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Observations on British and Singaporean perception of prominence

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Introduction

Many researchers find difficulty in the reliable identification of prominent syllables in Singapore English (SgE). This is because there is no understanding of how SgE speakers indicate stress, and whether what is perceived to be prominent is really meant by the speaker to be prominent. The problem is made worse when researchers cannot resolve if prominence in SgE can and should be determined using native or non-native perceptions.

The dilemma is clear. On the one hand, we can fall back on a long tradition of theories based on British English (BrE) and use them in the research on SgE, with a caveat that these theories may not work for SgE. On the other hand, we can try to approach the issue with a native SgE-centric perception and mindset, even though it is difficult to draw out the intricacies of the language when so much of it remains relatively unexplored, especially in areas such as intonation where there is still no established theory about the underlying structure.

We need, therefore, to keep in mind that many analyses of SgE remain as observations, and are in constant flux and change. Finally, it is not certain that there really is a need for such a demarcation between native and non-native perceptions. Do differences really exist between native SgE and non-native researchers working on SgE?

In this chapter, the impressions of BrE and SgE listeners are investigated regarding the perception of prominence in SgE, to find out if there are differences between the two types of listeners. Where such differences are found, the paper analyses what they are and how they come about.

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Background

Most researchers on stress patterns in SgE make use of well-documented research findings on Standard Englishes (usually British and American English) and apply them to their analyses of SgE. These researchers fall into two broad categories: non-Singaporeans (eg Tongue 1979; Platt & Weber 1980) using their own judgements to perceive prominence in SgE; and native SgE speakers (eg Chua 1989; Low 1998) using British models to analyse prominence in SgE speech samples. However, the study of prominence in SgE does not seem to be as straightforward as simply adopting these cues established for another variety of English.

For Fry (1955, 1958, 1965), the perception of prominence in BrE denotes a complex of perceptual physical dimensions, the listener relying on length, loudness, pitch and vowel quality. Testing his hypotheses on each parameter in turn in a series of experiments revealed that fundamental frequency (F0) ranks as the most dominant perceptual cue in BrE, followed by duration, intensity and, finally, vowel quality.

However, various studies have shown that different perceptual cues are employed for different languages and varieties of the same language. Bolinger (1958), using both natural and artificial speech, concludes that the primary cue to prominence in American English is pitch. While he also regards duration as an important cue, he rejects the notion that amplitude has a role to play as an effective perceptual cue. Morton and Jassem (1965), using nonsense words, note that raised F0 is more effective as a perceptual cue than lowered F0, and that the more intense and longer a syllable is, the more likely it is to be marked as prominent. In Southern British English, syllables that are 'louder, longer and higher' are prominent but in Northern Irish English, syllables with lower pitch are prominent (Lass 1987:108).

In other languages, Awedyk (1986) observes that Polish listeners take F0 to be the dominant perceptual cue for prominence, and similar findings are report in Czech (Janota 1979), Southern Swedish (Westin, Buddenhagen & Obrecht 1966), Estonian (Eek 1987) and Japanese (Beckman 1986). For Russian, however, Eek (1987) reports that duration, not F0, serves as the leading perceptual cue.

With SgE, as with other languages, it cannot be assumed that the perception of prominence is similar to that in BrE. While the chief perceptual cue for prominence in BrE is higher pitch or a pitch change (Fry 1958), for SgE Tan (2002) shows that higher pitch acts less as a trigger for prominence for ethnically Chinese Singaporeans, the majority group in Singapore, than for ethnically Malay and Indian Singaporeans. Further, as Tay (1982) points out (but with no supporting evidence), BrE speakers perceive prominence differently from SgE speakers.

Using data from the NIECSSE, this paper attempts to compare how BrE listeners and native SgE listeners perceive prominence in SgE speech samples.

The perception test

The interviews of 20 female speakers were selected from the NIECSSE. For consistency, and to make sure that the perception test is made up of utterances belonging to a reasonably uniform group, biographical backgrounds were used to determine the speakers chosen. The 20 female speakers chosen were ethnically Chinese, spoke Mandarin or other Chinese languages from birth, and learnt English only at a later age.

A total of 50 short utterances of lengths varying from 2 to 15 seconds were used for the perception test. Two native BrE and two native SgE listeners (one of whom is the author of this paper) listened to the data. All the listeners had considerable phonetic training. They were able to listen to each utterance as many times as they wished before marking the syllables that they heard as prominent on an orthographic transcription of the utterance.

Observations

Both BrE listeners made similar judgements of prominence for the 50 utterances in the perception test, with only very slight differences between the two. The two SgE listeners also showed strong similarities in their judgements of prominence.

In most of the utterances, all the four listeners showed similarities in identifying prominence at the sentence level. In other words there was general consensus about which words contained the prominent syllable(s).

The major difference between these two groups of listeners occurred in identifying the prominent syllable(s) within polysyllabic words. While there were some words where everyone heard prominence on the same syllables, there were a large number of polysyllabic words where the BrE and SgE listeners perceived prominence differently. In these words, there was a tendency for the BrE listeners to perceive prominence on the word-initial syllable while the SgE listeners identified the word-final syllable.

The polysyllabic words can be divided into three types:

- **Type 1 words**: SgE and BrE listeners all perceived prominence on a non-final syllable (see Appendix 11.1).

- **Type 2 words**: SgE listeners perceived prominence on the final syllable, while the BrE listeners did not (see Appendix 11.2).
- **Type 3 words**: BrE and SgE listeners all perceived prominence only on the final syllable (see Appendix 11.3).

In all the Type 1 and Type 2 words, BrE speakers themselves would have non-final stress, and all Type 3 words would have final stress. So it appears that the BrE listeners heard all these words with the stress patterns expected in their own variety of English. In contrast, SgE listeners tended to hear final prominence in many words, even when this broke the rules of English stress placement.

We will now investigate the acoustic features that triggered the differences in perception for these three types of word.

Acoustic correlates of prominence in polysyllabic words

Using Praat 4.2 (www.fon.hum.uva.nl/praat/), the F0, amplitude and duration were measured for two syllables of each polysyllabic word listed in Appendixes 11.1, 11.2 and 11.3. For words of more than two syllables, the syllable that is perceived as prominent by some listeners is compared with the final syllable. For Type 3 words (in which everyone hears final prominence), the only word with more than two syllables is *Singapore*, and in this case the first syllable is compared with the final one. For the measurements of F0 and amplitude, the highest point within the syllable was measured.

Tables 11.1 to 11.3 show the average measurements for the different syllables in the three types of word.

The amplitude differences for all word types are small. The biggest difference is for Type 3 words, but the difference of 2.2 dB is only marginally significant ($t=2.77$, paired-sample, two-tailed, $df=20$, $p<0.05$). It is possible that amplitude plays a small part in the perception of final-syllable prominence by all listeners in these words.

The F0 differences for Type 1 and Type 2 words are small and not significant, but for Type 3 words the final syllables tend to have an average 36.2 Hz higher pitch, and this difference is marginally significant ($t=2.47$, paired-sample, two-tailed, $df=20$, $p<0.05$). It seems that higher pitch may also contribute to the final syllable being perceived as prominent by all listeners.

The duration differences are clearly the most substantial in all word types. For Type 1 words, the final syllables are on average 0.029 seconds shorter ($t=3.36$, paired-sample, two-tailed, $df=35$, $p<0.01$), while for Type 2 words the final syllables are on average 0.056 seconds longer ($t=4.40$,

paired-sample, two-tailed, df=55, p<0.001), and for Type 3 words, the difference is even greater, with the final syllables on average 0.107 seconds longer (t=4.85, paired-sample, two-tailed, df=35, p<0.001).

Table 11.1: Average F0, amplitude and duration for Type 1 words (in which everyone hears non-final prominence)

	F0 (Hz)	Amplitude (dB)	Duration (sec)
Non-final syllables	213.0	62.9	0.169
Final syllables	215.8	62.4	0.140
Difference	2.8	–0.5	–0.029

Table 11.2: Average F0, amplitude and duration for Type 2 words (in which BrE listeners hear non-final, SgE listeners hear final prominence)

	F0 (Hz)	Amplitude (dB)	Duration (sec)
Non-final syllables	195.4	60.4	0.194
Final syllables	192.6	60.6	0.250
Difference	–2.8	0.2	0.056

Table 11.3: Average F0, amplitude and duration for Type 3 words (in which everyone hears final prominence)

	F0 (Hz)	Amplitude (dB)	Duration (sec)
Non-final syllables	181.1	61.0	0.137
Final syllables	217.3	63.2	0.244
Difference	36.2	2.2	0.107

It seems, then, that the SgE listeners perceive final-syllable prominence if this final syllable is longer, but the BrE listeners still hear the prominence according to the rules of standard English stress placement. However, SgE listeners hear non-final prominence if the final syllable is not longer, especially if it is also not on a higher pitch or louder.

Conclusion

This paper has looked at the differences between the British and Singaporean perception of prominence on SgE speech samples. The BrE listeners hear prominence as following the rules of stress in standard English, even when the final syllable is longer. In contrast, greater length in the final syllable is more likely to trigger the perception of syllable-final prominence for the SgE listeners, even when such syllable-final prominence does not follow the standard stress rules of English.

While this is a small experiment carried out with just four phoneticians, it does suggest that BrE and SgE listeners perceive prominence in different ways. What has been shown here too is a glimpse of how researchers of different linguistic backgrounds carry with them their native perceptions which could lead to vastly different conclusions, especially when dealing with another variety of English that is not their own. It is hoped that this experiment can serve as a reminder to future researchers working on SgE, that native and non-native perceptions differ.

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Appendix 11.1: Type 1 words

Both BrE and SgE listeners perceive non-final prominence.

F2-f:17	Turkey	F17-h:22	later	F23-g:17	furthering
F3-a:22	busy	F18-c:23	very	F23-g:21	primary
F3-a:22	assignments	F18-c:25	very	F23-g:23	longer
F5-e:12	getting	F18-c:30	problem	F23-g:23	only
F5-e:12	older	F20-d:07	social	F25-d:28	thirty
F5-e:2	backpacking	F20-d:15	during	F27-c:02	character
F9-g:11	teaching	F20-h:01	travel	F27-c:06	wanted

F9-g:11	probably	F20-h:06	various	F27-c:06	cover
F10-a:03	shifted	F20-h:06	stopovers	F27-c:12	wanted
F10-a:08	searching	F21-a:51	staying	F30-a:16	tired
F11-a:03	staying	F21-e:03	secondary	F30-a:21	after
F12-c:05	different	F23-g:14	posted		

Appendix 11.2: Type 2 words

SgE listeners perceive final prominence, BrE listeners do not.

	BrE	*SgE*		*BrE*	*SgE*
F2-e:26	sta-tues	sta-tues	F20-h:01	in-dus-try	in-dus-try
F2-e:26	e-very-where	e-very-where	F21-a:03	sis-ter	sis-ter
F2-e:29	sta-tues	sta-tues	F21-a:51	house-hold	house-hold
F2-h:9	re-lax-ing	re-lax-ing	F21-b:21	bar-gain	bar-gain
F2-h:22	mo-ney	mo-ney	F21-e:25	real-ly	real-ly
F2-h:22	ha-ppy	ha-ppy	F21-f:30	child-ren	child-ren
F3-a:22	read-ings	read-ings	F21-f:30	naugh-ty	naugh-ty
F3-a:22	bu-sy	bu-sy	F23-g:23	prac-ti-cum	prac-ti-cum
F5-e:22	trek-king	trek-king	F23-g:23	pe-riod	pe-riod
F10-a:08	fur-ni-tures	fur-ni-tures	F24-c:07	ac-tual-ly	ac-tual-ly
F10-f:14	fa-mi-lies	fa-mi-lies	F24-c:07	u-sua-lly	u-sua-lly
F10-f:17	va-ca-tion	va-ca-tion	F25-a:24	va-ca-tion	va-ca-tion
F11-a:14	co-mics	co-mics	F25-b:27	ex-ci-ted	ex-ci-ted
F11-d:01	is-lands	is-lands	F25-d:28	ma-xi-mum	ma-xi-mum
F18-c:30	call-ing	call-ing	F27-c:06	coun-try	coun-try
F18-c:33	can-cel	can-cel	F27-c:06	ac-tual-ly	ac-tual-ly
F18-e:15	de-part-ment	de-part-ment	F27-c:09	po-ssi-ble	po-ssi-ble
F18-e:18	ar-mou-ry	ar-mou-ry	F27-c:15	dif-fe-rent	dif-fe-rent
F18-e:18	wea-pons	wea-pons	F29-g:01	per-so-nal	per-so-nal
F18-f:12	so-ci-e-ty	so-ci-e-ty	F29-g:01	a-ssis-tant	a-ssis-tant
F18-f:15	so-ci-e-ty	so-ci-e-ty	F29-g:01	pas-tor	pas-tor
F18-f:16	peo-ple	peo-ple	F29-g:05	wor-ker	wor-ker

F18-f:16	child-ren	child-ren	F30-a:06	won-der-ful	won-der-ful
F18-f:19	cha-llenge	cha-llenge	F30-a:06	ex-pe-rience	ex-pe-rience
F20-d:07	men-tion	men-tion	F30-a:13	re-fresh-ing	re-fresh-ing
F20-d:07	mo-vies	mo-vies	F30-a:13	re-lax-ing	re-lax-ing
F20-d:15	ho-li-days	ho-li-days	F30-a:21	mas-sage	mas-sage
F20-h:01	pre-vious-ly	pre-vious-ly	F30-a:27	chin-chi-lla	chin-chi-lla

Appendix 11.3: Type 3 words

Both SgE and BrE listeners perceive final prominence.

F2-f:17	before	F18-c:27	within	F27-c:12	explore
F3-a:25	exams	F18-f:06	enjoy	F30-a:16	exams
F5-e:18	because	F20-d:15	revenge	F30-a:24	myself
F5-e:18	around	F20-h:01	because	F30-a:27	myself
F5-e:22	amount	F21-b:25	Singapore	F30-g:03	career
F10-f:12	because	F21-f:30	because	F30-g:08	degree
F12-f:09	attached	F27-c:02	because	F30-g:13	because