Somali pitch accent from a typological perspective

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Abstract

The classification of Somali as a tone or pitch/tonal accent language has long been debated. This paper examines the fundamental frequency (F0) manifestations of Somali accents in isolated word forms and noun phrases (NPs), as well as other features such as the function and predictability of accents. The results reveal both similarities and differences when compared to Japanese and Swedish, which are widely described as pitch-accent languages.

Introduction

Somali is a Cushitic language in the Afro-Asiatic phylum, spoken in Somalia and neighboring Kenya, Ethiopia, and Djibouti. It is the official language of Somalia and the Somali Regional State of Ethiopia. In Sweden, the Somali community represents the largest group of African-born immigrants, and among school children, Somali is the second largest minority language after Arabic (Nilsson 2018).

Somali is a typologically interesting language. Since Armstrong (1934), there has been a long-standing debate about whether it is a tone or pitch/tonal-accent language (see Hyman 1981, Le Gac 2016, and Downing & Nilsson 2019 for an overview). In the present study, we use the term accent.

This paper examines the Somali accent's fundamental frequency (F0) manifestations in isolated word forms and noun phrases (NPs). The results are compared with well-established pitch accent languages like Japanese and Swedish, including other features such as the function and predictability of accents.

Function and predictability of accent

Despite the debate about prosodic typology, there has been broad consensus that pitch accent in Somali and other Cushitic languages serves primarily a grammatical role rather than a lexical one (cf. Mous 2021).

The examples (1) – (4) below show different functions carried by the Somali pitch accent.

(1) case contrast for 'Mohammad'
a. *Maxámed,*   'Absolutive'
b. *Maxamed,*   'Nominative'
c. *Maxaméd,*   'Genitive'
d. *Máxamed,*   'Vocative'
(2) gender contrast
a. *ínan*   'boy'
b. *inán*   'girl'
(3) word class contrast
a. *hées*   'sing!'
b. *heés*   'a song'
(4) lexical contrast
a. *béer*   'liver
b. *beér*   'garden, field'

Thus, in Somali, the accentual pattern of a given word is predictable mainly based on grammar, with only a small number of exceptions, such as (4) above.

The function and predictability of pitch accents in Somali can be compared with those in Japanese and Swedish (Nagano-Madsen & Bruce 1998). In Japanese, pitch accents are mostly unpredictable as they are lexical, and there is even an accent dictionary for Japanese.

The pitch accents in Swedish are affiliated with the lexicon through the stress category first, as Swedish is a

Germanic language like English. The stress location in Swedish is partly predictable from syllable weight and word-internal structure but otherwise has to be specified in the lexicon. The distinction between accents 1 and 2 is often predictable by knowing both phonological and morphological factors (Nagano-Madsen and Bruce 1998).

Somali accent patterns

Thus far, three basic contrastive pitch patterns have been recognized for common nouns, verbs, and adjectives in Somali: penult and final accents marked by a H tone and an unaccented pattern, which has a realization of L-tone (Hyman 1981). In addition, some words have an accent on the earlier part of the word as a result of diachronic change, e.g., *már-ayaa < már-a hayaa* 'is passing by' (Saeed 1999: 89), also observed in the vocative case.

Unaccented words

In Somali, unaccented words are typically found among bare nouns as subjects and verbs in the non-progressive aspect. However, these verbs are often in tonal alternation with the preceding sentence type marker (STM) in accent placement (Hyman 1981, Saeed 1999: 45, Orwin 2007: 9). As a result, a long sequence consisting of only unaccented words is unlikely to occur in Somali.

Unaccented words differ entirely in Japanese, which can be considered the default (see Ito & Mester 2016 for discussion). According to Kubozono (2006), 71% of native Japanese words are unaccented, while this proportion drops to 7% for Western loanwords. Therefore, constructing sentences consisting entirely of unaccented words is easy in Japanese.

Dialectal variation

The dialectal variation in word accent patterns has been well-known for a long time, both for Japanese (Hattori 1933) and for Swedish (Meyer 1937, Gårding

1977). The dialectal variation in Japanese and Swedish includes even areas without accent distinction, i.e., accentless dialects. To our knowledge, no such dialectal variations have been reported in Somali. In our recordings of the wordlist, a striking agreement was found in accent placement (final, penult, and unaccented) between speakers of the Northern dialect around Hargeisa and those from the Southern dialect around Mogadishu.

Analysis of F0 manifestation

The F0 manifestation of the Somali accent is examined in word isolation form and a NP composed of a noun followed by an adjective.

Speakers

Five native speakers of Somali participated in the recording. Three are from Mogadishu, the capital of Somalia, and one is a female speaker. Two of them are from the Northern area around Halgeisha. The recordings were made either in a soundproof or quiet room. All the recordings were made during 2019 in Sweden as mono, 44100 Hz, 32-bit, float PCM wav-files using Audacity 2.1.2 and a SoundProjects LSM microphone. The recorded material was processed and analyzed using the SUGI Speech Analyzer.

Word in isolation form

A wordlist of 28 words varying in word length from 1 to 7 morae was prepared. The speakers show a remarkable agreement in accent placement despite their regional origin, with only a few exceptions produced by one of the speakers (Speaker 2), whose father turned out not to be a native Somali speaker.

F0 manifestation of Somali accents

Figure 1 shows F0 contours of final, penult, and unaccented (L) patterns. The invariant F0 configuration for the accent is a sharp F0 rise (H) on the accented mora, with the penult followed by a sharp F0 fall (L) on the post-accented

mora. No other invariant F0 shapes were observed.

Consequently, we propose the tonal structure of final and penult accents in Somali as H* and H*+L, respectively. The H*+L type also applies to other non-final accents besides penult, i.e., exceptional cases where the accent is found earlier in a word and the case of a tonal alternation. All five speakers show the same F0 manifestations for the three accent patterns mentioned above, with slight variation in final lowering. More examples are found in Figure 2, which shows the F0 manifestations of Somali accents in NPs.
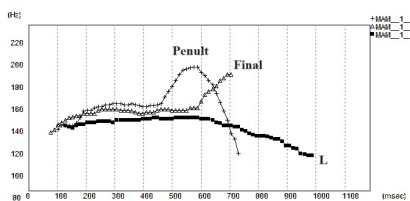

Figure 1. F0 contours of the three accentual patterns in Somali: *maamúle* 'manager' (penult), *minaarád* 'minaret' (final), *maalaa* 'milks' (unaccented/L), Speaker 1.

Comparison with other languages

The manifestation of F0 in Somali accents shows similarities and differences compared to Japanese and Swedish accents. Somali and Japanese share a similarity in the alignment of F0 and segments. In both Somali and Japanese, the rise and fall of F0 in accents are timed with a mora boundary (cf. Nagano-Madsen 1992:77). As for Swedish, accents 1 and 2 have been analyzed as a difference in the timing of the tonal contour with the stressed syllable.

The main difference between Somali and Japanese is the presence or absence of the phrasal component. In Japanese, there is an invariant F0 rise to mark the onset of a word/phrase, which applies to both unaccented and accented words. In Fujisaki's intonation model of standard Japanese (Fujisaki & Sudo

1971), accents are superimposed on a phrasal component. Even in the competing AM intonation model of Japanese, both phrasal and accentual components are recognized as basic components (Pierrehumbert & Beckman 1988, Venditti 2005).

Figure 2 illustrates the F0 manifestation of accented vs. unaccented words in Ryukyuan (or Ryukyu dialect of Japanese). The phrasal component is marked by (H-). Another difference is how unaccented words are realized: they are transcribed as a H in Japanese but a L in Somali.
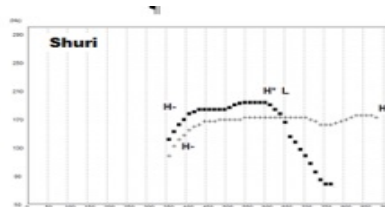

Figure 2. F0 contours illustrating accented vs. unaccented words in the Ryukyuan dialect of Japanese. Adopted from Nagano-Madsen (2018).

The tonal structure of pitch accents

Table 1 summarizes the labeling and tonal structure of accents in Somali, Japanese, and Swedish. The tonal structure of Japanese and Swedish accents is adopted from Venditti (2005) and Nagano-Madsen and Bruce (1998). It is difficult to see any similarities in labeling pitch accents for the three languages. When represented by tonal structure, their similarities in the F0 manifestation of accents become clearer.

Table 1. Pitch accent specifications.

language	Accent labeling	Tonal structure
Somali	Final penult	H* H*+L
Japanese	Unaccented Accented	H- H*+L
Swedish	Accent I, accent II	HL* H*L

Noun Phrases

This section examines the F0 manifestation of Somali accents in NPs (noun + adjective). Recent studies by Le Gac (2018) and Downing & Nilsson (2019) have explored accent realization in Somali NPs. Le Gac challenges the traditional binary analysis of accent reduction in the second H in subject NPs, citing variations observed in his acoustic measurements of F0 peak height.

Meanwhile, Downing & Nilsson analyze non-subject NPs from an extensive sentence corpus produced by three speakers. They report that the second H in an NP is omitted in 50% of the cases (297 out of 599 instances). Their findings contradict the general description, as asserted by Hyman (1981), Saeed (1993:111-117), and Green & Morrison (2016), that the H tone on the modifier is typically resistant to deletion. Since both Le Gac's and Downing and Nilsson's studies analyzed the existing speech corpus, the details of the noun phrase (NP) types were not specified. Therefore, in our test material, we used all possible combinations of accents for nouns and adjectives and short and long words.

Test NPs

Test NPs are composed of a noun followed by an adjective covering all the possible combinations of final (H*) and penult (H*+L) accents as shown in (1) – (4) below. Test phrases are also composed, as much as possible, to include short and long words. Each speaker produced the NP in isolation and repeated it at least three times.

(1) penult + penult
a. *malláay wéyn*   'a   big   fish'
b. *wíil róon*   'a healthy boy'

(2) penult + final
a.*malláay   yaryár* 'small   fish'
b. *wíil yár*   'a small boy'

(3) final + penult

a. *caaró wéyn*   'a   big   spider'
b. *maroodí nóol*   'a living elephant'

(4) final + final
a. *nál yár*   'a small light bulb'
b. *meél marán*   'an   empty   place'
c. *laamó yaryár*   ' small branches'

Results and discussion

Table 2. summarizes the accent combination of the first word (noun) and the second word (adjective) and the resulting F0 manifestations. It identifies three types of F0 manifestation regarding how the second accent is produced and how the speakers use the pattern. Figures 3 - 5 illustrate typical examples of each type.

Table 2. Accent combination and F0 manifestation with speaker specification in the bracket.

First word	Second word	
	Penult (H*+L)	Final (H*)
Penult (H*+L)	Downstep (all)	Downstep (1, 3, 4, 5) Deletion (2); for *wíil yár,* by all)
Final (H*)	Downstep (1, 4) Deletion (2) Plateau (3, 5)	Deletion (all)

Three types of F0 manifestations are found for the NP in Somali spoken in isolation: they are downstep, where the second accent is produced at a lower pitch register; deletion, where the second accent is deleted; and a plateau, where the second accent merges the first one, forming a level F0 like a plateau. Hyman (1981) describes the case where the H tone is lowered by an intervening L tone, i.e., automatic downstep. Our results show that a downstep can occur without an intervening L tone, i.e., a non-automatic downstep, and can also occur across a pause.
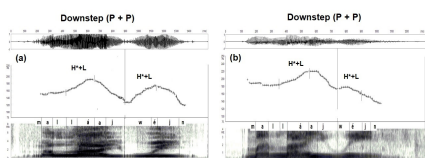
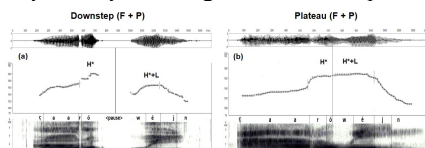Figure 3. (a) speaker 1, (b) speaker 2: *Malláay wéyn* 'big fish' P=penult.

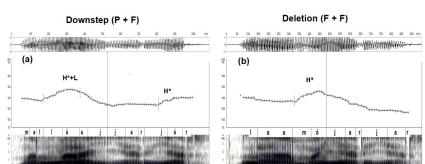Figure 4. (a) speaker 1, (b) speaker 5. *Caaró wéyn* 'a big spider' F=final, P=penult.

Figure 5. (a) speaker 3, *Malláay yaryár* 'small fish,' (b) speaker 3. *Laamó yaryár* 'small branches,' P=penult, F=final.

The most common type of F0 manifestation of NPs is a downstep, which all five speakers use for combining H*+L and H*+L (penult+penult) and other combinations. All speakers deleted the second accent in a combination for H* + H* (final+final) and for *wíill vár* 'a small boy', a combination of H*+L – H*. We consider the deletion in these examples primarily due to the production mechanism of the laryngeal muscles involved in producing a rising (LH) F0, which takes longer than a falling (HL) F0, cf. Hirose (1981).

The combination of final plus penult H*- H*+L allows more variations, including a plateau, typically found in fluent, fast speech.

Interestingly, three F0 patterns found for NPs with a modifier in Somali are reminiscent of those reported for Standard Japanese (Venditti 2005) and Ryukyuan (Nagano-Madsen 2015).

In our results, the deletion of the second accent is more limited than that reported by Downing & Nilsson (2019). We consider it due to the difference in the material analyzed in the two studies. Downing & Nilsson elicited the NPs from an existing sentence corpus, while the present study analyzed carefully produced NPs in isolation.

Conclusions

Somali is like Japanese in that both manifest accents on a mora basis, whereas Swedish does so on a syllable basis. Japanese marks the word/phrase onset by a well-defined F0 shape, called a phrasal component, while no such component is found in Somali. The unaccented word in Somali has a low F0 (L-tone sequence), while that in Japanese has a high F0 (H-tone sequence). The occurrence of unaccented words is limited in Somali, whereas it is a default in native Japanese words.

Accents in Somali are mostly grammatical and predictable, whereas accents in Japanese exhibit lexical contrast, making their patterns unpredictable. Accents in Swedish fall somewhere between Somali and Japanese in terms of function and predictability.

Acknowledgments

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