

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

As discussed in Chapters 1 and 2, it is assumed that there is a tendency to stress the final syllable in polysyllabic words among Malaysian English (ME) speakers (e.g. Baskaran, 1994; Platt & Weber, 1980; Preshous, 2001; Tongue, 1974). This research attempts to examine if the assumption is true by looking at ME speakers' placement of lexical stress in polysyllabic English words. The comparison of lexical stress by the subjects and British English (BrE) was done following Low and Grabe's (1999) research on lexical stress placement between Singapore English (SgE) and BrE. This was to enable cross-varietal comparisons on the placement of lexical stress.

This chapter begins with a description of the subjects used for this study, the selection criteria and rationale for selection. The procedure of data collection is described next, which includes the data description and rationale for both Experiments 1 and 2. This is followed by a description of the instrumentation involved in collecting the data, as well as the methodology employed in the whole data collection process. Finally, the method of data analysis is discussed.

#### **3.1 Subjects**

There were ten subjects in this study; all female Malaysian Chinese. As pitch movement would be measured in this study, having female subjects only would hold constant the

gender variable. Further, limiting the range of pitch to female voices would narrow parameters and create more objective and repeatable settings (see Vogel, Maruff, Snyder & Mundt, 2009).

As there may be some differences in the English spoken by the different ethnic groups in Malaysia, only Chinese subjects were chosen to ensure that the ethnic variable was held constant. It is assumed that the speakers, being first language (L1) or dominant speakers of ME would not display much difference in their realisation of word stress with other L1 speakers from different ethnic groups. This is because there is a tendency for L1 or fluent speakers to be less ethnically marked and to show less influence from their ancestral mother tongues (e.g. Pillai, Zuraidah, Knowles & Tang, 2010). Moreover, Low and Grabe's (1999) subjects were also (Singaporean) Chinese. The results of their research on lexical stress placement between SgE and BrE speakers were used for comparison based on the assumption that ME would be more similar to SgE given their geographical proximity and similar historical developments.

All the subjects were educated in Malaysian national primary and secondary schools that used Malay as the medium of instruction. The subjects were considered as being proficient in English based on their Sijil Pelajaran Malaysia (SPM) and Malaysian University English Test (MUET) results. For their SPM English language paper, they all scored an A1. In MUET, four of them achieved the highest score possible with a Band 6 (Very Good Users), while the other six achieved a Band 5 (Good User). Thus, the subjects can be considered to be proficient in English, and can use the acrolectal variety

of English. At the time of recording, all speakers were undergraduates at the University of Malaya pursuing their first degree at the Faculty of Languages and Linguistics with an average age of 22.

### **3.2 Data Collection**

Following Low and Grabe (1999), there were two experiments conducted in this study. Both experiments involved stress placement in polysyllabic words, specifically, three-syllable words. Experiment 1 focused on three-syllable adverbs while Experiment 2 on three-syllable nouns. Adverbs and then nouns were used to ascertain if ME speakers stress polysyllabic nouns the same as the adverbs when the primary stress should be in the first syllable for all test words, not the last syllable. Both experiments and the rationale for conducting them are explained in detail in the following sections.

#### ***3.2.1 Experiment 1***

Following Low and Grabe (1999, p. 51), a total of 10 polysyllabic words were embedded in two positions in carrier sentences for this first experiment: phrase-final position and medial position. The rationale for using the same test items and carrier sentence was to minimise differences in stress and intonation caused by neighbouring words and phonetic environments so that a valid comparison could be made with data from Low and Grabe's (1999) study. ME tends to be lumped together with SgE but research has shown differences in pronunciation between the two varieties (e.g. Pillai et al., 2010). It would be of interest to see whether the stress pattern is similar or if ME is different from its

neighbouring variety. The following are the sentences the subjects were recorded reading in a natural pace.

1. a) He did it *manfully*.  
b) He *manfully* defied the aggressive official.
2. a) She searched for it *hopelessly*.  
b) He looked *hopelessly* for jobs.
3. a) They looked for her *endlessly*.  
b) They looked *endlessly* for shoes.
4. a) He hit her *playfully*.  
b) He *playfully* derided her.
5. a) She sang it *cheerfully*.  
b) She *cheerfully* performed her item.
6. a) He abused her *sinfully*.  
b) He *sinfully* abused her.
7. a) Please steer it *carefully*.  
b) She *carefully* removed his stitches.
8. a) He disobeyed her *wilfully*.  
b) He *wilfully* resisted her.
9. a) He pulled the cart *slothfully*.  
b) He *slothfully* declined the job offer.
10. a) The rest proceeded *flawlessly*.  
b) She *flawlessly* delivered her speech.

The ten words were adverbs, in the form of *stem + suffix*, e.g. *hope + lessly*, where the suffix is not expected to be stressed. The primary stress for the test words is on the first syllable. This lexical stress placement, in these adverbs, when placed in two positions in carrier sentences, does not change. For example, the word “flawlessly” will be stressed on the first syllable regardless of whether it is in phrase-final or medial position (see 10a and b). With the primary stress being constant regardless of position in a sentence, it could be determined if ME speakers do stress the final syllable of polysyllabic words, instead of the first syllable in the test words. In other words, if it were true that ME speakers stressed the final syllable, then this could be anticipated in the test words regardless of their position in the phrase.

Words in citation form, that is, in isolation, were not used because it would involve a falling nuclear accent on *hope* and phrase-final lengthening on *ly* given that the single word produced in isolation would act as an intonation phrase (Low & Grabe, 1999). If ME, like SgE, had more phrase-final lengthening than BrE, and lengthening is perceived as a cue to stress by British English speakers, this phenomenon could be interpreted as the final syllable being stressed, as maintained by Low and Grabe (1999). Thus, if words in citation form were used, there would be phrase-final lengthening observed in all test words, and it cannot be determined if the perception of stress is due to syllable final lengthening being equated with a stressed syllable (see Low & Grabe, 1999). By embedding the test words in carrier sentences and placing them in two positions, the realisations of the test words in nuclear, phrase-final position, (a) in the sentences, with those in non-nuclear, (b) medial position can be compared.

- E.g. (a) Please 'steer it '**carefully**
- (b) She 'carefully re'moved his '**stitches**.

(' marks the accented syllables while the nucleus is also in bold)

Since English is one of the languages known to exhibit phrase final lengthening, the final syllables in the word *carefully* in (a) and *stitches* in (b) are likely to be lengthened (Klatt, 1976). However, at the same time, there would be no pitch movement anticipated here as the nucleus are the first syllables of the final words in (a) and (b). Thus, one way of determining if the final syllable of the test words like *carefully* are indeed stressed is to not only look for evidence of syllable lengthening, but also for pitch movement.

### **3.2.2 Experiment 2**

A second experiment, as a follow-up to Experiment 1, was done with five polysyllabic nouns, all with three syllables and with primary stress on the first syllable. It is a different experiment from Low and Grabe's (1999) second experiment which looked at compound nouns. The words in Experiment 2 of this study were also embedded in carrier sentences. The rationale for using the same test items and carrier sentence was to minimise differences in stress and intonation caused by neighbouring words and phonetic environments (Low & Grabe, 1999). The list of sentences is as follows:

1. Please say *emperor* again.
2. Please say *cinema* again
3. Please say *custody* again.
4. Please say *newspaper* again.

5. Please say *gentlemen* again.

While in Experiment 1 all the words are adverbs formed by adding *ful* and *ly* to the root word, that is *root + ful + ly*, the words in Experiment 2 are nouns; the first three not having a prefix or suffix and the last two being made up of two nouns. This test aimed to see if ME speakers would stress nouns in different forms, in phrase-medial position, the same way they stress adverbs (Experiment 1). The phrase-medial position was again adopted as it was assumed that there would be phrase-final lengthening in the test words in phrase-final position anyway (as explained in 3.2.1 Experiment 1). These words were selected to ascertain if the perceived tendency of ME stressing the final syllable applies to other types of words.

### **3.2.3 Recording**

Recordings were done using a microphone attached to an ASUS, M5200AE laptop using Praat Version 5.0.32 (Boersma & Weenink, 2008). Subjects were recorded one at a time, in a quiet environment, reading the sentences in the order presented in 3.2.1 and 3.2.2 using a sampling rate of 24 kHz. Subjects were encouraged to say the sentences as naturally as they could.

The recordings were saved as .wav files and named according to the speaker and sentence, e.g.

S1S1a – Speaker 1, Sentence 1 a) He did it *manfully*.

S6S2b – Speaker 6, Sentence 2 b) He looked *hopelessly* for jobs.

S9S3 – Speaker 9, Sentence 3 Please say *custody* again.

Later, after all the recordings were completed and saved, .wav files with only the test words were created. This was done by selecting only the part of the sentence needed, that is, the test word, and extracting the selected sound. These .wav files were named according to the speaker and test word, e.g.

S1W1a – Speaker 1, Word 1 a) *manfully*

S6W2b – Speaker 6, Word 2 b) *hopelessly*

S9W3 – Speaker 9, Word 3 *custody*

When that was done, the sounds were ready for transcription and annotation.

### **3.3 Transcription and Annotation**

The recordings with only the test words were annotated into four tiers in Praat: orthographic transcription, syllable tier, fundamental frequency (Hz) and duration (ms) as shown in Figure 3.1.



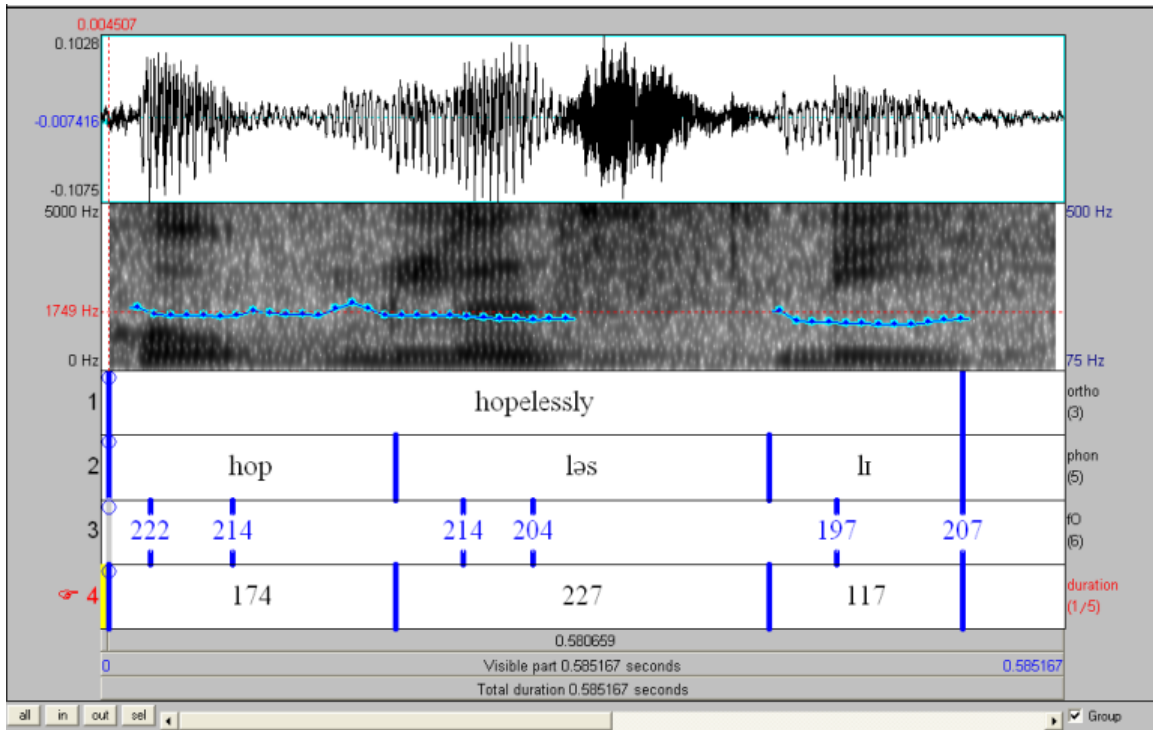


Figure 3.1: Text grid of *hopelessly* in the final position by Speaker 1

The first tier (ortho) shows the orthographic transcription of the sound in the spectrogram. The syllable tier (phon) separates the sound into its syllables. The test words in this study were syllabified based on a morphological criterion following Low and Grabe (1999) (see 3.4.1). The third tier (f0) shows the fundamental frequency (F0) measurements taken at the onset and offset of the voiced segments of each syllable. The fourth tier (duration) shows the duration of each syllable in milliseconds.

### 3.4 Method of Analysis

The analysis of the data collected was done using Praat Version 5.0.32 (Boersma & Weenink, 2008), where the duration and pitch movement or F0, two potential acoustic correlates of stress, were measured. Duration and F0 were chosen following theoretical

underpinnings of stress that duration and F0 are the most important correlates of stress (see 2.2.3).

### **3.4.1 Duration**

The measurement of the duration of each syllable in each test word was taken (in milliseconds) from the onset and offset of the syllable, following criteria described in Turk, Nakai and Suguhara (2006). Syllabication of the words in both experiments was, on the first instance, based on a morphological criterion (Low & Grabe, 1999; Turk & Shattuck-Hufnagel, 2007), where a word is syllabified based on its morphological make up (see 2.1.2). In Experiment 1, the morphological make up of the test words is *root* + *suffix 1* + *suffix 2*. Following morphological criteria, a word like *hopelessly* would be syllabified as *hope* (root) + *less* (suffix 1) + *ly* (suffix 2). The same goes for *endlessly* and *flawlessly*. As for the rest of the test words in Experiment 1, the seven test words could not be syllabified in such a way, for example, the word *manfully*. In these cases, a decision had to be made about whether to place the /l/ in the coda of the second syllable or the onset of the third, /mæn + fəl + ɪ/ or /mæn + fə + lɪ/. If the Maximum Onset Principle (MOP) is applied, then the tendency would be to push the consonant to the onset of the third syllable, provided that this is phonotactically legal in English, which in this case it is (Pulgram, 1970), thus /mæn + fə + lɪ/.

The next option is to consider, as Low and Grabe (1999) did, allophonic variation, that is, whether /l/ was produced as a clear or dark /l/. This is because in English, a dark /l/ can be expected at a syllable final position. According McMahon (2002, p. 111), where there

are two syllables, for example, as in the word *hilly*, the /l/ must be in the onset of the second syllable, “where it automatically surfaces as clear”. Therefore, the word *manfully* would be syllabified /mæn + fə + lɪ/. This syllabification would be constant with the syllabification of the other six cases in Experiment 1 where test words end with *-fully* (see Table 3.1 for the full list).

Table 3.1: Syllabification of test words in Experiment 1

Test word	Root	Suffix 1	Suffix 2
1. manfully	mæn	fə	lɪ
2. hopelessly	həʊp	ləs	lɪ
3. endlessly	end	ləs	lɪ
4. playfully	pleɪ	fə	lɪ
5. cheerfully	tʃiə	fə	lɪ
6. sinfully	sɪn	fə	lɪ
7. carefully	keə	fə	lɪ
8. wilfully	wɪl	fə	lɪ
9. slothfully	sləʊθ	fə	lɪ
10. flawlessly	flɔː	ləs	lɪ

*Note:* The actual vowels produced by the speakers may not be the same as the ones in citation form indicated above.

To syllabify the test words in Experiment 2, the morphological criteria were again followed. Words like *newspaper* and *gentlemen* are made up of two words, that is, *news* + *paper* and *gentle* + *men*. To syllabify *paper* and *gentle*, the MOP was adopted. *Paper* is syllabified as /peɪ + pə/ to keep each syllable open, just as *cinema* would be syllabified as /sɪ + nə + mə/, while *gentle* is syllabified as /dʒen + tə/ because the /e/ in *gentle* does

not occur in word-final position, so the consonant /n/ is detached from the onset of the next syllable and transferred to the preceding syllable. Furthermore, an /nt/ onset is not allowed in English. Following the same principles, the word *custody*, would be syllabified as /kʌs + tə + dɪ/ and not /kʌ + stə + dɪ/. As for the word *emperor*, it cannot be syllabified as /e + mpə + rə/ because /mp/ does not occur in word-initial position, so the consonant /m/ is detached from the onset of the next syllable and transferred to the preceding syllable, thus forming /em + pə + rə/ (see Table 3.2 for the full list).

Table 3.2: Syllabification of test words in Experiment 2

Test word	Root	Suffix 1	Suffix 2
1. emperor	em	pə	rə
2. cinema	sɪ	nə	mə
3. custody	kʌs	tə	dɪ
4. newspaper	nju:z	peɪ	pə
5. gentlemen	dʒen	təl	mən

NB: The actual vowels produced by the speakers may not be the same as the ones in citation form indicated above.

The onset and offset of each syllable of the spectrogram was then marked by visual examination of the spectrogram and auditory examination. After all the durations of every syllable were taken (in milliseconds), the figures were transferred to an MS Excel spreadsheet. The means for the duration of each syllable in phrase-final and phrase-medial positions were then calculated. This made possible the examination of the length of the final syllable in the test words, whether it was longer in phrase-final position compared to phrase-medial position.

The duration between the final and penultimate syllables of the test words were also calculated in percentage, following Low and Grabe's (1999) research. To enable a comparison between ME, SgE and BrE, the percentage difference between the last two syllables of all test words was calculated and done following Low and Grabe's (1999) formula of:

$$\frac{f - p}{f} \times 100$$

where  $f$  = average of the final syllables of all test words across all speakers, and

$p$  = average of the penultimate syllables of all test words

Low and Grabe (1999) hypothesised that the claimed stress difference between SgE and BrE was the result of more phrase-final lengthening in SgE than in BrE. Thus, the difference in duration between the final syllable and the penultimate was larger in SgE than in BrE in final position, and comparable in the medial position. Calculating the duration between the final and penultimate syllables of the test words would enable a comparison between the results of this study and Low and Grabe's (1999) research on SgE and BrE.

### ***3.4.2 Fundamental Frequency***

The F0 of the test words were measured (in Hz) at the onset and offset of each syllable based on the voiced portions of the syllable (see 2.2.3). In Praat, the pitch contour in a spectrogram (see Figure 3.2) appears as a line or as a sequence of dots. The figures on the right of the window states the ceiling of the pitch range at 500 Hz, and the floor of the

viewable pitch range, which is 75 Hz. F0 was measured at the line at the onset and offset of voiced segments of a syllable, not the entire syllable. This is because unvoiced segments have no F0 values. They appear as gaps in the F0 plot, as shown in Figure 3.2.

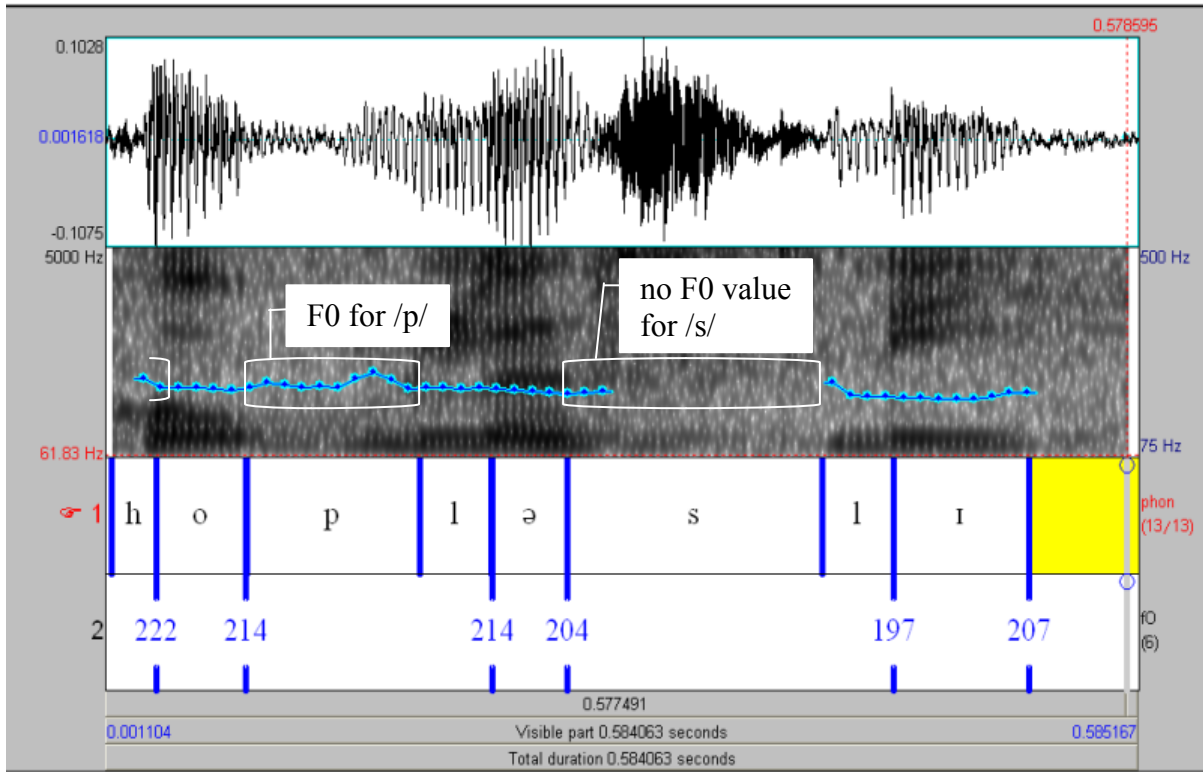


Figure 3.2: Pitch measurement of *hopelessly* in the final position by Speaker 1

After the F0 measurements had been transferred onto an MS Excel spreadsheet, the means for the F0 onset and offset values for each syllable were calculated and then plotted on a graph, following Low and Grabe's (1999) research to enable comparison.

Words such as *manfully* would have a nuclear falling accent pattern which involves an F0 maximum on *man* followed by a drop in F0 towards the end of the word. If the ME speakers had stressed the last syllable and not the first syllable, then a high F0 can be expected for *ly* instead of *man*. After the graph had been plotted following the F0

measurements, it was compared with Low and Grabe's (1999) graphs of BrE and SgE subjects.

Finally, the shape of the F0 contours produced by the ME speakers were examined for both final and medial positions. The contours were then compared with Low and Grabe's (1999) results.

### **3.5 Conclusion**

This chapter described the research design used in the study in terms of the data and methodology. The resultant findings in table and graphic forms will be discussed in the next chapter.