GEORGIAN SUPRASEGMENTAL PHONOLOGY:
SOME QUESTIONS, SOME ANSWERS

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Suprasegmental features of Georgian:

1. Lexical stress
2. Intonational properties in various contexts (all-new, questions, narrow focal contexts)
LEXICAL STRESS?
THE CHALLENGE OF GEORGIAN STRESS

- What do we know about stress in Georgian?
- What facts about Georgian stress are still poorly understood and/or lack instrumental evidence?
- Why is this question important?
SOME INFORMAL GENERALIZATIONS

- Stress never targets the last syllable of a phonological word;
- There is some acoustic prominence on the first, antepenultimate and penultimate syllables.

Now onto the existing literature…
In two- and three-syllable words the first syllable bears stress.

In polysyllabic words – the antepenult.

These rules operate also when the words are conjugated/declined (i.e., when the syllable count changes).
Approximate (sic) rules of stress placement:

- Initial syllable in disyllabic words
- Three- and four-syllable words: penult or antepenult
- Sometimes, 4+ syllable words bear two stresses, in which case primary stress is the one on the initial syllable.
Examination of stress in words uttered in isolation, with one speaker of Georgian:

<table>
<thead>
<tr>
<th>(\sigma) - count</th>
<th>location of stress</th>
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<tbody>
<tr>
<td>2</td>
<td>1(^{st})</td>
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<tr>
<td>3</td>
<td>1(^{st}) or 2(^{nd})</td>
</tr>
<tr>
<td>4</td>
<td>2(^{nd}) or 1(^{st}) &amp; 3(^{rd})</td>
</tr>
<tr>
<td>5</td>
<td>1(^{st}) &amp; 3(^{rd}) or 2(^{nd}) &amp; 4(^{th})</td>
</tr>
<tr>
<td>6+ (rare)</td>
<td>1(^{st}) &amp; antepenult</td>
</tr>
</tbody>
</table>
“Where a word has two stressed syllables, the first stress is secondary”;

“Stress in Georgian is not as strong as normal stress in standard English. Stressed syllables are said on a higher pitch than unstressed syllables; unstressed syllables tend to descend in pitch toward the end of the word”.

In two- and three-syllable words the first syllable bears stress.

“In words consisting of more than three syllables it is often impossible to determine the location of stress. The only thing to be said with certainty is that the first syllable often bears stress, and the last one never does.”
Set up:
- two Georgian speakers, male and female, recorded pronouncing a set of 21 sentences;
- two phoneticians, a native speaker of Georgian and one not speaking Georgian, analyzed the recordings.
Results:

- The location of ‘rhythmic stress’ depends on the overall prosodic make-up of a rhythmic group/‘syntagm’ (~ phonological phrase). Specifically:
  - Rhythmic groups with overall rising intonation bear stress on the initial syllables – confirmed by instrumental data (measurements of pitch and intensity);
  - Rhythmic groups with overall falling intonation are often perceived by speakers as having a stress on the antepenultimate syllable – not confirmed by the instrumental data. Instead, the initial syllables are still more prominent (pitch and intensity).
Analysis of pitch and intensity in Georgian words 1-6 syllables long
Uttered in isolation?
Number of speakers?
Main results:

- Pitch is taken to be the main correlate of stress, intensity is secondary
- The last two syllables of a word of any length are lowest in both pitch and intensity
Main results:

- In two- and three-syllable long words, the first syllable is taken to be ‘stressed’ (pitch and intensity).
- In four-syllable words, the first and second syllables are taken to be ‘stressed’ (sic) (pitch and intensity).
- In five-syllable words, 1st-3rd syllables share comparable intensity & pitch.
- In six-syllable words, 1st-4th syllables share comparable intensity & pitch.
“Stress in Georgian is extremely weak and has no effect on vowel quality.”

“The stress is so weak that linguists have not been able to agree on exactly where it falls.”

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<thead>
<tr>
<th>$\sigma$ - count</th>
<th>location of stress</th>
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</thead>
<tbody>
<tr>
<td>$&lt; 4$ or $4$</td>
<td>1$^{\text{st}}$ or</td>
</tr>
<tr>
<td></td>
<td>antepenult</td>
</tr>
<tr>
<td>$5$ or $&gt; 5$</td>
<td>1$^{\text{st}}$ and antepenult</td>
</tr>
</tbody>
</table>
For tri-syllabics in general it is true that the antepenultimate syllable takes the stress.

For words of more than three syllables, we can say that the stress will predominantly fall on the antepenultimate, though in some cases preference will be for the first syllable to carry it.

Since the stressed syllable is so relatively weakly distinguished from other syllables in the word, there is nothing like the vowel-weakening in unstressed syllables that is so characteristic of languages like Russian.
“The first syllable of an AP [Accentual Phrase] is often prominent by having stronger amplitude and longer duration (though not as prominent as stress in English). This suggests that the first syllable of a word is stressed in Georgian”.
Ft 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 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: \( t(79) = 9.596, p < 0.001 \)"
“Authors do not agree on the existence and location of lexical stress, though a majority of researchers assume initial stress; we follow Alkhazishvili (1959), Tevdoradze (1978), and Zhghenti (1963), who claim that pitch accent assignment applies at the post-lexical level.”
SOME OF THE REMAINING QUESTIONS

- Does lexical stress exist in Georgian?
- Might Georgian be similar to Japanese or Basque in having lexically stressed and unstressed words?
- What are the main acoustic correlates of Georgian stress?
- Is lexical stress found in Georgian dialects?
SENTENCE-LEVEL PROSODY
How do these accounts model question intonation in Georgian?
<table>
<thead>
<tr>
<th>Type of phrase</th>
<th>Accents</th>
<th>Notes</th>
<th>Tonal targets</th>
<th>Boundary Tones</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accentual phrase</td>
<td>H*</td>
<td>common with La</td>
<td>La</td>
<td>common with H*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L*</td>
<td>common with Ha</td>
<td>Ha</td>
<td>common with L*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LH*</td>
<td>a rise entirely within the 1st σ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L+H*</td>
<td>late rise; peak not reached till the next σ</td>
<td>L+Ha</td>
<td>common with L+H*</td>
<td></td>
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<tr>
<td></td>
<td>H+L</td>
<td>optional phrase accent on antepenult</td>
<td></td>
<td></td>
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<td>Intermediate phrase</td>
<td></td>
<td></td>
<td>H-</td>
<td>very common</td>
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<td></td>
<td></td>
<td></td>
<td>L-</td>
<td>rare</td>
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<tr>
<td>Intonational phrase</td>
<td></td>
<td></td>
<td>L%</td>
<td>in declaratives</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>H%</td>
<td>in YNQ and WHQ</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>HL%</td>
<td>in YNQ</td>
<td></td>
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</tbody>
</table>
DECLARATIVES

<table>
<thead>
<tr>
<th>Pitch (Hz)</th>
<th>L*</th>
<th>Ha</th>
<th>L*</th>
<th>Ha</th>
<th>L*</th>
<th>HaL*</th>
<th>Ha</th>
<th>L*</th>
<th>Ha</th>
<th>L*</th>
<th>L%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gi</td>
<td>or</td>
<td>gis</td>
<td>mos</td>
<td>tsons</td>
<td>dza</td>
<td>li an</td>
<td>la</td>
<td>ma</td>
<td>zi</td>
<td>go</td>
<td>go</td>
</tr>
<tr>
<td>Giorgi</td>
<td>likes</td>
<td>very</td>
<td>beautiful</td>
<td>girl</td>
<td>from Tbilisi</td>
<td></td>
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</tbody>
</table>
YNQs

[Graph showing pitch (Hz) over time (s) with labels for Gi, or, gis, mos, tsons, dza, li, an, la, ma, zi, go, go, Tbi, li, si, dan, Giorgi-DAT, likes, very, beautiful, girl, Tbilisi-from]
The status of phrase accent:

- In the original AM approach (Pierrehumbert 1980), phrase accent = boundary tone of the intermediate-level phrase.
- This convention is widely accepted among prosodists.
- Vicenik & Jun 2014 use the ‘phrase accent’ for a tonal target that is neither a pitch accent nor a boundary tone.
(1) Šeč’am-a Manana-m alubal-i?
eat-3sg Manana-ERG cherry-NOM
Did Manana eat the cherry?

(2) Manana-m šeč’am-a alubal-i?

(3) Manana-m alubal-i šeč’am-a?
YNQ, verb-initial
YNQ, verb-medial

![Pitch (Hz) vs Time (s) diagram]

- Mananam
- šečama
- alubali
- Manana-ERG
- ate.AOR
- cherry.NOM
YNQ, verb-final

Pitch (Hz)

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>H*</th>
<th>La</th>
<th>H*</th>
<th>La</th>
<th>H*</th>
<th>L</th>
<th>HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>1.67</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ma</th>
<th>na</th>
<th>nam</th>
<th>vaš</th>
<th>li</th>
<th>še</th>
<th>ča</th>
<th>ma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maana-ERG</td>
<td>apple.NOM</td>
<td>ate.AOR</td>
<td></td>
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</tbody>
</table>
NON-VERBAL PREDICATES

The penultimate is also found on non-verbal predicates.
In monosyllabic predicates, the L target associated with the penultimate and the boundary tone compete for being realized on the single vowel. Speakers adopt one of the two strategies (seem to be interchangeable):

- shifting L to the preceding word
- lengthening the vowel so that both tonal targets can be realized.

Neither the low tonal target on the penult nor the high target on the ultima of the predicate can be omitted.
MONOSYLLABIC PREDICATE: shift of L
MONOSYLLABIC PREDICATE: vowel lengthening
WHQs

- WHQ are similar to YNQ in that there too the predicate bears a L phrasal accent on the penultimate syllable.

- **Two main differences:**
  1. in WHQ, the Ha target on the ultima of the predicate might not be realised - instead, the tone can stay low till the H% or HL% boundary tone of the intonational phrase.
  2. focused material preceding the predicate (wh-phrase) receives a H* pitch accent.
WHQs
WHQs
CORRECTIVE CONTEXTS

The prosody of corrective contexts is similar to WHQs, the only significant difference being absence of a final rise – that is, corrective contexts, like declaratives, end in L% and not H% or LH% (example from Vicenik & Jun 2014)
CORRECTIVE CONTEXTS

<table>
<thead>
<tr>
<th>Time (s)</th>
<th>Pitch (Hz)</th>
<th>H* L</th>
<th>H* L</th>
<th>A ra, &lt;SIL&gt;</th>
<th>ga da ag do</th>
<th>No, threw-away.AOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of phrase</td>
<td>Tonal targets</td>
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<td></td>
<td>Accents</td>
<td>Notes</td>
<td>Boundary Tones</td>
<td>Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phonological phrase</td>
<td>H*</td>
<td></td>
<td>L-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L*</td>
<td></td>
<td>H-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intonational phrase</td>
<td></td>
<td>L%</td>
<td>L+H- complex</td>
<td>boundary tone</td>
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<td></td>
<td>H%</td>
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Bush (1999) himself notes that this solution is not a very satisfactory one:

“… it is the timing of the low tone that troubles us. <…> the penultimate syllable of the question is always low, followed by the rise on the final syllable. This rise does not appear to ever start on the penultimate syllable. It appears that we need some way of saying explicitly that the low tone must be associated with the penultimate syllable. Within our theory this cannot be done directly, because boundary tones are associated only with boundaries, not with individual syllables” (Bush, 1999:7).
<table>
<thead>
<tr>
<th>Type of phrase</th>
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<th>Notes</th>
<th>Boundary Tones</th>
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<tr>
<td></td>
<td>Accents</td>
<td>Notes</td>
<td>Boundary Tones</td>
<td>Notes</td>
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<tr>
<td>Phonological phrase</td>
<td>H*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L*</td>
<td></td>
<td>H-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L*+H</td>
<td>L-H-</td>
<td>complex boundary tone</td>
<td></td>
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<tr>
<td>Intonational phrase</td>
<td>L%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>H%</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>^H%</td>
<td></td>
<td>upstep, used in tag questions</td>
<td></td>
</tr>
<tr>
<td>Type of phrase</td>
<td>Tonal targets</td>
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<td>Accents</td>
<td>Notes</td>
<td>Boundary Tones</td>
<td>Notes</td>
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<tr>
<td>Phonological phrase</td>
<td>H*</td>
<td></td>
<td>L_p</td>
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<td></td>
<td>L*</td>
<td></td>
<td>H_p</td>
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<td></td>
<td>H*L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intonational phrase</td>
<td>LH*L</td>
<td>complex pitch accent</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>L_i</td>
<td></td>
<td>L_i</td>
<td>in declaratives</td>
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</tbody>
</table>
SKOPETEAS ET AL. 2009
Various tonal inventories proposed for Georgian
No agreement on modelling question intonation in Georgian
Prosody of focus in Georgian

- Received a fair amount of attention in the literature, but still not accounted for fully
- The interaction of prosody and syntax in Georgian: we just scratched the surface
Effect of focus on prosody (cf. also Skopeteas & Féry 2010)

- Basic pattern: low target L at the left edge of the prosodic phrase and high target H at the right edge. H targets are normally downstepped.

- Preverbal focus: no evidence for a pitch accent, focused constituent in a separate prosodic phrase, larger tonal contour at the left edge of the focus.

- Postverbal focus: prosodic boundary (H-) between the prefocal domain and the focus phrase.

- Sentence-final focus: flat contour (super-low LL)
OVERALL CONCLUSIONS

- Both data and analytical tools are there, but there is still a lot to be done:
  - A definitive account of lexical stress
  - A unified prosodic inventory
  - A way to account for the prosody of questions and focus
დიდი მადლობა!
REFERENCES


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