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Vowel Length Contrast and Word Stress in Somali-Accented Swedish

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Abstract

In recent years the situation on the Horn of Africa has meant that the number of people in Sweden whose mother tongue is Somali has increased. To better understand the specific difficulties for Somali speakers when learning Swedish as a second language, we need more knowledge about the differences as well as similarities between the two languages. Although there is a vowel length contrast in both languages, this study shows that speakers with Somali L1 have difficulty distinguishing between long and short vowels and consonants in the syllable in Swedish words, which makes native listeners confused. When producing minimal pairs with distinctive lexical word stress the L2-learners do not use the same cues as native speakers, namely duration and pitch. These findings are important for the development of pedagogical strategies when teaching Somali speakers Swedish as their second language.

In Sweden, as in many other countries, the numbers of immigrants has increased in recent years. The numbers of Somali immigrants in Sweden is the second highest after Syrians during 2012 (www.scb.se). During the last ten years more than 30,000 Somali immigrants have arrived in Sweden (www.migrationsverket.se).

When learning a second language the speaker's first language plays a role, more or less, especially concerning the pronunciation, and native listeners can often recognize non-native speakers and sometimes even identify the speaker's native language (Munro, 2008). When teaching second language pronunciation the goal is not to attain a native pronunciation, but intelligible speech. When learning Swedish as a second language, in general fronted rounded vowels and prosody often cause problems regardless of the learner's mother tongue (Bannert, 2004). But depending on L1 there could be other more specific features that are hard to achieve. From that perspective it is important that teachers have competence and knowledge about specific difficulties for learners with different first languages, regarding both segments and prosody. Therefore, a comparison of the phonology and prosody in L1 and L2 as well as analyses of recordings of L2-learners is of interest.

Studies of Somali-accented English show that Somali speakers have difficulties differentiating between /p/ and /b/ and that learners use coda cluster simplification by epenthesis as well as deletion (Conway, 2008; Koffi, 2010). These results are in concordance with Somali-accented Swedish (Zetterholm & Tronnier, 2012).

This paper focuses on vowel quantity and word stress produced by ten Somali speakers learning Swedish as a second language. The two prosodic features have a distinction function in Swedish and are therefore important to learn and master in a communicative situation. Other studies of L2-learners of Swedish, regardless of L1, show that these features, among others, often are hard to control, (e.g., Bannert, 2004; Zetterholm & Tronnier 2012; Tronnier & Zetterholm 2013).

METHODOLOGY

Phonological and Prosodic Inventory

In order to get an idea about special problems for Somali speaker when learning Swedish as a second language, an inventory and comparison between the two languages has been undertaken. There are some similarities concerning the vowels, with six front [i y ʉ e ø ɛ] and three back [u o ɑ] vowel phonemes in Swedish, but only five basic [i e a u o] vowel phonemes in Somali. Each of the vowels in Somali also occurs in back and front variants related to ATR, Advanced Tongue Root feature. Vowel length is contrastive in both languages. In Somali long vowels are twice as long as short vowels and are represented by double vowels in the

orthography. In Swedish, on the other hand, there is a complementary relation between the vowel and the consonant length in the syllable, as a stressed long vowel is followed by a short consonant, a short vowel is followed by a long consonant (Bruce 2012; Engstrand 2004; Koffi 2010; Saeed 1993).

In Somali there are 22 consonants, in Swedish 18 consonants. Only three of the Swedish consonants are not represented in Somali, namely [p v ŋ]. The Somali uvular, pharyngeal and glottal consonants do not match any consonants in Swedish. The distinction tonal/non-tonal is important between the Swedish bilabial stops [b p] as well as the fricatives [v f]. Non-tonal plosives are produced with aspiration in stressed syllables.

The syllable structure of Swedish allows three consonants in the syllable onset and coda, (C)(C)(C)V(C)(C)(C), but not all consonants can occur at the beginning or the end of a syllable (Garlén 1988). Somali has a CVC syllable structure where /t/ and /d/ cannot occur at the end of a syllable and /m/ and /j/ cannot occur at the end of a word (Saeed 1993 p. 18).

There are three important prosodic features in Swedish. Word stress has a distinctive function with a combination of duration and tone on a stressed syllable, e.g., *'banan* [ba:nan] (the course)—*ba'nan* [bana:n] (banana). The placement of the lexical stress varies depending on the morphology. Syllable quantity is complementary (V:C/VC:), e.g., *tal* [ta:l] (speech)—*tall* [tal] (pine). The entire sequence, V+C in a syllable, almost has the same duration regardless of V:C or VC:. It is the internal duration between the vowel and the consonant that differs (Bruce 2012). In most cases the short vowel is followed with two similar consonants, which is a clue for the reader. It is not only the quantity but also the quality of the vowel that changes, especially for the a-vowel. There are also two distinctive tonal word accents, accent 1 (acute) and accent 2 (grave), e.g., *'stegen* ['ste:gən] (the steps)—*`stegen* [ˈste:gən] (the ladder) (Bruce 2012; Engstrand 2004). Neither word stress nor word tonal accents are marked in written Swedish.

Somali has a tonal accent system where accents are introduced by morphological rules and sensitive to grammatical categories (Hyman 1981). There is a contrast between high (H) and low (L) tones, which represent a masculine/feminine distinction, e.g., *ínan* (a boy), *inán* (a girl), and a singular/plural distinction, *éi* (dog), *eí* (dogs). For masculine nouns the (H) tone is placed on the penultimate vowel and for the feminine nouns the (H) tone is placed on the final vowel. There is only one tone per noun. There is also a falling tone in word-final syllables containing a

vowel sequence (Hyman 1981, 172–173). Stress is often associated with tones and it is the vowel, not the syllable, that is stressed, usually on penultimate or the final vowel. Tones are not marked in written Somali. For a study of L2-accent production by Somali speakers, see Tronnier & Zetterholm (Proceedings New Sounds 2013).

Participants

Ten Somali speakers in the program Swedish for Immigrants (sfi) were recorded when reading sentences and a short story. Six male and four female speakers, aged 20–57, have all lived in Sweden 2–5 years and all of them have been learning Swedish less than three years. All speakers state that Somali is their mother tongue and only a few of them have some knowledge about English. There is no information about their competence in reading and writing, but none seems to be illiterate.

Materials and Procedure

The recorded sentences were compiled so that all Swedish vowels and consonants as well as consonants clusters were present in the material. In addition, minimal pairs contrasted by quantity characteristics, stress placement and word accents were built into the sentences. The short story had the same design and the aim was that different minimal pairs should occur in different contexts. The participants read the sentences to their teacher in Swedish and were recorded directly on a PC. There is no spontaneous speech for comparison in this study.

Perception Test

To get an idea of Swedish listeners' ability to differentiate minimal pairs depending on vowel length contrast and word stress, read by Somali speakers, a perception test was constructed. This is an ongoing study and therefore only preliminary results will be presented. Readings from recordings made by six of the Somali speakers were used. Four minimal pairs, two with a vowel length contrast and two with a word stress contrast, were chosen for the test. The words were cut from the sentences that were read and are not read in isolation. The words were chosen from recordings where they were easy to cut and no deletion of any sound of the word had to be made.

So far, 18 Swedish listeners have participated in the test, five male and 13 female, aged between 21 and 47. All are university students on different programs and no one reported any hearing damage. It was a forced-choice test and the participants had to choose one of the words in a minimal pair. Before the test there was a short training session consisting of similar words spoken by other speakers. In all, the test contained 48 words spoken by six different Somali speakers. The test was carried out in classrooms from loudspeakers. The words were presented in randomized order and each word was played twice. The listeners also had to rate the difficulty of their decision on a six-point scale (one = easy, six = hard to recognize). The results from these answers are not processed yet, but a quick glance tells that the responses seem to be very individual between listeners as well as different between words and speakers.

RESULTS

Auditory and Acoustic Analyses of the Recordings

All speakers have a clear accent. There are differences between their readings, probably depending on their knowledge of Swedish. It might be that they did not understand every single word they read, but hopefully they understood the meaning of the sentences and the story. However, all words are common Swedish words. Furthermore, concerning the pronunciation of short/long vowels/consonants the reader has a clue in the spelling. A short vowel is followed by (long) double consonants and a long vowel is followed by one (short) single consonant in all selected minimal pairs. But the lexical word stress is not marked in the spelling. The context is often a clue but you still have to know how to pronounce it and that word stress is distinctive and can occur on different syllables in Swedish.

The sentences and the story were also recorded by two native Swedish speakers, one male and one female. Comparisons are made between the Swedish and the Somali speakers. Figures 1 and 2 show a waveform, a spectrogram and a pitch contour from different recordings, using Praat (<http://www.fon.hum.uva.nl/praat/>). The same pattern as in Figure 2 is shown for other Somali speakers as well. A Swedish speaker pronounced the minimal pairs *vägen* [vɛːgən] (the road) in Figure 1 at top and *väggen* [vɛgən] (the wall) in Figure 1 at bottom. In the word *vägen*, the [ɛː] vowel is 32% of the word, the following short/g/ consonant 10% of the word. In Figure 1 at bottom, in the word *väggen*, the [ɛ] vowel is 18% of the word,

and the following long /g/ consonant 25% of the word. As shown, there is a clear difference between the lengths of the vowels as well as the consonants in the two words. In both words, the stressed syllable is 42 or 43% of the whole word. It is the relation between the duration of the vowel and the consonant that differs. This is in agreement with Bruce (2012).

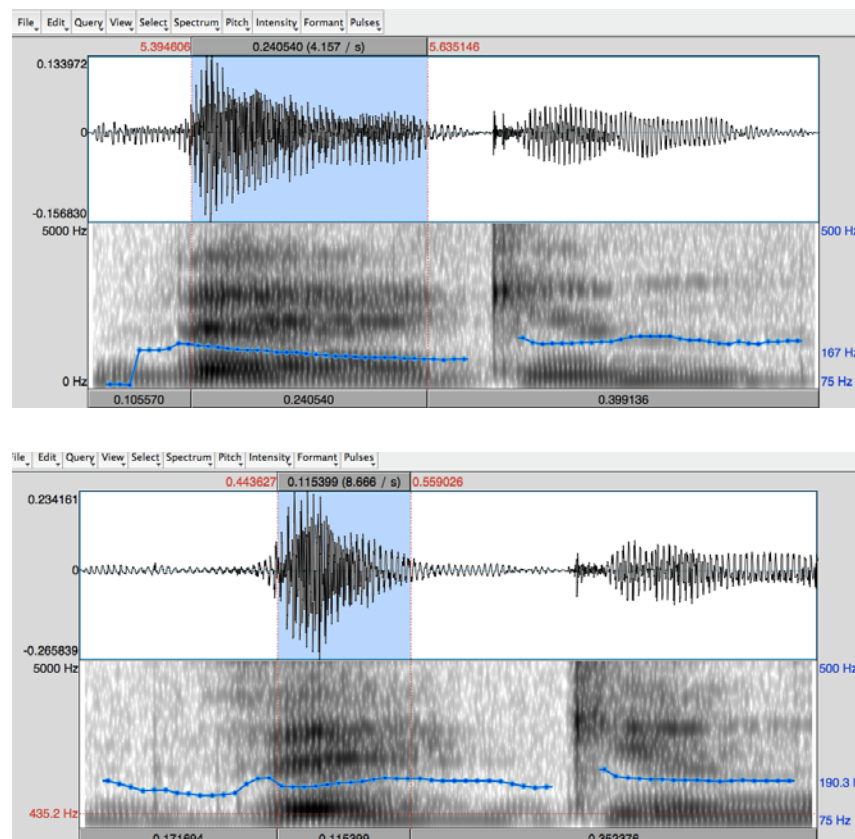


Figure 1. Vowel length contrast, a Swedish speaker. [vɛ:gən] (the road) at top. At bottom: [vɛgən] (the wall).

Figure 2 is an example from one of the Somali speakers reading the same words. In the word *vägen* (the road) at top the [ɛ] vowel is 46% of the word, the following long /g/ consonant is 15% of the word. In the word *väggen* (the wall) at bottom, the [ɛ] vowel is 29% of the word and the following short /g/ consonant 14% of the word. There is a difference in length between the expected long and short vowel, but no clear difference between the following consonant. The vowel is also longer than the consonant in both words, which is not the case in Figure 1. The expected stressed syllable is 61% in *vägen* (the road) and 43% in *väggen* (the wall).

This is confusing for a native Swedish listener without a referring context. The [ɛ] vowel is also pronounced more open, almost like an /a/ vowel, especially in the word *vägen* (the road), with the longest vowel at top in Figure 2.

Compared to the utterance by the Swedish speaker, the long vowel is much longer when pronounced by the Somali speaker and the expected short vowel is almost as long as the long vowel produced by the Swedish speaker. Unfortunately, there is no comparison recording with the long/short distinction in Somali, but it is known (Koffi 2010; Saeed 1993) that a long vowel should be twice as long as a short vowel. This is not the case in this recording, which indicates that the speaker might be aware of the difference between the languages.

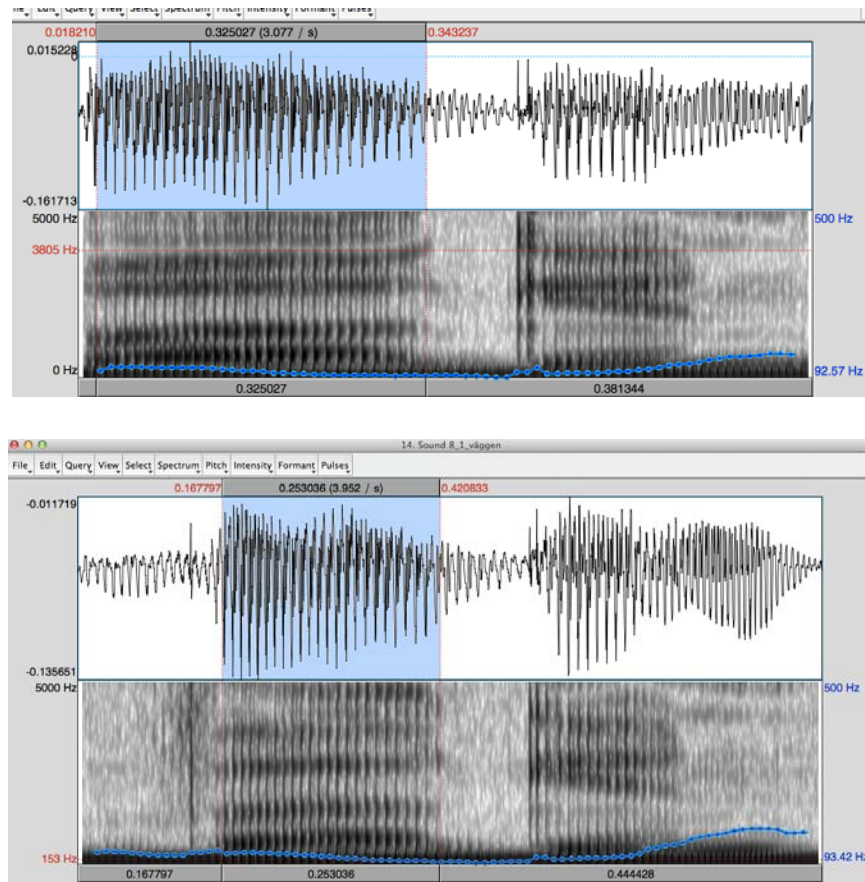


Figure 2. Vowel length contrast, a Somali speaker. [vɛ:gən] (the road) at top. At bottom: [vɛgən] (the wall).

The auditory analysis of the other minimal pair with a vowel length contrast, *vila* [vi:la] (rest) and *villa* [vila] (house), is confusing, and

measurements of the vowel and the following consonant confirm the impression. All vowels are produced as short vowels and the following consonant is longer in almost all samples. It is the same pattern in both words for each Somali speaker. But some of the speakers change the pitch contour or lengthen the last *a*-vowel, perhaps trying to make a distinction between the words. They might know that there is a difference, but are not aware of how to make the difference clear. Only one of the speakers made a clear vowel distinction between the two words.

Concerning the minimal pairs with word stress, the Somali speakers often manage to make some kind of distinguishing feature between the words. Even though the stress pattern is not always the same as for a native speaker, the L2-learners often give the listeners a clue about which word they intend to pronounce. It can be a lengthening of the last sound, e.g., the /s/ in *ka'las* [kala:s](party) or the middle nasal in *ba'nan* [bana:n] (banana). In other recordings, the stressed syllable is exaggerated to clarify the differences. The acoustic analysis, pitch contour and length contrast (duration of stressed syllable), confirms the auditory impression. In Swedish the stressed syllable is indicated with both duration and pitch.

The pitch contour increases at the end of the word in the recordings with some of the L2-speakers and differs from the Swedish speakers, see Figures 1 and 2. For the native speakers the pitch contour shows stress at the beginning of, or just before, the first vowel, but pretty much the same pitch contour on both syllables. This is an expected pattern due to the speaker's dialect. Both sentences begin with the target word and are not marked as the most prominent words in the phrases.

Another finding concerning the pronunciation of the phonemes is that the /v/ consonant is pronounced like an /f/ by four of the Somali speakers in all four words used in the test with vowel length contrast. As mentioned before, Somalis do not have the tonal/non-tonal v-f contrast. That is probably the best explanation for the non-Swedish pronunciation of the words. As in the findings by Koffi (2010) and Zetterholm & Tronnier (2012), almost all of the ten speakers in this study have problems with the distinction between /p/ and /b/. That is likely to be a transfer from L1 since /p/ does not exist in Somali phonology. None of the words selected for this study has a consonant cluster. If so, a simplification by epenthesis or deletion might have been expected, according to the study by Koffi (2010).

Perception Test

The preliminary findings in the perception test show that it is not easy for the native listeners to discriminate one of the words in the minimal pairs with a vowel length contrast (to the left in Figure 3). One interesting thing is that the word with the long vowel (the first word) in the minimal pair *vägen-väggen* (the road/the wall) is easier to recognize than the second word (86% and 16% respectively). On the other hand, in the minimal pair *vila-villa* (rest/house) the word with the shortest vowel (the second word) seems easier to recognize. Only 11% of the occurrence of the word *vila* (with a long vowel) were correctly recognized, but 89% of the occurrence of the word *villa* (with a short vowel) were correctly recognized. This is not surprising regarding the auditory and the acoustic analyses.

Concerning the two minimal pairs with distinctive word stress, the listeners recognize the right word in about 50% of all occurrences. This is interesting since some of the speakers do not use duration and pitch as an indication of a stressed syllable, which is a native way to do it. The acoustic analyses show that they often lengthen other segments than the vowel in the syllable.

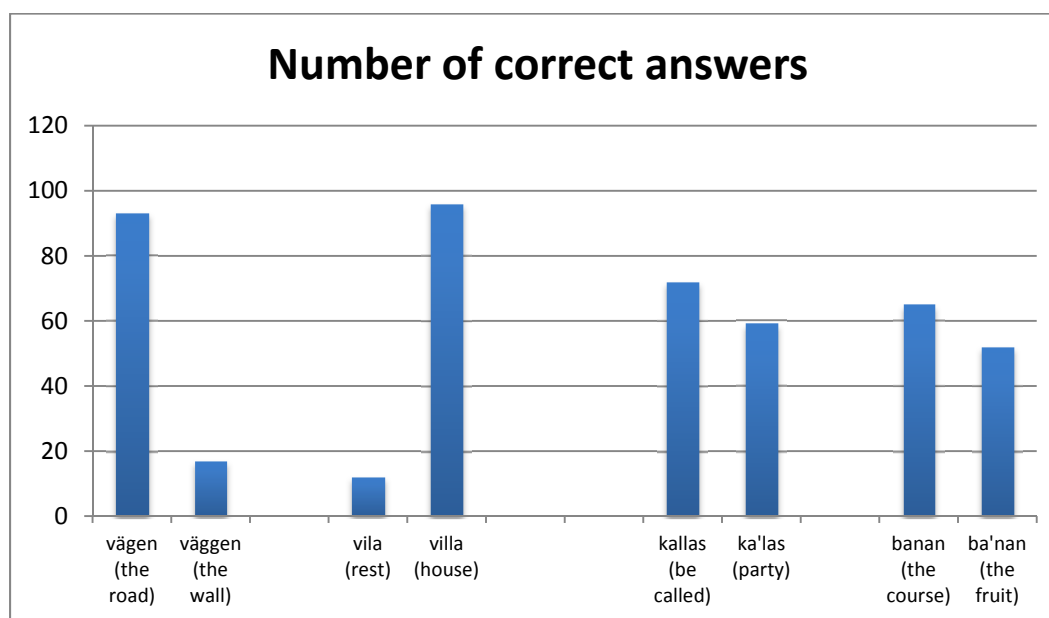


Figure 3. Number of correct answers for two minimal pairs with vowel length contrast to the left, two minimal pairs with word stress contrast to the right

There is no preference for any of the speakers in the test, but it seems as if one of the females is slightly easier to understand. The individual difference between listeners' judgments is great and there is also a variation in judgment between each word and each speaker. These preliminary results are based on answers from only 18 listeners, which is far too small to draw any certain inferences, only a hypothesis about the listeners' opinion in general. Before claiming any conclusions about the perception test it is necessary to have more listeners and after that more analyses and statistics have to be applied.

DISCUSSION

The contrast between the vowel/consonant lengths in Swedish is often obvious in a written text since the spelling is a clue; a short vowel is followed by two, often similar, consonants and a long vowel is followed only by one consonant. This is also the case in the minimal pairs that have been chosen for the analysis in this study. The auditory impression of Somali speakers' confusion concerning the use of long and short vowels in Swedish is confirmed in the acoustic analysis. There is a difference in vowel length (46–29% of the words *vägen* [the road]—*väggen* [the wall]) but since the following /g/ consonant has the same length native listeners do not perceive the difference between the words. The comparison with a Swedish speaker shows that the stressed syllable has the same length in both words, but there is a clear distinction in the relation between the duration of the vowel and the consonant in the syllables. Probably the impression of a long vowel, in relation to the length of the consonant, is a perception hang-up for a native listener. In Swedish the duration distinction is applied to the syllable, not only the vowel as in Somali. The difference between long and short vowels is important in Somali and the long vowels are pronounced twice as long as short vowels. In Somali a long vowel is doubled in the spelling, but in Swedish it is often the spelling of the following consonant that indicates the length of the vowel. Figure 2 is only one example for one speaker and one minimal pair but the pattern is the same for most of the speakers. The other minimal pair, *vila* (rest) and *villa* (house), is pronounced with a short vowel and a longer consonant in all examples, except for one speaker. That means that the auditory impression and the listener's answer in the perception test correspond to the acoustic analysis and it explains the differences in identification accuracy. However, it is interesting that the result is almost opposite between the two minimal pairs. Both words are common words

and in the context, the sentences read, the meaning is obvious. But it might be that the speakers do not know the words. The preliminary results of the perception test indicate that it is confusing for native listeners to hear the contrast, even though there are not listeners enough to draw any conclusions. In a context it is easier to recognize the words, but it can still be puzzling in a conversation situation.

The results, both the acoustic analysis and the perception test, indicate that the speakers try to distinguish the lexical word stress in Swedish. Even though they do not make the distinction by duration and a higher pitch in the stressed syllable (as a native speaker of Swedish), some of them use clues in pitch or lengthening of other segments in the word. In Somali, the stress is associated with a high tone on the stressed vowel, usually on the penultimate or final vowel. The stress is related only to the vowel, not the syllable as in Swedish, which seems to be confusing and a transfer from L1.

The inventory and comparison of the two languages Swedish and Somali reveal that there are some similarities, e.g., quite a few vowels and consonants are the same, a distinctive contrast between long and short vowels and use of tone accents in both languages. These findings might suggest that an L1 Somali speaker would not have problems with vowel length contrast in Swedish. However, the results of this study indicate that there are differences concerning the length of the long and short vowels and that the following long/short consonant plays a role for Swedish listeners. The internal distribution of length between the vowel and consonant in the syllable is important and the stress is on the syllable, not only on the vowel in Swedish. Other difficulties for the L2-learners, the /p/, the /v/, the velar nasal as well as the front rounded vowels, are observed in this study as well, but the segments might be easier to be aware of and change. Swedish prosody, on the other hand, is probably more complex to achieve.

The L2-learner has to be aware of the spelling clue and the importance of the length distinction in the whole syllable in Swedish. At a glance it might be that Swedish word stress is unpredictable, but there are rules related to the morphological structure of the word. The study sheds some light on didactic implementations in the program Swedish for Immigrants (sfi) and the importance of awareness for both teachers and learners about specific problems for students with Somali as their mother tongue. An intelligible pronunciation is important if L2 learners are to aid their integration into the society.

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