

INTENSITY IN NARROW FOCUS ACROSS VARIETIES OF SOUTH AFRICAN ENGLISH

Sabine Zerbian

Department of Linguistics, University of Potsdam, Germany

sabine.zerbian@uni-potsdam.de

ABSTRACT

The paper reports on an elicited production study that investigates prosodic marking of narrow focus in contact varieties of South African English. The acoustic analysis of fundamental frequency and intensity in narrow focus is presented and discussed. The results suggest that intensity is used differently in the contact varieties as compared to the standard variety with potential perceptual consequences.

Keywords: English, prosody, focus, intensity

1. INTRODUCTION

The current paper investigates the consequences of language contact in which two or more grammatical systems interact on prosody. It is well-known in the literature that prosodic systems differ in functional, phonological and/or phonetic aspects [5]. In South Africa the Niger-Congo Bantu languages are in contact with the West Germanic language English. English uses prosody to convey pragmatic differentiations such as focus [5], whereas South African Bantu languages seem to lack focus prosody and mark focus (morpho-) syntactically instead [12] (in how far this extends to other Bantu languages remains to be shown).

It has been shown in [8] that acrolect/postacrolect speakers of the contact variety Black South African English (BSAE) (referred to as L1-speakers in [8]) encode focus prosodically in a way that is perceptually equivalent to General South African English (for creole terms, esp. postacrolect see [6]). Mesolect speakers (referred to as L2-speakers in [8]), however, do not realise prominence according to focus status.

The current paper reports on a pilot study that investigates the acoustic realization of narrow focus in modified noun phrases across varieties of South African English with the aim to establish which differences in acoustic realization account for the perceptual differences.

2. METHOD

2.1. Experimental task and stimuli

A semi-spontaneous production task elicited modified noun phrases with differing focus structures, following the methodology in [8]. First, participants were asked to describe rows of five coloured objects which were presented to them as pictures in a PowerPoint presentation. The last modified noun phrase of the list was used for acoustic analysis. This target noun phrase varied in the constituent that encoded focused information: either it showed the same object as in the preceding pictures but in a different colour, or it showed a different object in the same colour as the preceding objects. Thereby narrow focus within the modified phrase varied across adjective and noun. The participants were also shown slides with yes/no-questions asking if the next slide would show a certain object of a certain colour. The question was followed by a slide which showed a coloured object differing either in shape or colour from the preceding question. The participants then had to correct what the slide showed. Again, by controlling whether the object noun or the colour adjective had to be corrected, focus structure varied in the modified noun phrases that the participants provided as answers.

The current pilot study investigates the acoustic realisation of the target phrase “yellow ruler” with focus on adjective and noun in two repetitions.

2.2. Participants

All participants were students at the University of the Witwatersrand, Johannesburg, aged between 19 and 30. The 33 participants represented four different varieties based on the phonological features of their speech, their performance in an English test (Quick Placement Test, QPT) and ethnicity. The QPT is an adaptive test which assesses language skills in listening, reading and use of English, including grammar and vocabulary. Of the 33 participants, eight speakers were white speakers of General South African English

(WSAE) with English as their first and only language (8/8) and an average QTP score of 97 (out of 100). Five speakers were black speakers of a postacrolect variety of South African English. They predominantly gave an African Bantu language as their first language (4/5) but English was given as their sole preferred language (5/5). They had an average QTP score of 92. Six speakers were black speakers of an acrolect variety of South African English. They all gave an African Bantu language as their first language and English was hardly cited among their preferred languages (1/6). They had an average QTP score of 86. Thirteen speakers were black speakers of a mesolect variety of South African English. They all reported an African Bantu language as their first language (13/13) and also gave English as or among their preferred languages (8/13), but they scored an average QTP score of 62.

As for the pronunciation features of the participants' speech, the speakers of White South African English and the postacrolectal variety of South African English showed the features of General South African English. The speakers of the acrolect and mesolect, on the other hand, showed phonological features reported for Black South African English [7], e.g. mergers in vowel quality, an alveolar, trilled /r/ (predominantly male speakers, [3], due to Bantu influence), and general overall rhythm [2]. The groups are summarised in table 1:

Table 1: Varieties of South African English.

	WSA E	post- acrolect	acrolect BSAE	mesolect BSAE
Ethnicity	White	Black	Black	Black
QTP (%)	5 (97)	5 (92)	5 (86)	2-4 (62)
Segmental features	SAE	SAE	Bantu influence	Bantu influence
N	8	5	6	13

2.3. Recording procedure and data extraction

Recordings were done in a quiet office at the University of the Witwatersrand, Johannesburg. The speech was captured using a clip-on stereo microphone and recorded onto a Micro Track II mobile digital recorder with a sampling rate of 44.1 kHz. Recordings were then transferred to a computer hard disk for further analysis.

Data extraction was done using ProsodyPro [11] for the software Praat. Praat provides automatic vocal pulse marking which was manually rectified for incorrect values using the script. For each phrase, the script computed the

mean F0, mean intensity and duration for each syllable.

2.4. Results and analyses

Pitch, duration and intensity are among the major correlates of word and sentence stress in English. Varieties of South African English differ considerably in the realisation of durational differences in vowels with resulting rhythmic differences [2]. This was confirmed in the current study in which only speakers of WSAE and the postacrolect of BSAE, but not speakers of the acrolect and the mesolect, produced consistent differences in vowel duration in the primarily accented syllables of the target phrase. We therefore exclude duration from the analysis.

All data reported on in the paper are analysed using linear mixed models [1] with subject as a random factor and focus, constituent, and syllable as the fixed factors. The tables list *t*-scores and corresponding *p*-values per variety.

2.4.1. Fundamental frequency (F0)

A coherent picture emerges across the varieties in what concerns fundamental frequency: When comparing F0 of the stressed syllables within the modified noun phrase it turns out that when the adjective is in focus there is a significant difference in F0 between the stressed syllable of the adjective and the noun. The stressed syllable of the adjective is produced with a higher F0 than the stressed syllable of the noun in all varieties except the postacrolect. This is shown in table 2 in which also the mean F0 on the stressed syllables are given.

Table 2: Comparing F0 of stressed syllables in adjective focus (fixed factor: constituent; *p* < 0.05 given in bold).

ADJ focus	Linear Mixed Model	mean adj (Hz)	mean n (Hz)
WSAE	t=-2.238 (p=0.0333)	161.57	149.22
Post BSAE	t=-1.993 (p=0.0616)		
Acro BSAE	t=-3.194 (p=0.0046)	146.37	129.67
Meso BSAE	t=-2.34 (p=0.024)	144.14	138.9

In noun focus, however, there is no significant difference between F0 on the stressed syllables of the adjective and the noun in any of the varieties, i.e. the F0 on the stressed syllable of the noun is not higher than on the adjective as would have been expected. This is shown in table 3.

Table 3: Comparing F0 of stressed syllables in noun focus (fixed factor: constituent; $p < 0.05$ given in bold).

N focus	Linear Mixed Model
WSAE	$t=1.173$ ($p= 0.2506$)
Post BSAE	$t=-0.265$ ($p= 0.7938$)
Acro BSAE	$t=-1.955$ ($p=0.0647$)
Meso BSAE	$t=-0.838$ ($p=0.4062$)

The lack of an F0 peak on a focused noun might be due to the interplay of a comparatively narrow pitch range during a short utterance and declination of pitch over the course of a phrase.

2.4.2. Intensity

The data analysis revealed an interesting effect for intensity. As expected, there is a significant difference in the intensity between the stressed syllables in adjective focus. The stressed syllable of the adjective is produced with a higher intensity than the stressed syllable of the noun in all varieties as shown in Table 4 (comparisons were made between items within the same audio file).

Table 4: Comparing intensity of stressed syllables in adjective focus (fixed factor: constituent; $p < 0.05$ given in bold).

ADJ focus	Linear Mixed Model	mean adj (dB)	mean n (dB)
WSAE	$t= -4.73$ ($p= 0$)	68.1	63.2
Post BSAE	$t=-4.28$ ($p=0$)	71	66.7
Acro BSAE	$t= -4.42$ ($p=0.0002$)	69.2	64.1
Meso BSAE	$t= -5.03$ ($p=0$)	68.2	64.7

There is also a significant difference in the intensity between the stressed syllables in noun focus. Interestingly, however, the difference is (a) only significant for BSAE varieties of South African English and (b) it is significant in an unexpected direction, namely, that just as in adjective focus the stressed syllable of the adjective is produced with a higher intensity than the stressed syllable of the noun. This is shown in table 5, which also gives the mean intensity on the stressed syllables for the BSAE varieties.

Table 5: Comparing intensity of stressed syllables in noun focus (fixed factor: constituent; $p < 0.05$ given in bold).

N focus	Linear Mixed Model	mean adj (dB)	mean N (dB)
WSAE	$t=-0.17$ ($p= 0.8658$)		
Post BSAE	$t=-2.111$ ($p= 0.049$)	70.2	68.1
Acro BSAE	$t=-2.7$ ($p=0.0132$)	68.9	64.8
Meso BSAE	$t=-4.23$ ($p= 0.0001$)	67.7	65

In WSAE the stressed syllable of the adjective does not have higher intensity than the stressed

syllable of the noun when the noun is focused. However, one might have expected to find a higher intensity in the stressed syllable of the noun in this case. This is also not the case. We suspect that this might be due to a declination of intensity over the course of a phrase.

This significant difference between the varieties is confirmed when looking at the intensity of each of the stressed syllables separately, depending on focus. If we compare the intensity of the stressed syllable of the adjective in focused and non-focused conditions, we find a significant difference only for WSAE. In WSAE, the stressed syllable of the adjective has a higher intensity in adjective focus than in noun focus, as shown in table 6 (Here comparisons were made across files of the same speaker. Note that a clip-on microphone was used and [11] extracts absolute intensity information.)

Table 6: Comparing intensity of stressed syllables of the adjective across focus conditions (fixed factor: focus; $p < 0.05$ given in bold).

adjective	Linear Mixed Model	mean focus (dB)	mean non-focus (dB)
WSAE	$t= -2.19$ ($p= 0.03629$)	68.1	65.7
Post BSAE	$t= -0.844$ ($p= 0.4096$)		
Acro BSAE	$t=-0.18$ ($p= 0.8556$)		
Meso BSAE	$t= -0.77$ ($p=0.4465$)		

For all other varieties there is no significant difference in the intensity of the stressed syllable of the adjective across the two focus conditions. This elaborates further on the results of table 4 and 5, which showed a significantly higher intensity of the adjective when compared to a following noun. Table 6 confirms that the intensity of the stressed syllable of the adjective is not significantly different depending on focus condition.

When the stressed syllable of the noun is compared across focus conditions, a parallel picture emerges as shown in table 7. Only in WSAE is there a significant difference in the intensity of the stressed syllable of the noun depending on focus. The stressed syllable of the noun in focus has a higher intensity than the one which is not in focus. For all other varieties, no significant difference emerges.

In table 4 it was shown that the stressed syllable of a noun is not significantly higher than the stressed syllable of the adjective when the noun is in focus in any of the varieties. Nevertheless, table 7 shows that at least in WSAE there is a significant difference in intensity of the stressed syllable of the noun in focused versus non-focused condition.

Table 7: Comparing intensity of stressed syllables of the noun across focus conditions (fixed factor: focus; $p < 0.05$ given in bold).

Noun	Linear Model	Mixed	mean focus (dB)	mean non-focus (dB)
WSAE	t=2.44 (p=0.0207)		63.2	65.5
Post BSAE	t=1.808 (p=0.0874)			
Acro BSAE	t=0.5 (p=0.6233)			
Meso BSAE	t=0.44 (p=0.6645)			

3. SUMMARY AND DISCUSSION

The acoustic analysis of narrow focus marking within a modified noun phrase has shown significant differences in the realization of intensity across varieties of South African English. In White South African English intensity is raised on the stressed syllable of a focused constituent. This results in a higher intensity on the stressed syllable of an adjective than on the following noun when the adjective is focused. In noun focus, the stressed syllable of the noun does not show a higher intensity than the stressed syllable of the adjective but its intensity is significantly higher than if the noun is not in focus. Based on the existing literature for British varieties, these results correspond to what is expected for English.

Black varieties of South African English realise intensity significantly differently because in these varieties intensity is not manipulated on the basis of focus. Instead intensity on the stressed syllable of the adjective is always higher than on the stressed syllable of the noun, independent of the focus condition. Moreover, the intensity on the stressed syllable of the adjective does not differ significantly in a focused versus non-focused condition.

Based on these results, the three BSAE varieties could be treated as one. However, these varieties differ with respect to English proficiency of their speakers as well as segmental phonological features, and they are therefore reported on separately in the current work.

Although intensity is less frequently considered in studies of focus in English or West Germanic languages in general (but see [4]), research on other languages and varieties of English has shown that intensity is crucial in information structure. Wu & Xu [10], e.g., have shown that duration and intensity are the major acoustic correlates of focus in Hong Kong Cantonese. Talla Sando Ouafeu [9] has shown that Cameroon English speakers use intensity and duration more than pitch. The current study has shown that in BSAE varieties the

parameter of intensity is manipulated differently than in WSAE in its correlation to focus.

The consistent high intensity on the adjective independent of its focus status should have crucial consequences for the perception of these phrases by listeners with a West Germanic language background. As a next step we therefore plan a perception experiment to test the prediction that the high intensity on the stressed syllable of the adjective leads to a potential misattribution of focus to this constituent.

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