately after the verb, was rated slightly higher. Two orders that placed the indirect object in a postverbal position, SDVI and DSVI, were ranked poorly.

For the I(?)VSD question order, there was no clearly preferred answer word order. SVDI, a word order that places the indirect object in neither a pre- or postverbal position, was ranked highest, but other orders in which the indirect object does appear in a pre- or post verbal position were ranked relatively well—SDVI, SVID, SIVD and IVSD. Again, the IVSD order, matching the question word order, was ranked relatively high. However, this preference for matching the question word order does not always seem to work. For the case of direct object focus, D(?)VSI, DVSI answer order was ranked quite poorly.

In general, although we found a tendency for focused constituents to appear in a pre- or postverbal position, this is not always the preferred case. In particular, the desire to place the focused constituent in either of these locations is mollified by a preference for unmarked word orders. For example, the optimal position for the subject, regardless of the argument in focus, is at the beginning of the sentence.

6.3.5.2 *Focus intonation* Focus in Georgian is realized through intonation as well as word order. In fact, the intonation of a sentence can signal focus even if the word order does not. Skopeteas et al. (2009) looked at the intonational realization of their focus stimuli. They observed that focused items showed an initial rise, a LH* pitch accent. Post-focused material was optionally dephrased and deaccented. If it was not deaccented, the material showed reduced pitch range. They also saw another pattern, when the focused item was postverbal and sentence final. In this case, the verb showed a final high tone with very high pitch and was followed by a short pause (a H- in our model), and the focused item was realized with low and flat intonation. In general, Skopeteas et al. (2009) found that focused items were separated from the rest of the utterance by short pauses.

In gathering data, we asked our consultants to respond to questioning or contrasting prompts with answers with word orders that had been judged good as well as orders that had been judged poorly. In our data, focus was most commonly realized through the use of the H+L phrase accent and high pitch accents—usually LH*, but H* was not uncommon. There was no readily observable difference in the intonation associated with question/answer focus or corrective focus. Figs. 6.20 and 6.21 show examples of focus intonation. Sentences with focus often show normal declarative

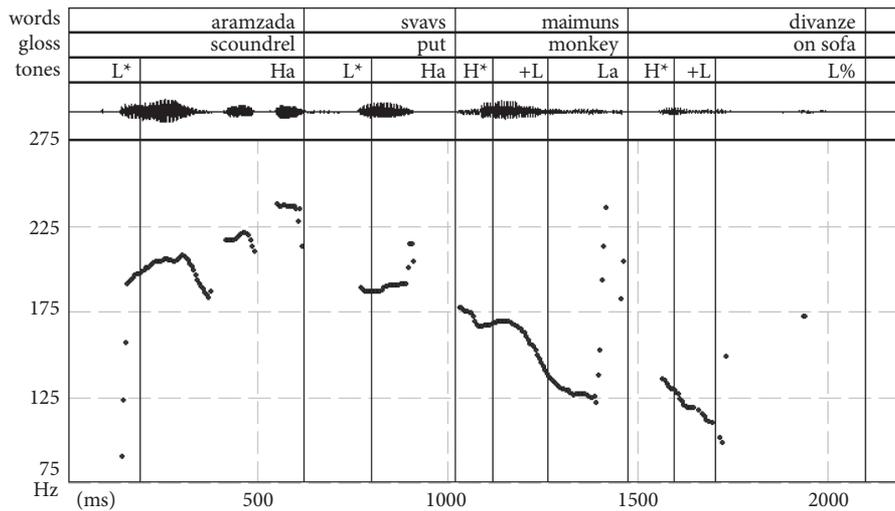


FIGURE 6.20 An example pitch track of the sentence, *The scoundrel is putting the MONKEY on the sofa*, where focus is placed on the direct object, [maimuns]. Material preceding the focused item show normal declarative intonation. The focused item shows a H* pitch accent and a H+L phrase accent.

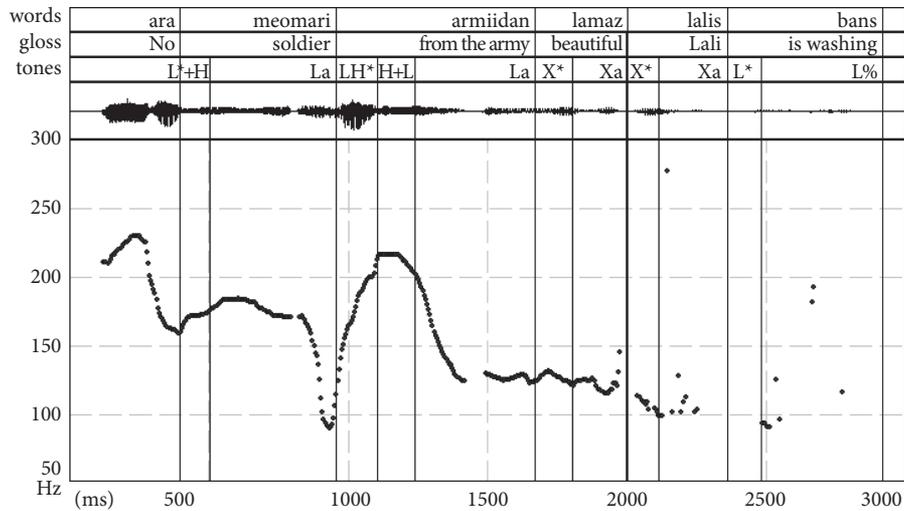


FIGURE 6.21 An example pitch track of the sentence, *No, the soldier FROM THE ARMY is washing beautiful Lali*, where focus is placed on the modifying phrase, [armiidan]. Material preceding the focused item shows normal declarative intonation. The focused item shows a LH* pitch accent and a H+L phrase accent.

intonation until the focused constituent is reached. In Fig. 6.20, every word preceding the focused direct object, *maimuns* (“monkey”), shows the typical low-high accentual phrase pattern. The focused word shows a H* pitch accent and a H+L phrase accent on the penultimate syllable. The material following the focused word shows a tonal pattern similar to the focused word, but with much reduced pitch range. In Fig. 6.21, the first word of the complex subject NP shows a L*+H and La AP boundary tone, common for words that are semantically linked to the following word. The focused word, *armiidan* (“from the army”), shows a LH* and a H+L phrase accent on the penultimate syllable. Again, the material following the focused word shows a much reduced pitch range—so reduced, in fact, that it is very difficult to tell which tones are present (thus, labeled X* and Xa).

Although the H+L phrase accent was common in our focus data, it was not obligatory. Specifically, when the subject was focused and sentence initial, it often simply showed a high pitch accent on the first syllable (again, usually LH*, but H* could also be used) and dephrasing of all material following. Fig. 6.22 shows the sentence, *No, MANANA is washing Miriam*, where the subject, *Manana*, is focused. It shows a LH* on the first syllable, and then the pitch falls and remains low until the end of the sentence. In our model, if a H+L phrase accent is present, then the material following is neither dephrased or deaccented, but instead simply shows much

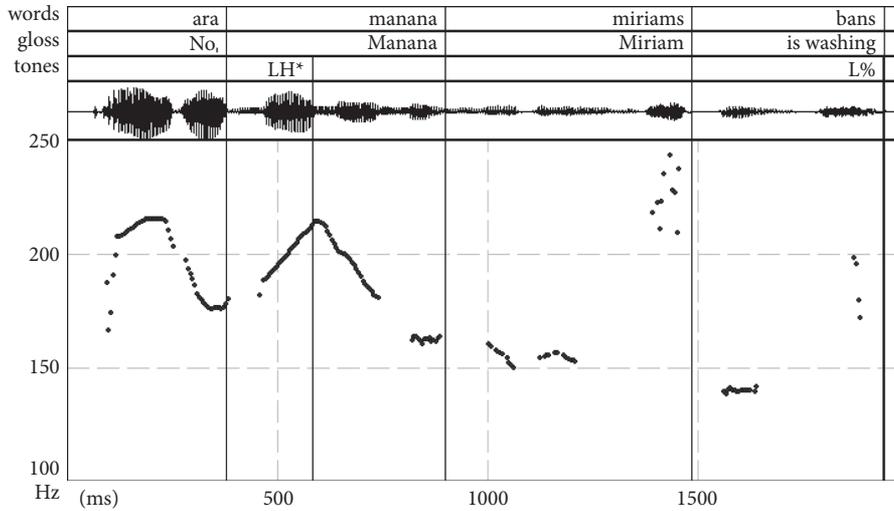


FIGURE 6.22 An example pitch track of the sentence, *No, MANANA is washing Miriam*, where focus is placed on the subject, [Manana]. It shows a LH* pitch accent, but no H+L phrase accent. All material following the subject is dephrased.

reduced pitch range. Often, post-focus material will repeat the tonal pattern found on the focused word, as in Fig. 6.20, but occasionally, normal declarative intonation was used, as in Fig. 6.23. We only observe dephrasing when no H+L phrase accent is present, as in Fig. 6.22. Regardless of the exact strategy taken in any given utterance, the basic intention seems to be to decrease the prominence of all post-focus material. While focus was commonly realized with the use of the H+L antepenultimate phrase accent, it was not always realized on the focused constituent. When the focused constituent appeared in a preverbal position, it would occasionally be grouped together with the following verb into one phrase and the H+L phrase accent would be realized on the antepenultimate syllable of the two-word unit. Fig. 6.24 provides an example of this pattern using the sentence, *No, GELA is hiding behind the ship*. In this example, the subject, *Gela*, is focused and is grouped together with the following verb, *imaleba* (“is hiding”). The H+L phrase accent appears on the first syllable of the verb, the antepenultimate syllable of the six syllable phrase. Post-focus material shows reduced pitch range. However, if the verb was three syllables or more long, although it would still receive the H+L phrase accent, there would frequently be AP break between it and the preceding focused constituent. In Fig. 6.25, *the drummer bought ICE CREAM for Manana*, the direct object, *naq’ins* (“ice cream”), is focused, but receives no special intonation. Instead, it shows a normal low-high accentual phrase rise. The verb, which immediately follows, shows a H+L phrase accent.

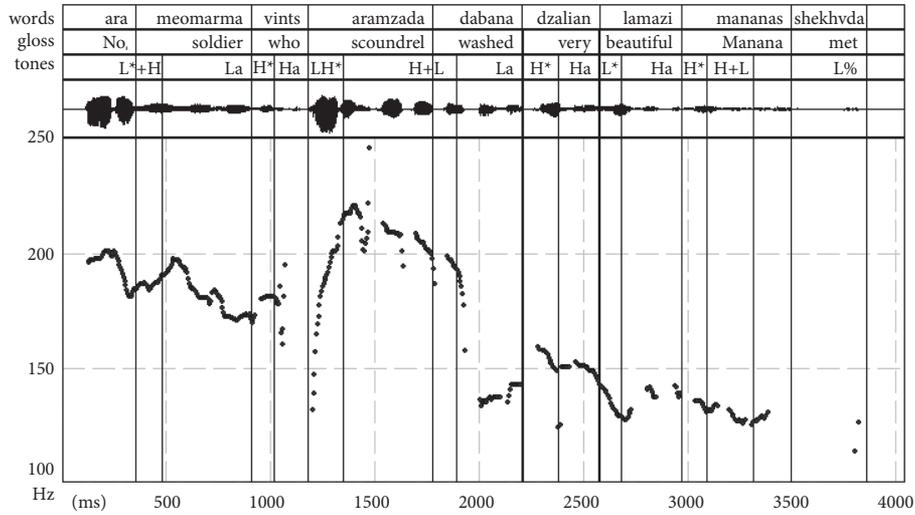


FIGURE 6.23 An example pitch track of the sentence, *No, the soldier who washed the SCOUNDREL met very beautiful Manana*, where the embedded object, [aramzada], is focused. The material following the focused constituent is not deaccented or dephrased, and instead only shows a reduced pitch range.

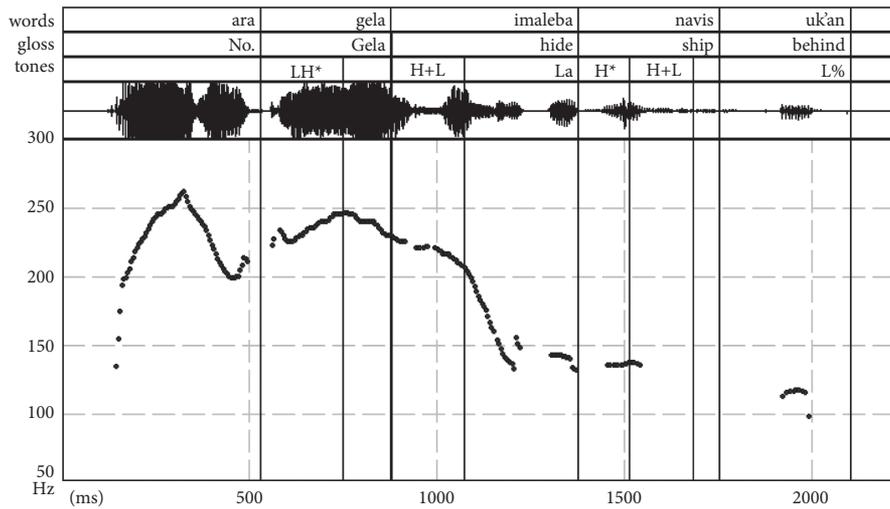


FIGURE 6.24 An example pitch track of the sentence, *No, GELA is hiding behind the ship*, where the subject, [Gela], is focused. The focused constituent is grouped together with the following verb, [imaleba]. The H+L phrase accent appears on the antepenultimate syllable of the two word sequence.

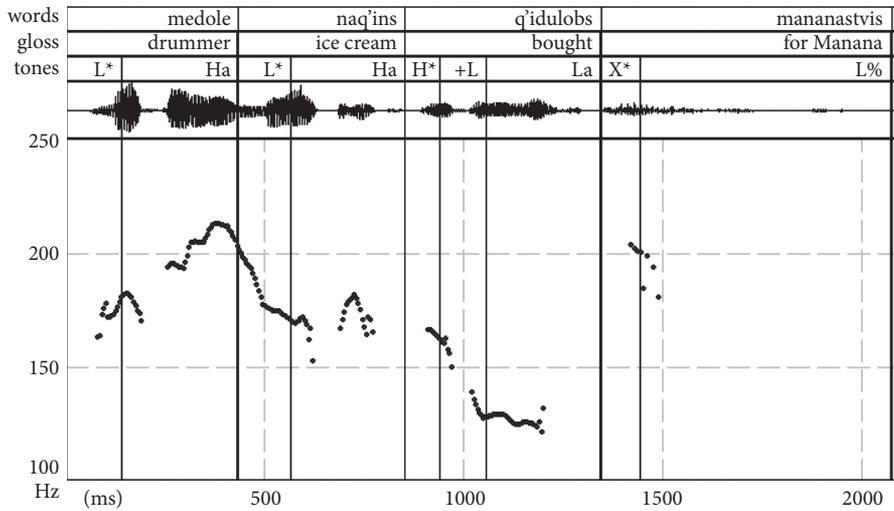


FIGURE 6.25 An example pitch track of the sentence, *The drummer bought ICE CREAM for Manana*, where the direct object, [naq'ins], is focused. The focused constituent receives normal declarative intonation and is separated from the following verb by a Ha boundary tone. The verb, [q'idulobs], shows a H+L phrase accent.

Focus was also frequently indicated by phrasing. The focused constituent often began its own intermediate phrase, preceded by a H- ip boundary tone. It was possible that this was the only sign of focus, as shown in Fig. 6.26. In this example, the focused constituent, the object, is sentence final and shows a low flat pitch contour, similar to the pattern observed in Skopeteas et al. (2009). This was a common intonational pattern when the focused constituent was in a postverbal, sentence-final position. In other cases, the focused constituent was preceded by a H- boundary tone and was marked with a high pitch accent and all following material was dephrased, as in Fig. 6.27. In both Figs. 6.26 and 6.27, the presence of an ip boundary is supported by the height of the H- and the presence of phrase initial lengthening of the focused word's initial consonant. However, quite often, the phrase break was used in conjunction with the H+L phrase tone, as shown in Fig. 6.28.

In summary, a focused word in Georgian received a high pitch accent, either LH* or H*, and usually a H+L phrase accent. If the focused constituent was in a preverbal position, then the following verb would usually receive the phrase accent by forming one AP together with the preceding focused word. If the focused constituent was sentence medial, it was commonly preceded by a H- ip boundary. All material following the focused constituent was either deaccented or dephrased in the cases where no H+L phrase accent appeared, or displayed reduced pitch range, when a

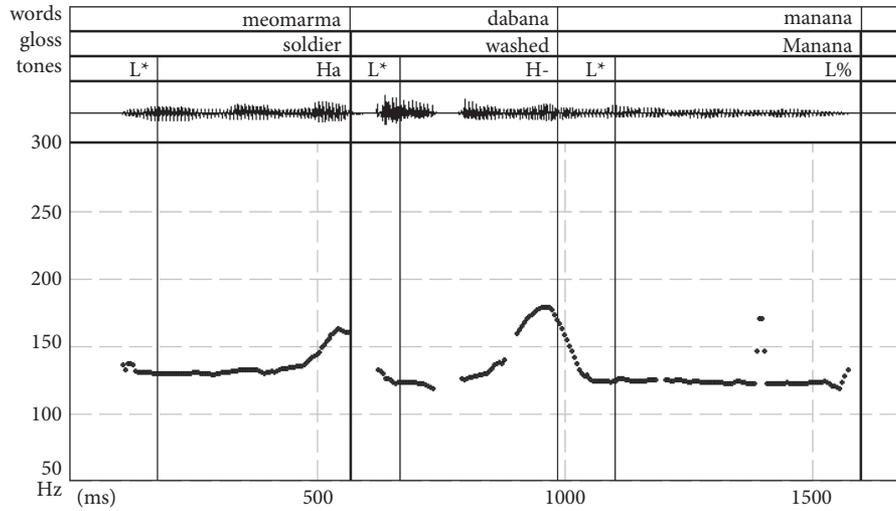


FIGURE 6.26 An example pitch track of the sentence, *The soldier washed MANANA*, where the object is focused. The focused constituent is preceded by the verb, [dabana], which shows a H- ip boundary, and is realized with low, flat pitch.

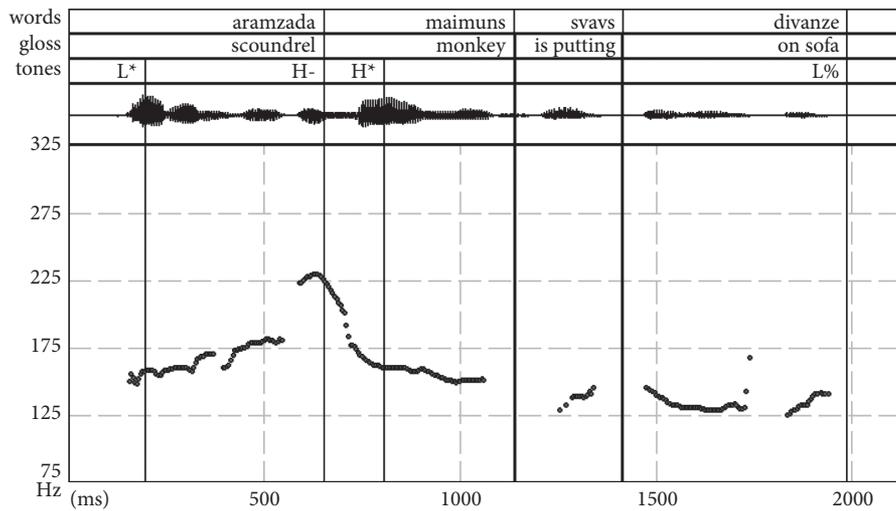


FIGURE 6.27 An example pitch track of the sentence, *The scoundrel is putting the MONKEY on the sofa*, where the direct object, [maimuns], is focused. The focused constituent is preceded by a H- ip boundary and is realized with a H* pitch accent. All following material is dephrased and deaccented.

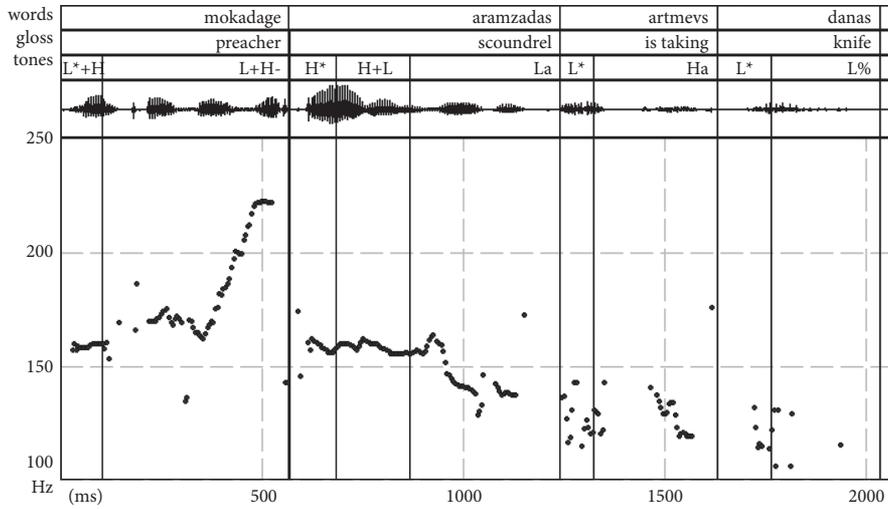


FIGURE 6.28 An example pitch track of the sentence, *The preacher is taking the knife from the SCOUNDREL*, where the indirect object, [aramzada], is focused. The focused constituent is preceded by a L+H- ip boundary and is marked with a H* pitch accent and the H+L antepenultimate phrase accent.

H+L phrase accent was used. Sentences with sentence initial subject focus tended to show a single initial pitch accent, no phrase accent, and post-focus dephrasing. The major deviations from these tendencies were sentences with a sentence final, postverbal focused object, which tended to show low, flat intonation following a H- ip boundary break at the end of the preceding verb.

6.4 Discussion and summary

In this paper, we have proposed a prosodic structure of Georgian and the tonal pattern of each unit in the framework of the Autosegmental-Metrical model of intonational phonology. There are three prosodic units above the Word: Intonation Phrase (IP), Intermediate Phrase (ip), and Accentual Phrase (AP). The right edge of each unit is marked by a boundary tone, and the ip and IP are also marked by phrase-final lengthening. The boundary tones of higher prosodic phrases replace, rather than combine with, the boundary tones of lower phrases. The Georgian accentual phrase is exotic by virtue of having two additional tones. An AP has a post-lexical pitch accent and H+L phrase accent. Pitch accents are realized on the first syllable of an AP, and the phrase accent is realized on the antepenultimate and penultimate syllables (H on antepenult and L on penult).

Some previous studies on Georgian stress claimed that the antepenultimate syllable of a word has stress in addition to the first syllable. Observations of pitch at a sentence level, however, suggest that the high pitch on the antepenultimate syllable is not a property of a word, but of a phrase, the AP. The high pitch was on the antepenult of an AP regardless of its location in a word. The antepenultimate syllable, however, was not as prominent as the word-initial syllable. It was not significantly louder or longer than surrounding syllables, so, we categorized this tone as a phrase accent of an AP, not a pitch accent, which is linked to a stressed syllable. A prosodic structure of Georgian and the affiliation of tones are shown in Fig. 6.29.

In general, each content word in Georgian forms one AP, and a sequence of APs that are semantically and syntactically close tends to form one ip by changing the tonal pattern of an AP and adding an ip boundary tone. In declaratives, the default tone pattern of an AP is a low-high rise, consisting of a L* pitch accent and a Ha boundary tone. When a sequence of APs form one ip, the ip-medial APs tend to have a H* pitch accent and La boundary tone. The ip-final AP tends to show a L* pitch accent and end in a H- boundary tone, which has higher Fo than a normal Ha AP boundary. Declaratives end in a L% IP boundary tone. The default word order for declarative sentences is SOV.

Focus is realized in Georgian through both word order and intonation. Speakers, in general, prefer focused items to appear in either a preverbal or postverbal position. However, appearing in such a position does not guarantee a word focus interpretation. Intonationally, focus is realized with high pitch accents, either LH* or H*, and

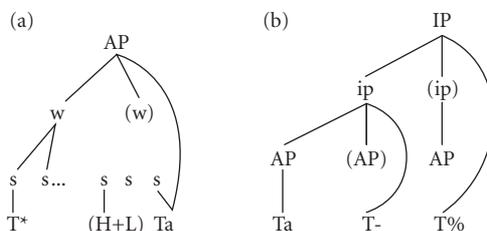


FIGURE 6.29 A prosodic structure and tone affiliations in Georgian.

a) The AP (Accental Phrase) can have one or more words, but only one pitch accent ($T^* = L^*$, H^* , LH^* , or L^*+H) on AP-initial syllable, a possible phrase accent ($H+L$) on the antepenult and a boundary tone realized on AP-final ($T_a = H_a, L_a$) or AP-penult & final syllables ($T_a = L+H_a$).

b) The ip (Intermediate Phrase) can have one or more APs, and is marked by a boundary tone ($T^- = H^-, L^-, L+H^-$) on the ip-final syllable, which is slightly lengthened.

The IP (Intonation Phrase) can have one or more ips, and is marked by a boundary tone ($T\% = H\%, L\%$, or $HL\%$) on the IP-final syllable, which is substantially lengthened. The boundary tones of higher prosodic phrases replace the boundary tones of lower phrases.

TABLE 6.2 Inventory of tones found in Georgian

Accents	
AP pitch accent	
L*	Common in declaratives.
L*+H	In longer, often sentence-initial words; common in declaratives.
H*	Common in focus and questions.
LH*	Common in focus and questions.
AP phrase accent	
H+L	Associated with the antepenult of AP, but realized on the antepenult and the penult of the AP.
Boundary tones	
AP boundary tones	
Ha	Common after L*
La	Common after H*
L+Ha	Common after L*+H; realized on AP-final two syllables.
ip boundary tones	
L-	Realized on ip-final syllable
H-	Realized on ip-final syllable
L+H-	Realized on ip-final two syllables
IP boundary tones	
L%	Common in declaratives; realized on IP-final syllable
H%	Common in questions; realized on IP-final syllable
HL%	Common in questions; realized on IP-final syllable

the H+L phrase accent, deaccenting or dephrasing or reduced pitch range of post-focus material, and H- ip boundaries immediately preceding the focused material. The realization of focus in any given instantiation may use a selection of these realization strategies, or they may use all of them. Sentence initial subject focus tends to be realized with only a LH* or H* pitch accent and deaccenting of the post-focus material. Sentence final, postverbal object focus tends to be realized with a preceding H- ip boundary and low, flat pitch.

Like focus, questions in Georgian are realized through changes in word order and intonation. Yes-no questions often show verb fronting, either to a sentence initial position, or following the subject (VSO or SVO word order), but a yes-no question can be verb final and still be interpreted as a question. Wh-questions always place the

wh-phrase in a preverbal position, often at the beginning of the sentence. Intonationally, questions are marked by a high-low-high intonation pattern that appears on the verb, or on the two word sequence consisting of the verb and the immediately preceding phrase, which in the case of the wh-questions, is the wh-phrase. The high-low-high pattern is made of a high pitch accent, either H* or LH*, the H+L phrase accent and usually a H- ip boundary. Material following the verb usually repeats this high-low-high pattern, but with the pitch range significantly reduced. Other material usually shows inverse-declarative intonation—APs consisting of H* pitch accents and La boundary tones. Questions show more variation in their IP final boundary tones than do declarative sentences. The most common boundary tones are H% and HL%, but L% was also observed.

The intonation of focus and question intonation is very similar. Both are marked with a high pitch accent and a H+L phrase accent. It is not uncommon cross-linguistically for wh-words to behave as a focused word prosodically (e.g. Japanese (Maekawa 1991), Korean (Jun & Oh 1996)), or for the verb in a yes-no question to behave as a focused word prosodically (e.g. Greek (Baltazani & Jun 1999; Arvaniti & Baltazani 2005)). The similarity to focus is more than prosodic for wh-questions. The wh-phrase must appear preverbally. As discussed, this is a preferred position for focused words.

In sum, the inventory of tones in Georgian is shown in Table 6.2.