The intonational structure of Singapore English

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ABSTRACT

This dissertation is a comprehensive description of the structure of the prosody of Singapore English. Using the Prosodic Hierarchy as a framework, each layer of the structure of Singapore English is described in detail. The smallest level described in this dissertation is the syllable, the domain in which the majority of segmental processes occur in Singapore English. The second level is the prosodic word domain, where there is a high tone anchored to the final syllable and a low tone anchored to the left edge, and these tones are shown in this dissertation to be recursive. These tones are independent of stress, which is argued to not exist in Singapore English. The third level is the intonational phrase, where the final syllable carries the boundary tone of the entire intonational phrase, affecting the tones of final particles. There is also a phrase-initial boost on the first prosodic word of the intonational phrase. Markedly absent is any intermediate phrase or domain between the word and intonational phrase, which is argued to not exist in this dissertation. The dissertation ends with a look at the possible origins of the prosody of Singapore English and a consideration of the prosodic systems which may have influenced its development.

ACKNOWLEDGMENTS

This dissertation is dedicated to my wife Lily whose indescribable support comes in so many different ways. I would also like to thank my family, especially my sister, who have always been there for me since the beginning. Many thanks to my advisor Marc Brunelle whose constant guidance and timely revisions made this work the best it could be. Thanks also to my committee members, Lisa Lim, Stephen Levey, Ian MacKay and Andres Salanova for their invaluable comments and advice.

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`§1 Introduction

Singapore English is a variety of New English which has been primarily influenced by Baba Malay, Bazaar Malay and the Southern varieties of Chinese, including Hokkien, Teochew and Cantonese. 'New English' is a term that describes a variety of nativized English spoken by a people of non-British origin. This is in contrast to Standard English, a term that I will use throughout this dissertation to refer to standard varieties of English in which English has spoken as a heritage language by the population for many generations (for example American English, British English, Australian English and so forth). Singapore English prosody has been observed to be very different from Standard English prosody. For example, it has been described as having a 'staccato rhythm' (e.g. Date 2005), 'machine-gun effect' (e.g. Tay 1982), 'singsong' (Lim 2004), and lacking the 'smooth rhythm' of British and American English (Date 2005).

However, an important thing to point out about Singapore English is that it is an English or New English that has been completely nativized and which possesses its own unique system of prosody. Platt and Weber (1980) were instrumental in establishing that the prosody of Singapore English was an entity systematic enough to merit research. In particular, they pointed out "the amount of system to be observed within Singapore English and the increasing similarity of Singapore English as spoken by those of different ethnic backgrounds" (Platt and Weber 1980: 46). In this respect, Singapore English speakers share a prosodic structure that is as distinct and systematic as any other prosodic system.

The aim of this dissertation is to provide a theoretical and complete description of the prosody of Singapore English. By prosody, I refer to the measurable suprasegmentals of the language, which are pitch, duration and intensity. Thus, this dissertation will provide a comprehensive account of the prosodic system of Singapore English, and this account should be able to predict to a large extent how acoustic suprasegmentals pattern in the language. In the next section (1.1), I will provide a brief

overview of the history of English in Singapore and in section 1.2 I will present the prosodic framework that I will adopt for this dissertation.

§1.1 An Introduction to Singapore English

Singapore English is a variety of English spoken by the people of Singapore. Singapore became a British colony in 1819 when it was founded by Sir Stamford Raffles of the East India Company, and by the end of the 19th century, the British established English-medium schools in Singapore to foster the growth of an English-educated population in a growing city where English was the language of administration as well as one of the main languages of commerce.

English was the language of power in the British territories in South East Asia (Crystal 2003:104). The East India Company established settlements in Penang in 1786, in Singapore (1819) and in Malacca (1824), and these formed the Straits Settlements where English was used as an administrative and legal language. The British officially took over control in August 1824 when a treaty was signed between the Sultan of Johor and the British. Initially, the population of Singapore consisted of mostly Malays (60% in 1824), but the Chinese soon took over this majority (45.9% in 1836 and 75% in 1921) (Lim 2011). The Chinese mostly came from the southern provinces and cities of Chaozhou, Xiamen and Guangdong, but also included large numbers of Hakkas and Hainanese.

The British had administrative control over Singapore for more than a hundred years until 1959, when Malaya became independent from Britain (excluding the years of Japanese occupation between 1942 to 1945). The British government established English primary schools towards the latter half of the 19th century (Low and Brown 2005). This created a growing pool of English-medium educated across three major ethnic groups: the Malays, Chinese and Indians, and these English-educated Singaporeans took up positions in the government, commercial and educational sectors.

In the 1950s, a bilingual educational system was introduced in Singapore, with English used as a unifying and utilitarian medium alongside Chinese, Malay and Tamil (Crystal 2003:104). After attaining independence in 1965, English remained the language of government and the legal system, and retained its importance in education and the media. Its use has also been steadily increasing among the general population. In a 1975 survey, only 27 percent of people over age 40 reported understanding English, whereas in the age group 15-20, the proportion was over 87 percent. Currently, English is growing as the home language of all ethnic groups in Singapore (Chinese: 23.9% to 32.6%, Malay 7.9 to 17%, Indian 35.6 to 41.6%) (Singapore Department of Statistics, 2010). More information on the history and languages surrounding Singapore English is provided in Chapter 6.

The present-day demographics of Singapore are 74% Chinese, 13% Malays and 9% Indian (Singapore Department of Statistics 2010), showing that the Chinese consist of the majority of the population. For this reason, this dissertation will only focus on Singapore English spoken by the Chinese population in Singapore, assuming it is the most representative variety. While there is certainly some variation across the English spoken by different ethnic groups in Singapore, this difference seems relatively unpronounced and has not been studied extensively (but see X, Y, Z). In any case, this topic is beyond the scope of this dissertation, which focuses mostly on formal prosody, and will have to be kept for future research.

§1.2 The Levels of the Prosodic Hierarchy

Across languages, phonological processes tend to apply within well-specified prosodic domains. For example, rules that govern stress have been attributed to the level of the foot in languages such as Standard English (e.g. Liberman and Prince 1977), and devoicing in languages like German and Russian has been argued to take place in the realm of the syllable (e.g. Nespor and Vogel 1986). One of the most influential frameworks that posits such prosodic domains across languages is the Prosodic Hierarchy

(Nespor and Vogel 1986, Peperkamp 1997, Selkirk 1981, 1984, Truckenbrodt 1999, Gussenhoven 2004). The original framework stipulated a number of universal prosodic domains ordered in a hierarchical domain as follows:

Figure 1: Prosodic Hierarchy Framework

Syllable < Foot < Phonological Word < Clitic Group < Phonological Phrase < Phonological Utterance

(Nespor and Vogel 1986)

The Strict Layer Hypothesis (Selkirk 1984) posits that in the prosodic tree, a domain at any given level of the hierarchy can only dominate domains at the next lower level. The Clitic Group is an older version of the label of the domain between the word level and the phonological phrase that includes cliticizing function words (hence the name), but the existence of this node has been debated by various scholars (e.g. Peperkamp 1997). In this paper I will argue for a recursive theory (recursion will be discussed in section 1.5) that will eliminate the need for a Clitic Group, and thus will not refer to this label henceforth.

At this point, I would like to describe the levels of the intonational structure in the Prosodic Hierarchy that I will make reference to throughout the course of this dissertation. The following prosodic structures currently constitute the most commonly accepted prosodic hierarchy (Selkirk 2011):

Figure 2: A common prosodic hierarchy

Intonational Phrase (ι)
Phonological Phrase (φ)
Prosodic Word (ω)
Foot (π)
Syllable (σ)

In the next few paragraphs, I will describe each of these levels of prosodic structure in detail, starting from the smallest (syllable) and moving upwards.

Syllables have been described as the smallest constituent of the prosodic hierarchy. Units smaller than the syllable such as the mora (μ) or segment (C/V) have been assumed to be properties of syllables and not prosodic constituents (Ito and Mester 2003). It is the smallest unit in phonology that serves as the domain of segmental phonological rules (e.g. Nespor and Vogel 2007). For example, glottalization in English has been argued to be a syllable-domain rule (Nespor and Vogel 2007).

The next level up from the syllable is the foot. It has been proposed that syllables are not grouped directly into words, but first grouped into intermediate-sized constituents (i.e. feet) (Nespor and Vogel 2007). Stress assignment is one of the main arguments for the presence of the foot as a phonological domain, as the foot has been seen as fundamental in determining the positions of stressed and stressless syllables within words and larger strings (e.g. Liberman and Prince 1977). However, the foot has not been identified in the literature in Singapore English as an active phonological domain (primarily due to the lack of stress as I will describe in chapter 2).

Next, the prosodic word (ω) corresponds to the syntactic constituent of a single lexical word (noun, verb, adjective or adverb) that possesses an individual (and non-grammatical) meaning (Selkirk 2009, 2011). In addition to a single core lexical word, prosodic words may also contain function words or items which cliticize to the core lexical word. Prosodic words can be marked by pitch accents on either their most prominent syllable, or on their edges. In addition, prosodic words are typically characterized as being the domain of word stress, phonotactics and segmental word-level rules (Peperkamp 1999).

The nature of the prosodic domain (or prosodic domains) situated between the Prosodic Word and the Intonational Phrase, as well as its label, is a topic that has been and still is open to debate in the literature. The most commonly accepted domain at this general level is the phonological phrase, which groups together prosodic words and corresponds to a syntactic XP (i.e. a VP or NP). Ito and Mester (2009)

also identify the 'minor phrase' and 'major phrase' (also referred to as the 'accentual phrase' and 'intermediate phrase' in the literature) and argue in their 2009 paper that both the 'minor phrase' and 'major phrase' can be collapsed into a single 'phonological phrase' using recursion (I will discuss recursion in section 1.5). Other terms used to describe prosodic domains between the Prosodic Word and the Intonational Phrase include 'intermediate phrase', which has been noted to be equivalent to 'phonological phrase' (Hayes and Lahiri 1991). Since "phonological phrase (ϕ)" is the most common term used in the literature, this is what I will use in this dissertation to refer to an eventual level located between the prosodic word and the intonational phrase. This choice has limited implications because, as I will show in chapter 4, there is no evidence for such a level in Singapore English.

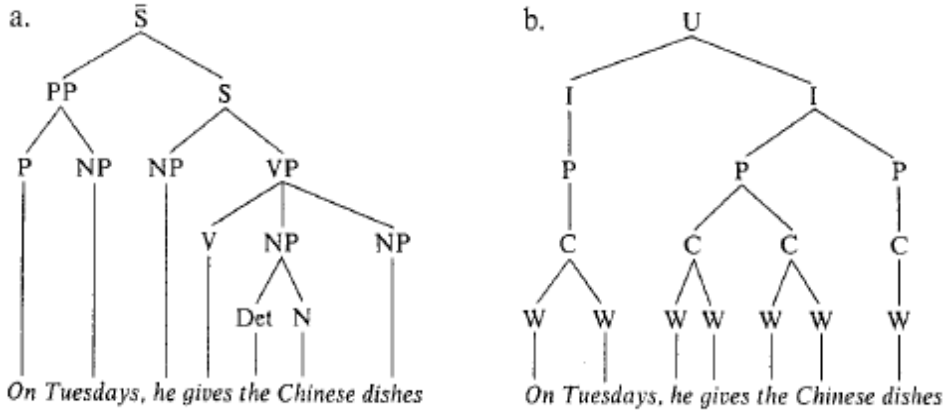
The intonational phase (ι) is the highest level of the prosodic hierarchy that I will refer to in this dissertation, and the syntactic domain of the intonational phrase is the clause. Besides the root clause, other constructions such as parenthetical expressions, nonrestrictive relative clauses, tag questions, vocatives, expletives and fronted elements have been noted to form intonational phrase domains (e.g. Ladd 1980, Selkirk 1984, Nespor and Vogel 1986). For example, the formation of the relative clause in the following sentence breaks it up into three intonational phrase domains '[My brother]$_{\iota}$ [who absolutely loves animals]$_{\iota}$ [just bought himself an exotic tropical bird]$_{\iota}$ (Example from Nespor and Vogel 2007:188)'. In addition, list intonation has also been found to separate each individual item on the list into its own intonational phrase, such as in the sentence '[We were told to buy the following]$_{\iota}$ [milk]$_{\iota}$ [eggs]$_{\iota}$ [bread]$_{\iota}$ [and cheese]$_{\iota}$' (Nespor and Vogel 1986). Intonational phrases are affected by boundary tones, which occur at the edges of the intonational phrase, or intonational tones, which occur on or near to accented syllables (Gussenhoven 2004:22).

§1.3 Syntax and the Prosodic Hierarchy

Another crucial feature of the Prosodic Hierarchy framework is its grounding in syntax. Although in the standard theory 'no inherent relation is assumed to exist between the prosodic category types found in phonological representations and the category types of syntactic representation' (Selkirk 2011:437), recent versions of the prosodic hierarchy make the relationship between syntax and the prosodic hierarchy more explicit.

Figure 3 below (from Hayes 1989:201) illustrates how the sentence 'On Tuesdays, he gives the Chinese dishes' can be broken down from both the viewpoint of both syntactic bracketing and the prosodic hierarchy. Hayes argues that the prosodic hierarchy in (1b), where U: Utterance, I: Intonational Phrase, P: Phonological Phrase, C: Clitic Group, W: Phonological Word, is derived from (but not completely identical to) the syntactic skeleton of (1a).

Figure 3: Example of how the Prosodic Hierarchy maps to syntactic structure (Hayes 1989)



Selkirk's Match Theory or Match Correspondence Theory (2011) is a prosody hierarchy hypothesis that is firmly grounded in syntax. This idea reiterates the prosody hierarchy (e.g. Nespor and Vogel 1986, Selkirk 1986, 1995, Truckenbrodt 1999), but aims to make direct reference from

phonological domains to syntactic domains. Match Theory is a 'constituent faithfulness' theory that aims to give all prosodic constituents grounding in syntactic structure, and it posits that in the ideal case, all prosodic constituents have an exact parallel in syntactic structure. Selkirk (2011) proposes that both edges of the prosodic constituent should map to the syntactic constituent (as opposed to single-edge-based theories that only require one edge to match up, e.g. Selkirk 1986, 1995). Selkirk's Match Theory is in many ways an expansion of Truckenbrodt's (1999) WRAP XP constraint, which was limited to matching domains for XPs and phonological phrases. Match Theory generalizes the idea of matching domains throughout the hierarchy by proposing that every prosodic domain matches a domain in syntax.

Match Theory has three universal constraints that reflect this correspondence between the syntactic and prosodic structure: MATCH CLAUSE, whereby a clause in a syntactic constituent structure has to be matched by an intonational phrase, MATCH PHRASE, where a phrase in syntactic constituent structure has to be matched by a phonological phrase, and MATCH WORD, where a word in syntactic constituent structure has to be matched with a prosodic word. Secondly, any prosodic category larger than a foot is a subtype of these three categories (ι, ϕ, ω). For instance, Ito and Mester (2009) have argued that subtypes of these categories (specifically minor and major phrases, which are subtypes of phonological phrases) can be explained through recursion (which I will discuss in section 1.5). One thing that has to be pointed out about Match Theory, however, is that prosodic markedness constraints must interact with Match constraints in order to make sure that all of the MATCH XP constraints produce the expected real-life results. For example, the constraints BINMAX and BINMIN, which state that phonological phrases maximally or minimally consist of two prosodic words, can override basic match constraints in some languages.

In phonology, prosodic domains can be referred to by phonological processes in two main ways. Firstly, phonological rules that occur within a domain may only apply if all of the triggering segments and

undergoing segments are within the same domain. An example of this is liaison in French. In the sentence 'Les enfants [sont_allés]$_{\phi}$ à l'école', there is liaison between 'sont' and 'allés' as they are in the same phonological phrase, but not between 'allés' and 'à' as these two words belong to different phonological phrases (Nespor and Vogel 2007:179). Secondly, the edges of the domains of the Prosodic Hierarchy may be referred to in phonological rules. What this means is that there can be phonological rules that directly refer to the left or right edges of prosodic domains, such as devoicing, which devoices obstruents at the right edge of every Prosodic Word in languages such as German, Polish and Singapore English.

§1.4 The Universality of the Prosodic Hierarchy

The domains of the Prosodic Hierarchy are fundamentally anchored in syntax - it is a theory of interactions between phonology and the other components of the grammar (Nespor and Vogel 1986), and since syntactic structure is universal across languages, the Prosodic Hierarchy is assumed to apply to all languages cross-linguistically. Vogel (2009:16) notes that one of the key claims of the prosodic hierarchy is that it is 'universal'. Therefore, the Prosodic Hierarchy aims to capture all phonological patterns across languages with a fixed and finite range of possible domains.

However, the empirical evidence often does not match the straightforward theoretical predictions of the Prosodic Hierarchy framework (Inkelas and Zec 1995, Bickel et al 2009). Although there are indeed a large number of languages that do exhibit the three main levels of the hierarchy, if a single language shows strong evidence that it does not exhibit these levels, the framework can no longer be deemed to be universal. Therefore, there should be linguistic evidence for each prosodic constituent within the Prosodic Hierarchy as evidence that that prosodic constituent exists, rather than taking its existence for granted. Motivations to posit a prosodic constituent include 'if the string is the domain of phonotactic restrictions', and if 'there are rules of the grammar that need to refer to it in their

formulation' (Nespor and Vogel 2007). In other words, this means that the Prosodic Hierarchy and its levels are falsifiable, and if there is a phonological process (either segmental or autosegmental) that targets a specific prosodic constituent, that is evidence enough that that prosodic constituent exists. Conversely, if there are no phonological rules or processes that target a proposed prosodic constituent, theoretically there is no proof for its existence. According to Vogel (2009), new constituents must be components of all languages or otherwise 'we no longer have a testable theory of the prosodic hierarchy' (Vogel 2009:17). In other words, all constituents have to be part of the existing prosodic hierarchy in all languages, or it cannot be claimed as universal.

There are a number of languages that do not follow this strict prosodic structure framework. Jun (2005) noted that some languages only have one prosodic unit above the word (e.g. Serbo-Croatian), while others have three (e.g. Bininj Gun-wok, Farsi). Venditti (1995) and Pierrehumbert and Beckman (1988) make the claim that the level of the intonational phrase does not exist in Japanese. Further to this, Bickel et al (2009) demonstrate that there is cross-linguistic evidence that goes against the universality of the Prosodic Hierarchy. They show that languages such as Limbu, for example, may have up to four and at least two prosodic constituents between the syllable and the phonological phrase if lexically limited phonological rules were enough evidence for a phonological domain. Bickel et al (2009) further show, through quantitative methodology within a probabilistic typology, that Limbu is not unique in the respect of having multiple word domains. In fact, they found that there is 'a cross-linguistic trend for languages to multiply prosodic domains between the foot and the phrase' (Bickel et al 2009:72). Therefore, it appears that the Prosodic Hierarchy is very useful in conceptualizing prosodic domains in languages, but might not be a perfect fit for natural data. In this dissertation, I will describe the intonational structure of Singapore English using the Prosodic Hierarchy as a framework, and will examine if the levels (ω, ϕ, ι) of the Prosodic Hierarchy exist in the intonational structure of Singapore

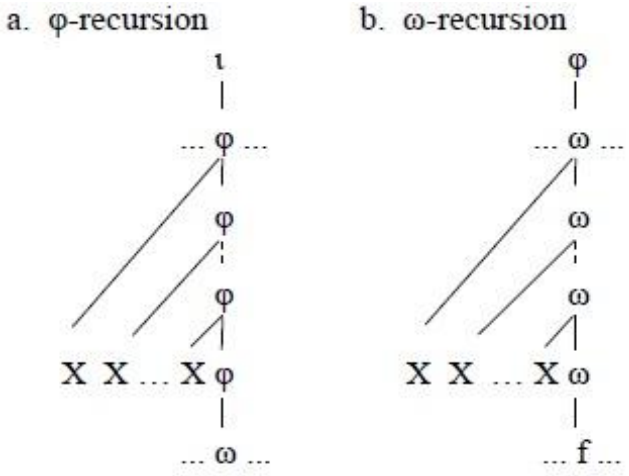
English. If no evidence is provided for these levels, I will assume that these levels do not exist. In addition, if there are additional levels in Singapore English (which the current dissertation has no evidence for), then these should also be proposed as part of the intonational structure of the language.

§1.5 Recursion

Recursion is a phenomenon that is very common in syntax and it refers to the fact that rules can repeatedly applied or iterated in order to generate a sentence. For example, there is theoretically no limit to the number of adverbs that may modify a verb, such as in the sentence 'She played the piano beautifully, masterfully, confidently'. The adverbs join up with the verb to form a Verb Phrase, and each time a new Verb Phrase is recursively created. Another example of recursion in syntax is the fact that you may endlessly append prepositional phrases to a noun in a Noun Phrase, such as 'The person with a gun in the room on the chair to your left'.

Recursion in phonology is an entirely different matter. The Strict Layer Hypothesis (Selkirk 1984) assumed that prosodic structure is not recursive, which means that even though syntactic constituent structure may be recursive, the phonological structure is linear. However, Selkirk (1995) revises this position by proposing that the Strict Layer Hypothesis is a violable OT constraint; that is to say that some languages may allow recursion if it allows the satisfaction of another more highly ranked constraint. It is still a matter of debate as to whether there is indeed recursion in the phonology itself (i.e. whether the recursion lies in the phonology or the syntax). However, since phonological domains are predicated on syntax, and syntax is recursive, it is possible to have syntactically defined recursive domains that provide the structure that phonological rules operate over. For example, phonological phrases and prosodic words may be recursively added on through adjunction such as in figure 4 below (taken from Ito and Mester 2009):

Figure 4: Prosodic recursion in phonological phrases and prosodic words (Ito and Mester 2009)



The main benefit of proposing recursion is that 'recursion imposes further levels of structure on the string being parsed without claiming that each time a different category is involved' (Ito and Mester 2009). In other words, there is no need to propose that there are different phonological or prosodic categories created whenever new material is added to the prosodic domain. An important thing to note is that following standard definitions of recursion, multiple instantiations of the same domain would have the same phonological properties (Peperkamp 1996, 1997).

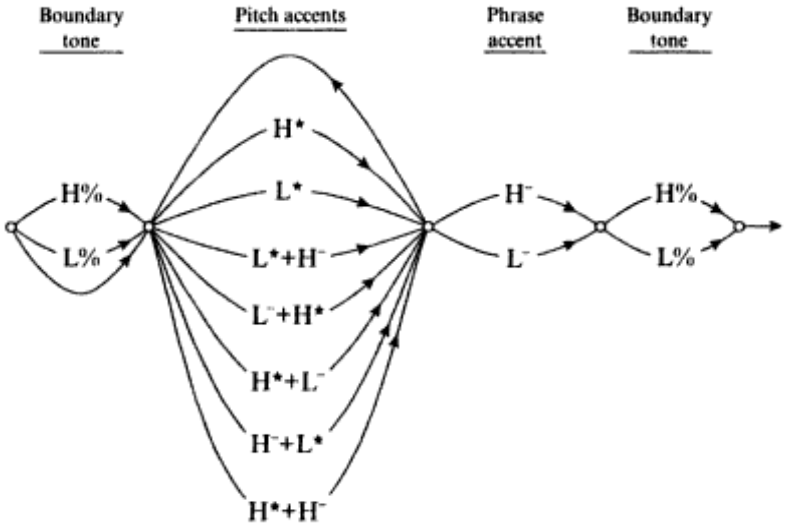
In this dissertation, I will propose that there is recursion in the formation of the phonological domains (in particular the prosodic word), a notion that goes against the Strict Layer Hypothesis but which is necessary to accommodate empirical evidence without having to create superfluous levels of structure.

§1.6 Autosegmental-Metrical Theory

Following the main tenets of the autosegmental metrical theory of intonation (e.g. Goldsmith 1976, Pierrehumbert 1980, Ladd 2008, Gussenhoven 2006), intonational contours are analyzed as a sequence of high and low tones on an autosegmental tier which are associated with metrically strong

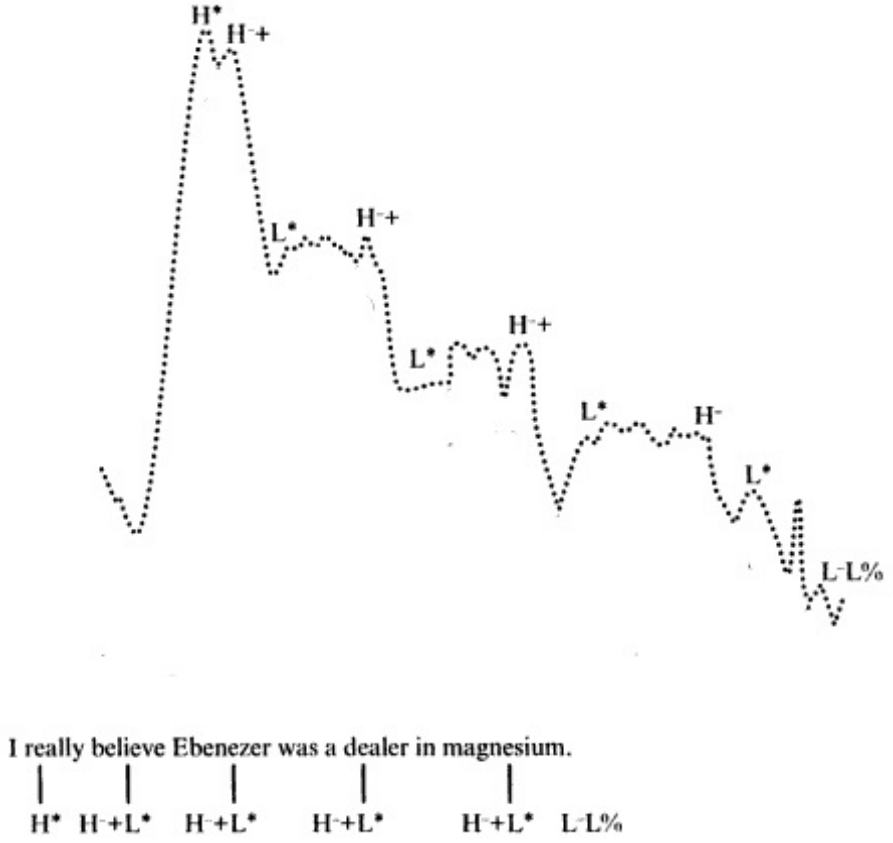
syllables or edges of prosodic domains. There are two main types of intonational tones in autosegmental theory: *pitch accents*, which are prominence lending pitch excursions associated with metrically strong syllables, and *boundary tones*, which are associated with edges of larger prosodic domains such as intonational phrases. A subtype of the latter, *phrase accents*, consists of boundary tones which are associated with the edges of shorter prosodic domains such as phonological phrases. In Standard English, stressed syllables bear a pitch accent. Standard English also has two subtypes of boundary tones: phrase-accents that are associated to phonological phrases and intonational boundary tones that attach to intonational phrases. In this dissertation, I will treat the term 'pitch accents' as associated with the domain of the prosodic word, the term 'phrase accents' as being associated with the phonological phrase, and the term 'boundary tones' as being associated with the intonational phrase. In Standard English, these three types of tones are realized in different ways, shown in figure 5 below.

Figure 5: Boundary tones, pitch accents and phrase accents in Standard English (Pierrehumbert 1980)



The following sentence 'I really believe Ebenezer was a dealer in magnesium' (modified from Pierrehumbert 1980) illustrates the interaction between pitch accents and boundary tones in Standard English.

Figure 6: Example sentence of pitch accents and boundary tones in Standard English (Pierrehumbert 1980)



In the above diagram, tones that are marked with a star (*) fall on the stressed syllable and tones that lead or trail the starred tone are marked with a raised hyphen ($^{-}$). H* refers to a local peak and L* is a local valley aligned with the stressed syllable. H* and H^{-}+L* are two of a number of pitch accent types in Standard English as illustrated in figure 5. The stressed syllables in each word in the sentence attract a pitch accent. This sentence also showcases downstep, a phenomenon in which a H tone is realized at a

lower pitch than a preceding H tone if a L tone intervenes (Gussenhoven 2004). Downstep has been shown to be part of the phonological phrase domain in Standard English (Pierrehumbert 1980, Gussenhoven 2004), and in more recent notation it is marked with an exclamation point (e.g. !H is a downstepped H tone). It is possible to have multiple downstepping in the same utterance and each such downstep has a persisting effect on the pitch range of the utterance. In this sentence, we see downstep occur three times, on the H tone in 'Ebenezer', 'dealer' and 'magnesium'. The sentence ends with a boundary tone L%. As boundary tones affect the right edge of the intonational phrase in Standard English, it is realized on the rightmost edge of the sentence.

§1.7 Framework of Dissertation

Using the prosodic framework laid out in this chapter, Chapter 2 provides the reader with a background literature of work that has been done on these three different prosodic layers in Singapore English. First, in Section 2.1, I look at the prosodic word in Singapore English, covering both the word stress and word tone approach to lexical word prosody in Singapore English. This is followed by the section on the intermediate or phonological phrase in section 2.2, a level which I argue does not exist in Singapore English. In Section 2.3 on the intonational phrase, I examine issues in the literature that have been identified on this level, including utterance-final syllable lengthening, sentence-final tones, information structure and sentential prominence. Each of these sections will detail the research that has been done on these respective phonological domains. I end Chapter 2 with Section 2.4, in which I identify the outstanding issues and research questions that I address in this dissertation.

Chapter 3 focuses on the prosodic word in Singapore English. Section 3.1 looks at the syllable while Section 3.2 looks at word tone, a feature of the prosodic word in Singapore English. Section 3.3 and 3.4 presents the formal analysis of the prosodic word structure while 3.5 shows examples that illustrate this analysis. Section 3.6 demonstrates a study on function word tone that looks explicitly at

how the prosody of different function words work within the framework of the prosodic word structure. Section 3.7 provides additional cases that do not fall within this default word-tone framework, and 3.8 gives us a summary of the chapter.

Chapter 4 moves one prosodic layer higher to look at the intermediate phrase. Section 4.1 looks at the literature and evaluates whether there is indeed a prosodic layer between the Prosodic Word and the Intonational Phrase. Sections 4.2 and 4.3 present an experiment aimed at locating downstep, a phenomenon that has been noted to be part of the Accentual Phrase, which has been equated to the Phonological Phrase in Standard English (Pierrehumbert 1980, Gussenhoven 2004). The presence or absence of downstep is part of the overall picture of the phonological structure that has not been previously explored.

Chapter 5 looks at the largest prosodic unit in terms of the prosodic hierarchy, the intonational phrase. In Section 5.1 I present results from an experiment that looks at the initial pitch boost in intonational phrases in Singapore English and see how this pitch boost affects function words and lexical words. In Section 5.2 I show the effects of intonation on the final syllable of the intonational phrase and discuss the different types of intonational contours present in Singapore English. In Section 5.3, I present a discussion on the tones of final particles in Singapore English. 5.4 presents a summary and formalization of the intonational phrase.

Chapter 6 postulates how various aspects of Singapore English prosody might have originated. In this chapter, I recount the history of Singapore English and list the possible influences that might have led to the development of the current day prosodic structure. Chapter 7, the final chapter, provides a summary and conclusion of the dissertation.

§2 A Review of Singapore English Prosody

In this chapter, I will review the literature on the prosody of Singaporean English. First, in Section 2.1, I look at the prosodic word, in particular word stress in Section 2.1.3 and word tone in Section 2.1.4. In Section 2.2, I argue for the lack of evidence for an intermediate prosodic domain in Singapore English, in light of the limited previous research on the topic. In Section 2.3, I focus on the intonational phrase as well as features of the intonational phrase in Singapore English, including rightmost prominence in Section 2.3.1, sentence-final particles in Section 2.3.2, information structure in Section 2.3.3 and sentential prominence in Section 2.3.4. Finally, in Section 2.4, I identify the outstanding issues and research questions that will be dealt with in the remaining chapters.

§2.1 Segmental Phonology

In this section, I will briefly lay out the key aspects of Singapore English segmental phonology that are possibly relevant to the study of its prosodic system. Firstly, Singapore English has been noted to have a vowel inventory consisting of six vowels (i, u, ɛ, ə, ɔ, ɑ) excluding diphthongs (Bao 1998). Bao also notes that these vowels do not contrast for length (e.g. i: and ɪ have no distinction). Therefore, there is no distinction of tense-lax vowels nor vowel length in Singapore English.

In terms of consonants, Bao (1998) states that while the consonant inventory is the same as Standard English phonemically, the phonetic realization is different from Standard English. For example, initial plosives are unaspirated (making 'park' and 'bark' near homophones with the only difference between the two being a slight change in voice onset timing) (Low and Brown 2005). /θ/ and /ð/ are realized as [t] and [d] respectively in initial position and [f] and [v] in word final position. There is also devoicing of consonants in coda position (e.g. bags is realized as [bɛks]), as well as plosive deletion in coda clusters (these two processes will be looked at in detail in section 3.1). Other

properties include the lack of syllabic consonants resulting from the lack of /ɹ/ in coda position and the omission or vocalization of /l/ in coda position (e.g. 'little' can be pronounced as [litə] or [litəu] (Low and Brown 2005).

§2.2 Word Prosody

In this section, I will look at the background literature on prosody at the word level in Singapore English. It is essential to point out from the onset that studies on word level prosody in Singapore English have been divided into two main streams: word stress and word tone. Initial literature on Singapore English has concentrated on the topic of word stress, but more recent studies have shifted focus to word tone. I will lay out the literature on word stress first before delving into word tone.

§2.2.1 Word Stress and Standard English

Standard English is noted to be a stress language – that is, every lexical word – noun, verb, adjective or adverb has a stressed syllable. In this proposal, I will refer to word stress as *stress*, and the term used instead to convey the idea that a certain element in the word or phrase stands out will be *prominence* (e.g. *phrasal prominence*, or *sentential prominence*). Stress is a property of the syllables in the word (Hayes 1995:49), and is a way of expressing the foot structure of the language (Gussenhoven 2004:15). When more than one syllable bears stress, one of these stresses will be the main stress, and the others subordinated (Giegerich 1992). In acoustic terms, stressed syllables in English have a relatively greater loudness, increased duration, and a change of pitch. As demonstrated in section 1.6, stressed syllables in English attract and often bear pitch-accents. English is a *stress-timed* language (i.e. there is approximately the same amount of time between syllables receiving primary stress regardless of the number of intervening syllables). The main function of stress is its syntagmatic role in connected speech parsing. Another feature of Standard English is that it is an intonational language (e.g.

Gussenhoven 2004:296). Stress remains a word property, but pitch accents and boundary tones align to sentences and phrases rather than individual words or segments. An important aspect of Standard English is that, in addition to the presence of rhythmic stress, there is also contrastive lexical stress placement (e.g. there is a difference in phonetic realization between 'cóntrast' and 'contrást'). Crucially, in Singapore English, there is no contrastive lexical stress placement (i.e. 'cóntrast' and 'contrást' are pronounced exactly the same way). In addition, I will demonstrate in this section that there is no evidence that Singapore English possesses delimitative or rhythmic stress.

Because Standard English contains stress, most of the literature on Singaporean English prosody has started with the assumption that Singaporean English is a stress language. However, due to the obvious differences and perceived dichotomy between British English and Singaporean English prosody, much of the literature on Singaporean English word prosody focuses on comparing the differences between these two varieties of English. Linguists have been trying to pinpoint exactly why Singaporean English is as unintelligible prosody-wise (keeping lexical items constant) as it is to speakers of standard varieties of English. The earliest work on Singaporean English in a contemporary linguistics framework (Tongue 1979) makes judgments on Singapore English based on British English speakers' impressions and perceptions of Singaporean English. Phonological factors that have been identified to hamper intelligibility include (a) absence of a nuclear syllable, (b) unexpected stress placement, (c) lack of de-stressing, (d) unexpected high-level tone (Date 2005:175).

§2.2.2 Syllable Timing

One of the experiments that have been conducted across British English and Singapore English has been to test the differing rhythm of the two varieties. Before delving into further detail here, it has to be pointed out that the dichotomy between the terms syllable-timed and stress-timed systems is one that is not clear-cut, and various researchers such as Roach (1982) have not been able to find a clear

quantifiable dichotomy between the two terms. Miller (1984) proposes that there is rather a continuum of syllable and stress timing rather that a distinct cut-off point. An interesting thing to note here is that languages without word stress are syllable-timed by definition (since they can't be stress-timed), but languages with stress can either be stress-timed or syllable-timed. However, syllable-timed stress languages (like Spanish) are rare cross-linguistically, so it would be surprising if Singapore English fell into this category.

Low (1994, 1998), Low & Grabe (1998) and Low et al (2000) tested the claim that Singapore English was syllable-timed, as opposed to British English, that is described to be stress-timed. Low et al (2000) compared the rhythm of Singapore and British English using two types of acoustic measurements: a variability index reflecting changes in vowel length over utterances and measurements reflecting vowel quality. They provide acoustic data which show that successive vowel durations in Singapore English are more equal than in British English, supporting the hypothesis that Singapore English is 'syllable-timed' while British English is 'stress-timed'. Results have consistently showed that the rhythmic timing of Singapore English is syllable-timed. This conclusion was also drawn by Ling (2006), who demonstrated that Singapore English has equality in timing between syllables while stress-timed languages have equality in timing between stresses. Deterding (2001) extended Low's (1998) methodology to the conversational speech of 12 speakers and measured the variability in timing across syllables and found the same results. He came to the conclusion that Singapore English was syllable-timed rather than stressed-timed, based on the fact that there was a significant difference in the syllable-to-syllable duration between British English and Singapore English. He also found that there is a much greater incidence of reduced syllables in British English, which might account for the difference in rhythm in both languages. Bao (1998:167) states that syllable-timing is a feature 'not only characteristic of Colloquial Singapore English, but of most new varieties of English'. He claims that this specific effect

comes from the 'substrate influence' of Chinese, which is a syllable-timed tone language. Deterding (2007) notes that a syllable-based rhythm makes it hard to determine which syllable within a word carries stress in Singapore English (2007:32), which hints that Deterding himself finds it difficult to ascribe a stress system to Singapore English.

A topic inherently related to syllable-timing in Singapore English is the subject of reduced vowels. Standard English reduces vowels to schwa in unstressed syllables. However, there is a notable lack of reduced vowels in Singapore English speech (Deterding 2005, 2007). Deterding (2005) finds that schwas in Singapore English do not pattern like either British or American English. Singaporean English speakers often have full vowels where Standard English would have a reduced vowel (such as in 'absorb' and 'adventure'). Deterding (2007) shows that even function words (80 per cent of the words that were tested), words that are regularly reduced in Standard English, surface with a full vowel rather than a schwa. The lack of schwas and regular occurrence of full vowels rather than reduced vowels is not unique to Singapore and occurs in the Englishes throughout South East Asia as well as India, China, the Caribbean and West Africa (Deterding 2007).

§2.2.3 Word Stress in Singapore English

As we have seen in the previous section on syllable timing, Singapore English word prosody is syllable-timed and does not reduce its vowels the same way that Standard English does, making it unlikely that Singapore English is a stress language. Despite this fact, most studies on word-level suprasegmentals in Singapore English have treated Singapore English as a stress language. One of the earliest studies that regarded Singapore English as a stress language include Tongue (1979:33-38), who claimed that stress placement was different in Singapore English and British English.

More recent studies that examine stress in Singapore English are not able to systematically locate patterns of stress. Deterding (1994) stated that 'it is certainly not true that all syllables have an equal degree of stress in Singapore English' (1994:63) and noted that most function words might be treated as unstressed, whereas content words tend to be stressed. He found that both syllables of disyllabic content words as well as all syllables of some trisyllabic words 'seem to have about an equal degree of prominence', which led him to conclude that 'both syllables might be regarded as stressed' (1994:64). In four syllable words such as 'accessible' (Deterding 2007:32), he noted that there is approximately equal stress on all four syllables. Function words, on the other hand are generally unstressed (such as 'of', 'they' and 'the') but there are systematic exceptions such as the demonstratives 'these' and 'this' (Deterding 1994:64), and sentence-final pronouns such as 'me', 'them' and 'him' (Deterding 2007:34, Levis 2005).

Another attempt to define phonological rules for stress placement in Singapore English is found in Bao (1998). He proposes that the following rules can mostly account for stress placement in Singapore English:

Figure 7: Rules for stress placement in Singapore English (Bao 1998:169)

(i) Heavy syllables (defined as containing a long vowel/diphthong/coda) are stressed

(ii) Stress occurs on alternate syllables

(iii)If a word has more than one stressed syllable, the last one carries the primary stress

However, even in his short list of examples, there were a number of words that do not comply with these rules, and Bao acknowledged that other rules would be needed to account for them. Bao (2003:31) further notes that if the last syllable is heavy, it is stressed; otherwise the penultimate syllable

is stressed. However, it is unclear what causes a syllable to be 'heavy', as he states that words such as 'abacus' are stressed on the second syllable.

An experiment that involves the perception of prominence by Singapore English speakers was carried out by Tan (2005), who asked British English speakers and Singapore English speakers to identify the prominent syllable in the word. Results showed that there was a tendency for British English listeners to perceive prominence on the word-initial syllable, while Singapore English speakers performed radically different, perceiving prominence on the word-final syllable. This perception of prominence on the word-final syllable persisted even when 'this broke the rules of English stress placement' (Tan 2005:98). Low (2000) ran an experiment on whether Singapore English speakers distinguish between compound and phrasal stress in speech, and found that Singapore English speakers do not assign different stress patterns to compounds and phrases. Thus, Singapore English speakers are unable to tell the difference between an ENGlish teacher (someone who comes from England) and an English TEACHer (someone who teaches English) through prosodic cues alone (Low and Brown 2005:154). Thus, in general it seems that in lieu of a stress-based Standard English word prosody, Singapore English speakers subscribe perceptually to a prosodic system that is categorically different.

The evidence that casts doubt upon the existence of stress in Singapore English, includes the inability to systematically locate a stressed syllable in speech, the inability of speakers to perceive stress cues, as well as the fact that Singapore English is syllable-timed and rarely reduces syllables. A further argument against the existence of stress is the lack of consensus in the literature on Singapore English stress as to the acoustic properties of stress (i.e. what acoustic feature causes a word or syllable to be 'stressed'). In fact, British English has often been the point of comparison in determining whether something is 'stressed' or not. Tay (1982) and Yeow (1987) have noted that 'pitch is not an important correlate of stress in Singaporean English' (Tay 1982), and that only loudness and length are phonetic

indicators of stress (a stance also taken by Bao 1998 and Tan 2002:257). In contrast, Low (1998) comes to the conclusion that syllables with high pitch are stressed.

To further complicate matters, Singapore English stress has been noted to be weakly marked (Brown 1988, Low et al 2000). In addition, some researchers occasionally use the term 'stress' to refer to sentential stress or the focused element within the sentence rather than to refer to word-level stress, whereas 'focus' would be an apter term. Thus, the literature on Singapore English stress is divided as to what determines prominence in the word, and the only perception study of stress, Tan (2005) is not directly tackling the question of phonetic properties that speakers perceive as correlates of stress.

Although there is scant evidence of stress, there is a word final prominence consistently mentioned in the literature on Singapore English. It has been argued that 'stress placement in Singapore English moves toward the end of the word' (Bao 2003) and that speakers usually stress the final syllable of the word, such as 'carefully' and 'hopefully' (Low and Brown 2005). Tan (2005) has also shown that there is a very strong tendency for Singapore English listeners to identify the last syllable in a word as being prominent. Furthermore, many other researchers have claimed that Singaporean English speakers place stress on a later syllable in the word than British English (Tongue 1974, Platt and Weber 1980, Tay 1982, Deterding 1994). This final prominence has been shown to be consistent across lexical categories. For example, 'convert' has a 'stress' on the second syllable for both noun and verb forms of the word (Ling 2006). Bao (2003) has claimed that the tendency to move stress toward the end of the word is due to heavy syllable weight, though this obviously does not apply to all words. Bao (1998) has also shown that in two-word compounds, the stress falls on the second word, such as in 'leather shoe' and 'White House', which contrasts with British English (Bao 1998:172). Therefore, from both acoustic and perceptual studies, it seems that in lieu of a systematic stressed syllable within the word, there is instead a heightened prominence of the last syllable in the Singapore English word.

As we have seen in this section, there is substantial evidence against the existence of stress in Singapore English. Firstly, syllables are of equal prominence within the word, except for when the last syllable of the word is perceived and produced as prominent (I will demonstrate in the next section that this could be due to the existence of a H tone on the final syllable). Secondly, it has been shown from multiple experiments and studies that Singapore English speakers do not subscribe to 'prescribed' Standard English stress patterns. An analogy can be drawn to the research on stress in Malay, where researchers initially assumed that Malay words contained stress due to emphasis on the penultimate syllable (Don, Knowles and Yong 2008). The Malay word has two main prosodic properties that have been assumed to be correlated to stress: the lengthening of the final syllable and a high pitch towards the end of the word. However, there are no other obvious variations in vowel quality that could be attributed to stress, and schwas are realized normally as part of the vowel system rather than reduced due to stress. Don, Knowles and Yong (2008) conclude that 'there are no phenomena in spoken Malay corresponding to what phonologists call stress, and that the whole notion of stress is completely irrelevant in the description of Malay'. They further note that 'the pitch may go up down, loudness and tempo may increase or decrease, and on occasion the effect may be superficially similar to that produced by stress in a language like English; but these phenomena are all accounted for independently of stress'. Although Malay and Singapore English are obviously two separate languages and the presence of stress in one language has no necessary bearing in the status of stress in the other, it is interesting to note the many parallels in both languages because Malay is the language of the first people who were native to Singapore and different varieties of Malay (including Bazaar Malay, Baba Malay and Standard Malay) have all been in heavy contact with Singapore English at some point in its lifespan.

In the next section, I will describe a prosodic system that appears to be a much better fit for Singapore English than word stress: word tone.

§2.2.4 Word Tone

Deterding (1994) noted that the second syllable of disyllabic words has a higher f0 than the first syllable, leading to the overall auditory impression of a rising tone for the whole word. Singapore English has also been described as a tone language with a series of level tones (Killingley 1968, Bloom 1986:430, Goh 1998, Lim 2004:42), with tones rising from one syllable to the next within the word (Yeow 1987:87, Deterding 1994:66, Tan 1998:29, Wee 2000:67).

However, it has only been in more recent studies (Ng 2008, 2009, Siraj 2008, Wee 2007, 2008a, 2008b, Chow 2009) that the existence of word level tone has been examined in Singaporean English. Wee (2007) himself notes that it is 'quite mysterious' that the presence of tone in Singapore English should have escaped attention for so long. All of the above authors concur that there are three level tones in Singapore English: High (H), Mid (M) and Low (L). Examples of lexical word tone in Singapore English are listed below, from Ng (2008) and Wee (2007):

Figure 8: F0 chart showing the prosodic differences on the same segment (Ng 2008)

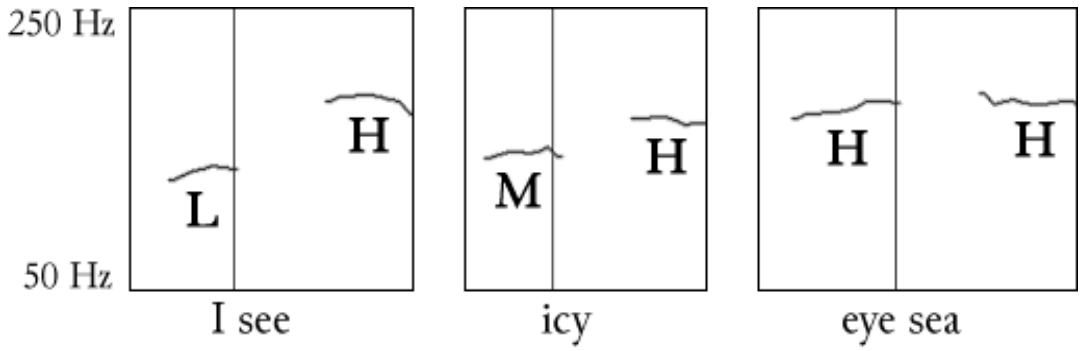


Figure 9: Examples of word tone in Singapore English (Wee 2007[1])

i.	*cat*	[$k^{h}ɛt^{55}$]	v.	*origin*	[$ɔ^{11}.ri^{33}.dʒin^{55}$]
ii.	*intend*	[$in^{11}.t^{h}ɛn^{55}$]	vi.	*original*	[$ɔ^{11}.ri^{33}.dʒi^{33}.nə^{55}$]
iii.	*manage*	[$mɛ^{33}.neidʒ^{55}$]	vii.	*dictionary*	[$dik^{33}.ʃn^{33}.nə^{33}.ri^{55}$]
iv.	*managing*	[$mɛ^{33}.nei^{33}.dʒiŋ^{55}$]	viii.	*originally*	[$ɔ^{11}.ri^{33}.dʒi^{33}.nə^{33}.li^{55}$]

Wee (2007:490) states that except for the tone of the initial syllable, which 'requires some amount of specification', tone assignment in Singapore English is highly predictable. When there is only one syllable (such as in 'cat'), that syllable will have a high tone. When there are two or more syllables (such as 'intend', 'origin' or 'original'), the final syllable again receives a high tone, the initial syllable could be pronounced with L or M, and all intermediary syllables receive a M tone. In summary, the word melody in Singapore English can be prescribed using the following: word-final syllables are pronounced with a high tone, all non-edge syllables are pronounced with a mid-flat tone, and the stipulation of whether the first syllable has a low tone is optional (but where the option lies is still yet to be determined).

In addition, Siraj (2008) states that the following categories of function words receive an L tone by default: auxiliaries, monosyllabic preposition and some bisyllabic ones (e.g. into), expletives, personal and relative pronouns, conjunctions and some clausal connectives (e.g. whereby) and determiners. However, these function words end in a H tone like lexical words when used metalinguistically or in isolation, as these contexts force a prominence onto the word for functional or structural reasons (Siraj 2008).

Although the literature concurs on the general distribution of tones, there remain several points of contention. For example, Siraj (2008) usually transcribes the penultimate syllable of polysyllabic word

[1] Wee (2007) uses tone letters to mark tonal height, with 5 being high and 1 being low.

as H whereas Ng (2009) states that M would be more appropriate (and also much easier to describe) and gives acoustic evidence for this.

A point of contention that is yet to be resolved is that of word tone and stress. Ng (2007) and Siraj (2008) conclude that word tone is stress-dependent, whereas Wee (2007, 2008a, 2008b) and Chow (2009) maintain that the pitch patterns of the lexical word in Singapore English is independent of word stress. In fact, Ng (2008, 2009) bases her word tone analysis on the location of stress within the word:

Figure 10: Word Tone Assignment in Singapore English (Ng 2009)

a. H is assigned to the final syllable of the prosodic word

b. M spans all non-final stressed syllables

c. L is assigned to initial unstressed syllables

d. Remaining unstressed syllables receive M by rightward spreading

However, neither she nor Siraj (2008) gives any acoustic evidence to show that the initial syllable is stressed or unstressed besides the fact that the first syllable sometimes varies between an L and M tone. Since the difference between L and M tones are not perceptibly prominent, this claim needs to be supported by acoustic evidence. If stress is posited only to explain variation between L and M on the first syllable of the word, and there are no other reasons to posit stress due to lack of acoustic evidence, then it is likely that stress does not exist. For example, if we say that 'elephant' (LMH) is different from 'hibiscus' (MMH) because either 'e' or 'hi' is stressed, then it seems like we are positing a hypothetical explanation for a difference that is not even highly significant. Wee (2008b) also notes another problem with this approach. He provides an example: if we assume that M tone is assigned to a stressed syllable, why would stress spread all the way to the penultimate syllable in words such as 'university' (MMMMH)? Furthermore, the definition of stress is that a single syllable in the word is made prominent. If all

stressed and unstressed syllables receive M tone, there would be no way to distinguish a stressed and unstressed syllable.

Chow (2009) explicitly states that there is no acoustic evidence for stress within the lexical word prosody of Singapore English. The acoustic production study carried out by Chow (2009) employed a word list which contained words that contrasted in primary stress location in Standard English, such as 'giant' and 'today', and was specifically designed to test if Singapore English speakers utilized the same stress system as Standard English. Results showed that the position of the Standard English stressed syllable did not have any impact in terms of tone assignment, which was always a H tone on the last syllable. Additionally, trisyllabic words differed in terms of position of the prosodically prominent syllable (for example, the second syllable of the word 'energy' has the highest intensity and duration while the third syllable of the word 'employee' has the highest intensity and), but crucially they still have the same pitch pattern (LMH). In Standard English, syllable weight and stress are correlated, which means that the prosodically prominent syllable in the word is almost always the syllable that is pronounced with a high pitch. In Singapore English, this is not the case, and word tone and syllable length do not seem to correlate. It appears that duration is dependent on segmental properties of the syllables themselves, while pitch is dependent on the prosodic system of word tone. Since pitch and length do not correlate, they should be independent of each other, and thus tone should not be sensitive to syllable length or weight. Wee (2008b) carried out an informal study with similar goals (i.e. to test whether tone is dependent on stress). Although only two participants were tested, the test yielded similar results in the respect that pitch patterns are independent of syllable length. The results from Chow (2009) also showed Singapore English speakers exhibit no tendencies to group syllables in binary patterns (i.e. no evidence for binary feet). Further evidence for the lack of stress comes from the

fact that there are no unreduced vowels (including schwa, which is fully realized) and the fact that there are no segmental processes sensitive to stress.

To recapitulate from the previous section on lexical word stress, there have been a large number of studies looking for lexical word stress in Singapore English but they were unable to pinpoint its existence. In addition, Singapore English is syllable-timed, does not exhibit reduced vowels, and all non-final syllables are of similar prominence, and these are not traits commonly found or expected in a stress language. Across all these studies, there is also a lack of acoustic evidence that stress is present on specific syllables within the word in Singapore English. Therefore, I will assume in this dissertation that there is no system of stress (in the definition in which it applies to Standard English) in Singapore English.

On the other hand, various studies have found word tone in Singapore English. This word tone is not lexical, but is assigned suprasegmentally on the prosodic word in Singapore English. H tones are assigned to the right edge (final syllable of the lexical word) of the prosodic word. Intermediary syllables are generally agreed to receive an M tone (I will argue in Chapter 3 that the M tone is not specified but interpolated from intermediary tones). A remaining point of contention in the literature is the debate as to why some words exhibit an LMH pattern while others have an MMH pattern. Ng (2008, 2009) and Siraj (2008) have claimed that this is due to stress, but there is no acoustic evidence to back up this claim, but rather evidence against it. From acoustic experiments carried out by Chow (2009) and Wee (2008b), it appears that the word tone assignment is most likely independent from a stress system, if one is present at all. This will be further addressed in Chapter 3.

As for function words, they have been categorically assumed to be pronounced with an L tone. I will show in section 3 that this is not the case, and that there are different categories of function words

that have not been yet presented in the literature. A third category of words that have also been rarely discussed are borrowings that do carry lexically specified tone, the topic of the following section.

§2.2.5 Vestigial lexical tone

Another aspect of Singapore English word prosody that has been mentioned in Chow (2009, 2011) is fixed lexical tone on borrowings from other languages spoken in Singapore such as Cantonese and Hokkien. These words are the only lexical words in Singapore English that do not follow the expected L(M)H pattern, but instead have their own lexically-specified pitch, such as the examples below:

Example (1): Singapore English borrowings from Hokkien

‘paiseh’ (to feel ashamed)	‘chin chai’ (easygoing)	‘pek chek’ (frustrated)
/pʌɪseɪ/	/tʃɪn tʃʌɪ/	/pɛk̚ tʃɛk̚/
LH L	H HL	H L

In the examples above, ‘LH’ refers to a rising tone (following autosegmental theory) and ‘HL’ refers to a falling tone. We know that these borrowed words have a lexically specified tone because they do not follow the regular or default pattern of word prosody that we have discussed above (i.e. there is no H tone anchored to the last syllable of these words). It is important to note that not all speakers might pronounce these lexically-specified tones, especially Malay or Indian Singaporeans. Yet, ethnic Chinese, who constitute the majority of Singapore English speakers, accommodate and retain the tonal identity of a number of such borrowings from Hokkien, Cantonese and Mandarin Chinese words. There is a possibility that speakers of Singapore English might be code-switching when using these words, thus switching over to a different prosody when uttering them. However, the majority of Singaporeans no longer speak Hokkien or other Chinese dialects (except for Mandarin) as their native language, yet these words have been incorporated into Singapore English with fixed tones. Furthermore, these are often-

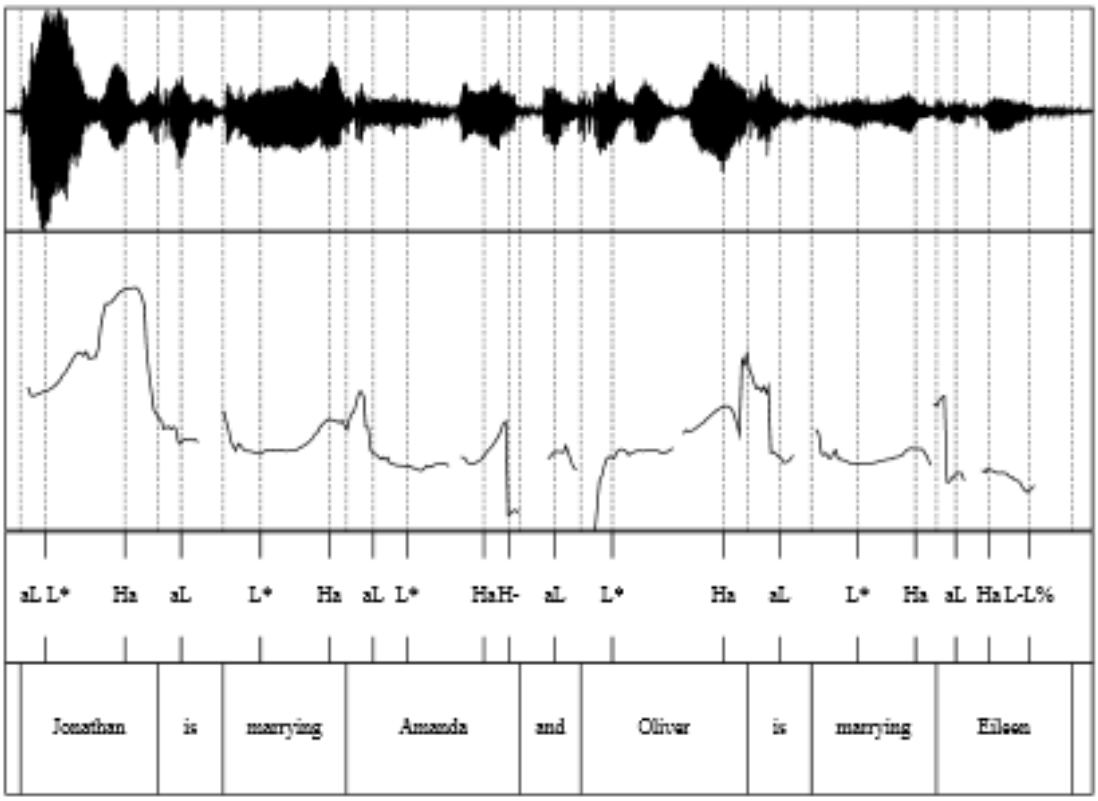
used Singaporean words and understood by any speaker of Singapore English, regardless of native language or ethnic group. Thus, even though there are only a handful of words that preserve lexical tone in Singapore English, the intonational structure of Singapore English would have to accommodate the possibility of these vestigial tones. I will demonstrate these vestigial tones in Chapter 4 when incorporating these tones into the overall intonational structure.

§2.3 *Intermediate or Phonological Phrases*

The next level of the intonational structure of Singapore English to be explored is the intermediate phrase or phonological phrase level. In accordance with the Prosodic Hierarchy, the Intermediate Phrase or Phonological Phrase is a domain that falls between the Prosodic Word and the Intonational Phrase. The existence of phonological or intermediate phrases in Singapore English is an area of research that has been relatively less described until recently, and as we will see in this section, an area in which no conclusive results can yet be drawn.

Chong (2013) argues for the existence of an intermediate phrase with the following sentence:

Figure 11: Jonathan is marrying Amanda and Oliver is marrying Eileen (Chong 2013)



In the example above, Chong argues that there are accentual tones located at 'is', 'and' and 'is'. He argues that these accentual tones mark accentual phrases and that words after the accentual tone (i.e. the beginning of new intermediate phrases) have a pitch reset (e.g. 'marrying', 'Oliver' and 'marrying' in the above example). However, this pitch reset, even in the examples he provides, isn't apparent from the pitch curves provided. For example, looking at Figure 11 above, there does not seem to be pitch reset for the words 'marrying', 'Oliver' and 'marrying', the words that he claims should exhibit pitch reset following the end of the intermediate phrase. Chong and Sneed (2015) have a follow-up study in which they try to identify the presence of an accentual phrase in Singapore English. This experiment aimed to locate acoustic evidence for accentual phrases by testing the following three sentences:

Figure 12: Different sentence conditions testing for phrasal boundaries (Chong and Sneed 2015)

He said he will (IP-final)

He said he will tomorrow (AP-final)

He said he will go tomorrow (Word)

The study measures the duration of the word 'will' in 3 prosodic domain-final positions. Results show that IP-final, AP-final and non-final words all have different vowel durations. However, there are two issues with this study. Firstly, in the AP-final condition, 'will' could possibly be in an IP-final position as 'tomorrow' could be construed as a separate IP. Secondly, use of the word 'will' in the study is problematic as 'will' can be pronounced as both a function word and a lexical word. In the sentences above, 'will' in AP-final position is a lexical 'will' while 'will' in non-final position is a function word. Therefore, the differences in duration could be due to a function-lexical word contrast. Interestingly, this study claims that this AP is 'unlikely' not an intermediate phrase, contrary to Chong (2013), and this hints that there might not be intermediate phrases in Singapore English after all.

Thus, due to the 'equal placement of stress' on all syllables in the Singapore English utterance, there does not currently appear to be phonetic evidence for an intermediate or phonological phrase in Singapore English. In addition, there are no segmental phonological processes that apply across the boundaries of the Prosodic Word; i.e. all phonological processes seem to be contained within the Prosodic Word in Singapore English. Therefore, there is currently no evidence for an intermediate level prosodic phrase that exists above the level of the prosodic word and lower than the intonational phrase. In summary, although there has been effort to locate phrases in between the prosodic word and the intonational phrase, there still does not seem to be any convincing evidence of an intermediary phrase in Singapore English. Chong (2013) and (2015) come the closest to identifying phrasal boundaries in

Singapore English, but there is still no concrete acoustic proof of boundary lengthening or accentual tones in Singapore English.

§2.4 The Intonational Phrase

§2.4.1 Rightmost Prominence

Standard English intonational phrases have been noted to possess a single 'nucleus' (e.g. Cruttenden 1997) on which a 'pitch accent' (e.g. Gussenhoven 2004) is imposed suprasegmentally. The nucleus is usually the most prominent syllable within the intonational phrase on which the pitch movement takes place, and this pitch movement on the accented syllable conveys the intonational meaning of the phrase. Deterding (1997) utilized the framework of Standard English intonation to search for intonational groups with a tone anchored on a nucleus in Singapore English. He factored in the possibility that 'such a nucleus may be cued differently from that of British English' (Deterding 1997:62). However, he did not find any evidence for a 'nucleus' in Singapore English, and could not 'identify any one word per intonational phrase that is more prominent, or that anchors a tone for the whole phrase'. He comes to the conclusion that 'the underlying system for the great majority of utterances is that there is not one syllable or word, a nucleus, that clearly acts as the focus of information as a result of the intonational contours' (Deterding 1997:65). Low and Brown (2005) also attempted to apply a British English framework to analyze the intonation of Singapore English utterances, and similarly concluded that such an approach was not fruitful due to the following reasons: (1) the identification of stressed syllables was problematic since virtually all syllables exhibited some form of prominence; (2) Accents were very difficult to identify as many of the syllables exhibited some form of pitch movement and/or prominence; (3) the identification of the nucleus as the syllable displaying the highest pitch prominence was impossible as there was no way of telling which of the pitch prominent syllables was the most prominent. In summary, researchers have concluded that due to the 'equal placement of stress' on all

syllables in the Singapore English utterance, there is no 'stress' or intonational nucleus on the level of the intonational phrase.

In addition, the utterance-final syllable in the Singapore English intonational phrase has been noted as being exceptional in length. Goh (2005:105), from her investigations into the discourse intonation patterns of Singapore English, points out that prominence is assigned to the last word in the intonational phrase. Low (2000) investigated the claim that there was utterance-final syllable lengthening, and demonstrated experimentally that there is significantly more lengthening in utterance-final position. A similar experiment was done by Low and Grabe (1999) comparing stress placement in Singapore English and British English, with the conclusion that Singaporean English speakers place more emphasis utterance-finally. Along the same lines, Deterding (2007:38) states that 'there is a tendency for the final syllable of an utterance to be dragged out' before a pause or the end of the utterance. He observes that this final lengthening is similar to a pattern that occurs regularly in Malay, the language that he suggests might have imposed a greater prosodic influence over Singapore English than Chinese.

In many other East Asian and South East Asian languages, the last syllable of the intonational phrase has been shown to be more susceptible to intonational variation than the rest of the utterance. Fox, Luke and Nancarrow (2008) have shown that there is an intonational effect on utterance final tones in Cantonese. Brunelle, Ha and Grice (2009) make similar observations about Northern Vietnamese, noting that even if intonational variation can be realized over the entire sentence, it tends to be stronger at the right edge, where lexical tones can even be masked by modality and attitudinal effects. Pittayaporn (2007) shows similar results in Thai, demonstrating that lexical tones and boundary tones are in competition and that only one can be realized. This effect has also been shown in Kammu (Karlsson et al 2012). The common thread in these results and across these languages reveals that even

in lexical tone languages, intonation plays an effect in altering the tones of utterance-final particles, and it is the final syllable of the utterance which is most influenced by intonational effects.

§2.4.2 Sentence-Final Particles

Another related factor that has to be considered when looking at the communicative function of intonation of Singapore English is its particles. The pervasive usage of pragmatic particles in everyday speech is a hallmark of everyday Singaporean speech. These pragmatic particles carry discourse pragmatic meanings and occur at the end of intonational phrases. In addition, these particles are always monosyllabic and may not co-occur with other sentence-final particles (Wee 2003).

The topic of sentence-final particles is a varied and much-discussed one, with most literature on the topic discussing the origins and semantics of the different particles. In terms of prosody, it has been suggested that these particles carry lexical tone (Kwan-Terry 1978, Loke and Low 1988, Platt 1987, Lim 2004). Loke and Low (1988) identify nine tonal variants of '*la'*, falling into three major groups – in contrast with Kwan-Terry (1978), who identifies two tonally distinct '*la's*. A question that has been posed in the literature (Platt 1987, Lim 2004: 48) is whether the particles have an independent lexical tone and/or whether they are the nuclei of their respective tone units and therefore carry the major pitch movement (in other words, whether the tone on the particles is due to lexical tone or intonation). The question of whether this tone is lexical or intonational will be discussed in detail in Section 5.3.

In regards to origin, Gupta (1992b) proposes that all particles in Singaporean English come from Southern varieties of Chinese such as Hokkien, Teochew and Cantonese. Lim (2007, 2011) argues that the tonal aspect of particles in Singapore English can be mostly attributed to Cantonese, since it has a system of final particles most similar to Singapore English and since a large number of particles can be

shown to have been borrowed from Cantonese. However, the particles in Singaporean English are not all direct borrowings from Chinese languages, as the most commonly used particle 'lah' /la/ has roots in Malay. Furthermore, there are particles in Singaporean English that do not originate from the surrounding Singaporean languages that influence it. Wong (2005) illustrates this with the particle 'one' that presents information that the speaker confidently knows. Although this particle has semantic counterparts in Chinese, 'one' is clearly an English word. 'One' occurs 'at a very high frequency' in everyday informal speech in sentences such as 'Things always disappear here one', 'Last time sure a lot of lover one' (Wong 2005:251). Wee (2003) also traces the relatively recent birth of the particle 'know', which he argues has evolved from English 'you know', and this particle has no counterpart in Chinese dialects. For example, he shows the parallel between 'The coffee very hot, know' and 'The coffee very hot, you know', and shows that the usage is almost exactly identical, except that 'know' is restricted to the final position, and may never co-occur with other particles whereas 'you know' has no such restrictions.

In regards to the semantic properties of particles, studies have reported that the particles can be organized along a scale of assertiveness (Gupta 1992b) and how they reveal different reactions to a proposition (Wong 1994). The important thing to note here is that these particles are grammatical (i.e. they do not have a lexical meaning), similar to pragmatic particles such as 'man' in American English, and they express attitudes such as disbelief (eh), surprise (meh), agreement (hor), contradiction (lah). Since our focus in this dissertation is on the intonational properties of particles, I will not discuss the semantic aspect of particles in further detail.

§2.4.3 Old versus New Information

In Standard English, prosodic focus or sentence-level prominence is given to new information (e.g. Selkirk and Kreitzer 2010, Katz and Selkirk 2011). Again, Singapore English does not seem to follow

Standard English in this respect. In contrast to Standard English, prosodic focus on new information appears to be variable. According to Lim (2004), there are instances occurring in Singapore English conversation in which new information is made prominent (through varying loudness and pitch). However, there are also instances in which new information is not made prominent but phrase-final words are acoustically emphasized instead (Lim 2004:49-51). That last scenario is also attested by Ling (2006) who demonstrates that it is the last syllable of a sentence that tends to be made prominent in pitch and duration. For example, the word 'car' is pronounced with the most prominence (pitch and duration) in every sentence, as opposed to British English (BrE) in the following example:

Figure 13: Difference in prominence between British English and Singapore English (Ling 2006)

BrE: A: I need to borrow your CAR.
B: WHICH car?
A: Your NEW car.
SgE: A: I need to borrow your CAR.
B: Which CAR?
A: Your new CAR.

More evidence that there is no added prominence to new information comes from studies that have looked at the lack of de-accenting in Singapore English (Low 1994, 1998, Deterding 1994, 2007) in comparison to British English. Low (1994, 1998) used the sentence 'I wonder why Chinese girls are better speakers than Chinese boys' to prove this claim. 'Boys' is a new lexical item which contrasts with 'girls', and should in theory be accented. However, Singapore English speakers give equal prominence to both 'girls' and 'boys', demonstrating that Singapore English speakers do not make a prosodic distinction between old and new information (as opposed to British speakers).

This lack of prosodic focus can also be seen in a study of elicited utterances carried out by Lim and Tan (2001) in which responses were triggered by three different questions below that aimed to elicit a prominence contrast from speakers.

Figure 14: Sentences designed to elicit focal difference (Lim and Tan 2001)

Which cake do you want?
I want the LEMON cake.
You want the banana cake?
I want the LEMON cake.
Which lemon product do you want?
I want the lemon CAKE.

In the above setup, the word in capital letters was supposed to be made prominent (as in Standard English). Results showed that Singaporean English speakers pronounced 'lemon cake' the same way in all instances. However, older speakers of Singapore English seem to have retained this prominence contrast (Fong and Lim 2000). Brown and Deterding (2003:10) also note that Singapore English does not place any acoustic prominence on contrasted items in the sentence. They note that while in Standard English there is always a nuclear syllable or word that carries the greatest prominence in the sentence, there is often no such syllable or word in the Singapore English sentence. In contrast to Standard English, syllables in the Singapore English sentence can all be equally prominent.

In addition to this lack of nuclear prominence, Singaporeans differ by ethnic group in terms of what they find prosodically prominent. From highly-controlled elicited perception data (Lim and Tan 2001, Tan 2001), Chinese Singapore English seem to rely on loudness and length, while Indian Singapore English relies on pitch and loudness and Malay Singapore English relies on all three parameters. Furthermore, Chinese and Malay Singapore English do not distinguish between neutral stress and emphatic stress, but Indian Singapore English speakers do.

In summary, there appears to be a lack of prosodic focus on new information in Singapore English. In addition, Singapore English speakers appear to be insensitive to the Standard English use of prosody at the sentence level for new information.

§2.4.4 Sentential Prominence

Although we have seen from the previous section that there is no evidence of new information focus or any other form of nuclear prominence, there may still be ways to express prominence through prosody in Singapore English. On the level of the intonational phrase, there seems to be an exaggerated raising of pitch at the beginning of an utterance. This 'boosted pitch' (Deterding 1994) or early 'booster' (Low 2000) may possibly be related to emphasis. An example of this 'early booster' is shown below:

Figure 15: Examples illustrating initial pitch boost (Deterding 2007:35)

and actually I would like to visit there one day

basically it's a good combination ah

I think they are quite…nice and interesting magazines

so I guess I will try to go to the park to cycle

In the previous sentences, the underlined words ('actually',' basically' and 'I' in the last two examples) are pronounced with a sharply rising pitch over the entire word (Doyle and Deterding 2005). According to Deterding (2007:35), this causes the words to become 'especially salient', and Deterding also notes that this only occurs early in the utterance as opposed to the final position in British English. Goh (2005) notes that the presence of this booster expands the pitch range of speakers. However, since this prosodic strategy only occurs in spontaneous conversation, the propensity and frequency of usage of this initial pitch boost among speakers and indeed whether it is used by all speakers is yet undocumented. In fact, Deterding (2007) only lists examples from one speaker in the corpus, who produces this boost in sentences with both old and new information and quite often in general. It is also yet to be determined whether this added salience corresponds to prosodic focus or is present in all intonational phrases. Nevertheless, it seems that this is a prosodic strategy available to speakers of Singapore English.

In addition, Singapore English speakers seem to use syntactic fronting as a strategy to lend emphasis or discourse prominence to an object. For example, in the sentence 'Certain medicine we don't stock in our dispensary' (Platt and Weber 1980:73), the object 'certain medicine' moves to the front of the sentence. Another example would be 'This house I like to stay in' or 'This one I like'. Note that there are no commas in these sentences because unlike Standard English, there are no pauses to mark that the object has been fronted. This is a common occurrence in Singapore English and Alsagoff and Ho (1998:148) believe that this is evidence that Singapore English is a topic-fronting language, a claim further backed by Tan (2003) who notes sentences such as 'Model answers they have' and 'Stories I can't remember'.

Although we have seen in the previous section that sentential prominence in Singapore English is optional, when speakers do want to impose prominence on certain words, Deterding (1997) observes that boosts in pitch bring attention to new topics or when a new topic is introduced by the interviewer (Deterding 1997:70). For example, in response to the question 'What school did you go to before the secondary school?', an interviewee responded 'I'm *still* in the Methodist School', with 'still' having a boosted pitch. Brown and Deterding (2003) note that Singapore English speakers are able to make an element in the sentence more prominent through a boost in intensity and pitch range. This emphatic boost can focalize any element in the utterance, including function words. They observe that another difference between Singapore English speakers and Standard English speakers is that while in Standard English, only content words may carry prominence in a sentence, function words such as pronouns may also carry prominence (i.e. receive a boost in intensity and pitch range).

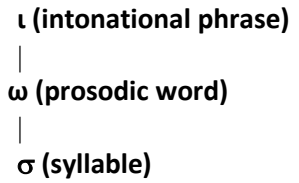
Thus, we see that while sentential prominence is optional in Singapore English, it is possible to express emphatic focus through a boost in intensity and pitch range. In section 3.6 later in this

dissertation, we will see that some function words are also inherently focused and carry an extra-high pitch.

§2.5 Summary and outstanding research questions

In general, we have seen in this chapter that Singapore English prosody is vastly different from Standard English prosody. There are some overall conclusions that we can draw from the properties of Singapore English word prosody: 1. Singapore English is syllable-timed and not stress-timed; 2. There is a lack of reduced vowels in Singapore English speech; 3. There has been no conclusive evidence or argumentation for the existence of stress; 4. There seems to be a consistent rightmost prominence in words, regardless of the position of stress in Standard English. All of these different aspects of Singapore English prosody recognized by previous scholars point to the fact that Singapore English does not have Standard English prosody and does not exhibit properties of a stress language. In addition, I also looked at the different prosodic domains in Singapore English and can summarize the previous findings in the literature in the provisional Prosodic Hierarchy below:

Figure 16: Proposed intonational structure of Singapore English



The three tiers illustrated above, namely that of the syllable, the prosodic word and the intonational phrase, are the only tiers in the Prosodic Hierarchy for which there is concrete phonological evidence. The relative sparseness of the prosodic hierarchy of Singapore English is due to the fact that only prosodic levels that have been shown to exist are illustrated above (following Bickel et al (2009)).

The absence of the mora (if it is indeed part of the prosodic hierarchy) is evidenced by the fact that Singapore English does not distinguish between long and short vowels (e.g. there is no contrast between 'fit' and 'feet') and that there is no evidence for moraic codas. The omission of the foot, a common prosodic domain in other languages, is due to the fact that Singapore English does not contain stress (argued for in section 2.1). In addition, previous attempts to locate binary feet did not yield any findings (Yeow 1987, Chow 2009). The fact that Singapore English is syllable-timed (Low et al 2000, Ling 2006, Deterding 2007) also lends further credence to this.

In terms of the lowest level of the prosodic hierarchy that does exist, that of the syllable, the picture seems to be relatively straightforward. There are a number of segmental processes that take place on the level of the syllable. For example, there is plosive deletion in syllable-final consonant clusters as well as syllable-final (i.e. coda) devoicing (examples of this are provided in section 3.1). In addition, a number of studies have reported that the rhythm of Singapore English is syllable-timed (Low et al 2000, Ling 2006, Deterding 2007), and the literature on intonational tone also informs us that it is the final syllable of the utterance which receives the boundary tone imposed by intonation. Thus, it appears that the syllable is the basic building block of the intonational structure.

Looking further up the tree, we see that the next level of intonational structure that is evidenced to exist is the Prosodic Word. From what we have seen in section 2.1, numerous studies have located the high tone at the right edge of the word (Ng 2008, 2009, Siraj 2008, Wee 2007, 2008a, 2008b, Chow 2009), suggesting the existence of a Prosodic Word domain. I will thus preliminarily sum up the properties of the prosodic word in Singapore English with the following observations (Chapter 3 will provide a formal account for the prosodic word): 1. The Prosodic Word unit consists of a lexical word and clitics; 2. A H tone is associated with the rightmost edge of the Prosodic Word; 3. Function words generally receive a L tone.

That last generalization, however, is something that needs to be addressed more comprehensively. In the literature, function words have been noted to have an L tone (Ng 2008, 2009, Siraj 2008, Wee 2007, 2008a, 2008b, Chow 2009). However, polysyllabic function words are harder to pinpoint and might either have all L tones, such as 'into' (Siraj 2008) or a LH pattern such as 'before' (Chow 2009). In addition, there is an even more fundamental question that needs to be addressed from the onset – which grammatical categories of words are considered to be function words? Do Singapore English speakers have the same grammatical categories as Standard English (i.e. do Singapore English speakers pronounce all non-lexical words with an L tone, or have they reanalyzed certain 'function words' as possessing a H tone)? . Another major question is where function words fit into the overall picture of the intonational structure of Singapore English. Do function words merely cliticize to Prosodic Words, or do they create their own prosodic phrases akin to the Clitic Group (Nespor and Vogel 1986, Vogel 2009), or a slightly different prosodic word similar to a PW' (Peperkamp 1997)? Therefore, an in-depth study and exploration on the prosody of function words is crucial to complete the picture of the intonational structure of Singapore English. This will be dealt with in the Prosodic Word chapter in Chapter 3.

Moving onwards to the next level of intonational structure, the phonological phrase, a larger question remains: is there a level of prosodic phrasing that exists between the Prosodic Word and the Intonational Phrase? At the moment, there is no phonological evidence for an intermediate level of prosodic phrasing, as there are no segmental phonological processes that apply across word boundaries that furnish evidence for the existence of the level of the Phonological Phrase. However, as there has been no convincing study that has pinpointed whether an intermediate level of prosodic phrasing exists between the Prosodic Word and the Intonational Phrase, I will argue in this chapter (Chapter 4) that there is no evidence for any intermediary phrase between the Prosodic Word and the Intonational

Phrase. The level of the phonological phrase has been described in the literature to be one of the crucial rungs of the Prosodic Hierarchy since Nespor and Vogel (1986), so the absence of a Phonological Phrase in Singapore English would provide evidence that not all levels of the Prosodic Hierarchy exist for all languages, along the lines of the framework proposed by Bickel et al (2009). In addition, in chapter 4, I will look at the issue of whether tonal interaction exists in Singapore English and see if specific tone sequences result in any downstep or upstep. Any interaction between tone sequences will give a clue as to whether there are any intermediary phrasal domains between the Prosodic Word and the Intonational Phrase levels.

On the level of the intonational phrase, the highest level in the intonational structure, there are two pieces of evidence for the existence of the intonational phrase in Singapore English. The first comes from the prominence in length of the utterance-final syllable, which has been attested in multiple studies (Low and Grabe 1999, Low 2000, Goh 2005, Deterding 2007). Besides these two prosodic processes, there is no evidence for any other prosodic effects or phenomena that surface on this level of prosodic phrasing. Previous researchers have tried to locate prosodic effects of focus and have not produced any conclusive evidence for either prosodic cues of contrastive focus, or in fact any sort of focus on the sentential level (Low 1994, 1998, Deterding 1994, 2007, Fong and Lim 2000, Lim and Tan 2001, Tan 2001), which demonstrates that the use of prosody for focus is not a feature of the intonational structure of Singapore English.

In Chapter 5, I will analyze two aspects of the intonational phrase. First, I will present an experiment that focuses on the initial boost and will explore how the initial boost in intonational phrases affects different types of words (i.e. function and lexical words). Secondly, I will explore the limitations and extent of the pitch prominence on the final syllable of the utterance, and see whether pitch prominence can be expressed through different pitch-accents that convey difference sentence

types. In addition, I will see if the boundary tone of an intonational phrase is only pronounced on the final syllable, rather than the presence of a constant pitch change throughout the intonational phrase. Thirdly, I will look at one of the hallmarks of Singapore English, sentence-final particles, and posit that the tones on these particles are mostly due to intonational tones rather than lexical tones. I will end Chapter 5 with a look at how both word prosody and intonational prosody come together in a formalization.

§3 The Prosodic Word in Singapore English

In this chapter, I begin by laying out the reasons why the syllable is the smallest prosodic unit in the intonational structure of Singapore English. I then propose a formal approach to word tone in Singapore English and show how data bears out this approach. I also look in depth at how function words fit into the tone system of Singapore English, and show in a phonetic study that different function words have different pitch realizations, including a number that have not previously been reported in the literature. I end by demonstrating a number of additional cases that initially appear like exceptional cases but which can be accounted for in the approach adopted here.

§3.1 The Syllable

The syllable is the smallest prosodic unit in the intonational structure of Singapore English, and is the basic building block of the prosodic word and the prosodic structure in general. Segmentally, syllables consist of a (C)(C)(C)V(C)(C) format, where the vowel provides the nucleus of the syllable. There are no syllabic consonants in Singapore English (even though there are syllabic sonorants in Standard English such as in words like 'apple' and 'button') and syllabic consonants are either deleted ([ɛpə]) or a vowel is inserted ([batən]).

The main evidence that the syllable is a prosodic domain in Singapore English is that it is a domain for segmental processes. One such segmental process that occurs on the level of the syllable is devoicing in codas. Singapore English exhibits word-final devoicing in words such as 'dog' and 'crab', where the final consonant surfaces as a [k] and [p] respectively, making 'crab' and 'crap' homophones. When the underlying voiced consonant is followed by a consonant-initial morpheme, such as in 'doglike' or 'crabcake', the 'g' and 'b' still surface as [k] and [p] respectively, demonstrating that this devoicing process is not merely a word-final phenomenon. However, when the underlying voiced consonants are followed by a vowel-initial suffix, such as 'doggy' and 'crabby', they surface as [g] and [b] respectively,

showing that the previous cases are indeed instances of devoicing. Another segmental process that occurs on the level of the syllable is plosive deletion in consonant cluster reduction. Mohanan (1992) states that a plosive in a coda is deleted when preceded by an obstruent. Therefore, 'lisp' and 'list' are both pronounced as [lis]. When a vowel occurs after the consonant cluster, the plosive is retained, so 'lisping' and 'listing' are still differentiated in [lispiŋ] and [listiŋ]. Plosive deletion is not only a word final phenomenon because in words like 'listless', the plosive is still deleted: [lisləs].

Suprasegmental evidence for the syllable comes in the form of tones on syllables. Although lexical words have a (L)H tone, monosyllabic words (i.e. individual syllables) bear a single flat H tone rather than a rising tone. This shows that the final syllable of each prosodic word receives a flat H tone, demonstrating that tones are anchored to syllables and that syllables are a salient part of the prosodic hierarchy. In addition, as we will see in Chapter 5, the final syllable of the intonational phrase has a boundary tone anchored to it. Therefore, there appears to be strong evidence for the syllable as a prosodic domain both segmentally and suprasegmentally.

There are two pieces of evidence why the mora does not appear to be a prosodic domain in Singapore English. Firstly, there is a lack of distinction in vowel length. Singapore English has a six-vowel system similar to that of other Asian Englishes such as Indian English, Pakistani English, Malay English and Philippine English (Mesthrie and Bhatt 2008:120) and other New Englishes of non-Asian origin (Hall 1966, Arends et al 1995, Bao 1998). The vowel system in Singapore English does not distinguish between tense or lax vowels (in contrast to Standard English), and vowels have been reported to be 'equally tense' (Tay and Gupta 1981) and 'lack a tenseness contrast' (Bao 1998). More relevantly, for purposes of the prosodic structure, vowels have a 'lack of length contrast' (Bao 1998). This lack of distinction in vowel length is very common in New Englishes – there is no distinctive vowel length in most New Englishes in Africa and South East Asia (Mesthrie and Bhatt 2008:122). This lack of distinctive vowel

length hints that the speakers are insensitive to the moraic length of the syllable, and that syllables are likely not broken down into moraic units. Secondly, since Singapore English does not appear to parse syllables into feet (as we will see in the next paragraph), there is no evidence that moraic codas exist either. Therefore, there is no evidence for the level of the mora in Singapore English, and the syllable is the most basic level of the prosodic hierarchy in Singapore English.

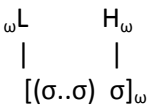
Similarly, there is no evidence that the foot is a prosodic domain in the rhythmic system of Singapore English. As we have seen in Chapter 2.1.2, a number of studies have reported that the rhythm of Singapore English is syllable-timed (Low et al 2000, Ling 2006, Deterding 2007). Syllable timing is a common occurrence in New Englishes – all New Englishes surveyed by Mesthrie and Bhatt (2008:129) had syllable timing and very rarely had vowel reduction. Bautista and Gonzalez (2006:134) also noted similarities across South East Asian varieties of English in terms of the absence of schwa as well as the syllable-timed rather than stress-timed rhythm. In addition, from Chapter 2.1.4, I have concluded that there is no stress in Singapore English. The rhythmic division by syllables rather than stress as well as the lack of vowel reduction lends further credence to the fact that the foot is absent and irrelevant to the intonational structure of Singapore English. Moreover, previous studies that have tried to examine the existence of binary feet have not produced any evidence of their existence (Yeow 1987, Chow 2009).

§3.2 The Core Prosodic Word and its Tonal Structure

Following the prosodic hierarchy, the core prosodic word corresponds to a single lexical word (noun, verb, adjective or adverb) that possesses an individual (and non-grammatical) meaning. By this definition, function words and compound words are ruled out as individual prosodic words. In other words, the core prosodic word is a phonological mirroring of a syntactic constituent in the language. Before delving into the structure of the prosodic word, I would like to propose that the underlying tonal

form of all lexical words is $(_{\omega}L)H_{\omega}$ by which I mean that a H_{ω} tone is associated to the last syllable of the prosodic word while a $_{\omega}L$ boundary tone is anchored to their left edge as shown in the diagram below:

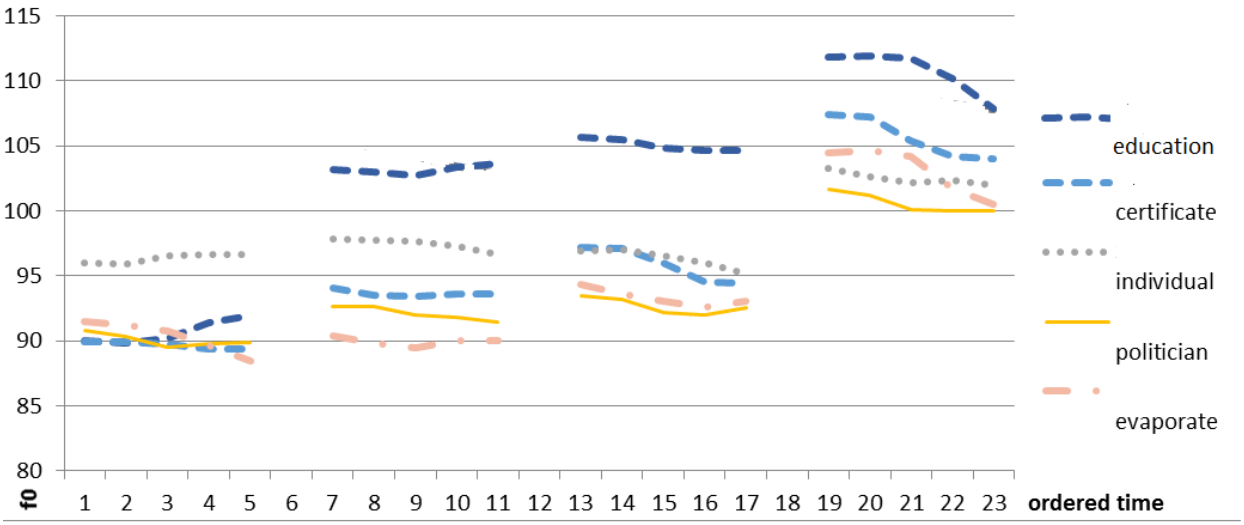
Figure 17: Proposed word tone structure for Singapore English



The reason why the $_{\omega}L$ tone is anchored to the prosodic word boundary rather than the syllable is because in polysyllabic words, the syllable closest to the boundary (i.e. the first syllable) is not entirely realized with an L plateau (it often has an interpolated f0 contour rising towards the H of the final syllable). All intermediary syllables between the $_{\omega}L$ boundary and the H_{ω} tone gradually rise in pitch throughout the word in anticipation of the H_{ω} tone on the last syllable. In comparison, the final syllable in an utterance is always pronounced with a high flat tone, which shows that the H_{ω} tone is anchored to the syllable rather than the edge. In the case where there is only one syllable in the word, the L tone is not realized and the monosyllabic lexical word is pronounced with a H tone.

This point that the pitch of non-final syllables is gradually raised as the position of the syllable is closer to the final syllable is briefly illustrated in the following chart. The first syllable starts with the lowest tone in the word, while the other tones do not appear to have a fixed value. This shows that the 'mid' tone previously proposed in Singapore English (Ng 2008, 2009, Siraj 2008, Wee 2007, 2008a, 2008b, Chow 2009) is a mere interpolation between other targets, rather than an absolute tone level. The table shows the pitch over ordered time (five sampling points per syllable) of four syllable words read out by the same subject (1 reading per word). The data was recorded from a 25 year old male speaker on a Marantz PMD660 and processed in Praat.

Figure 18: Table showing f0 of 4 syllable words in Singapore English



§3.3 *The Structure of the Extended Prosodic Word*

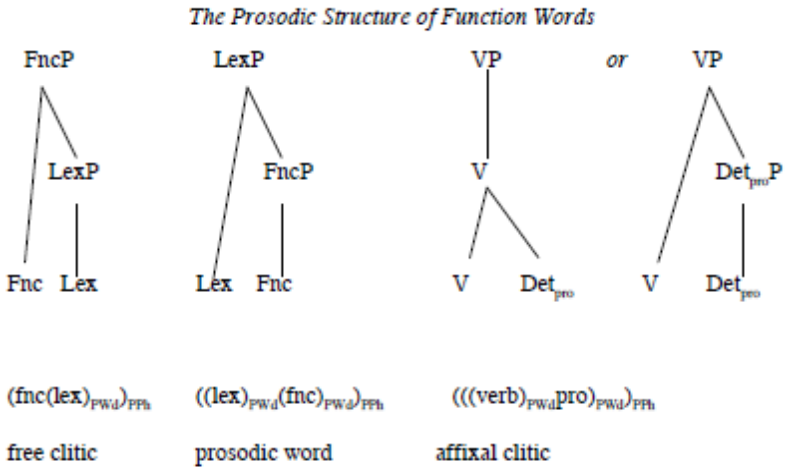
In addition to lexical words, a prosodic word may also contain function words or items which cliticize to the core prosodic word. Function words are closed class items that play a grammatical role in the language and contrast with lexical words which are an open class and are semantically richer. Examples of function words include determiners, prepositions, auxiliaries and conjunctions, and these function words display significantly different prosodic properties from lexical words (Nespor and Vogel 1986, Selkirk 1984, 1986, 1994, Zec 1993 among others).

Function words are an important element of the prosodic word both in terms of syntax and phonology. In terms of phonology, although function words most often cliticize to lexical words, the prosody characterizing a typical function word is not that of an impoverished item that has not attained prosodic word-hood and is directly attached to the phonological phrase, but rather that of a dependent

element within an extended prosodic word structure, where it has adjoined to a core prosodic word, its head (Ito and Mester 2009:188). Function words have a much more varied representation than lexical words in the prosodic word structure, as they may be prosodized as prosodic words or prosodic clitics (Selkirk 1994). Monosyllabic function words in English may be realized as 'weak' (stressless and reduced) or 'strong' (stressed and unreduced) forms (e.g. Sweet 1891). English function words also have shorter pronunciations, after controlling for frequency and predictability (Bell et al 2009).

In addition, Selkirk (1995) notes that there is a prosodic difference between non-final function words and phrase-final function words. A function word followed by a lexical word in the same syntactic phrase predictably appears in weak form, while phrase-final function words can be pronounced in either their weak or strong form (for example 'hit him' or 'hit 'im') in Standard English. In Selkirk's model of the prosodic structures of function words (Selkirk 1994), there are three different representations of function words in Standard English, shown below:

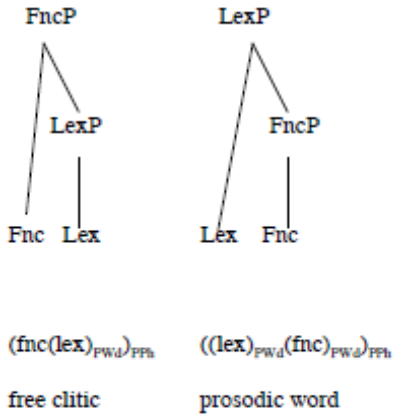
Figure 19: The three prosodic structure of function words in Standard English



There are three main structures here. Firstly, for the 'free clitic' structure, an example would be 'the store', where a proclitic attaches to the left of the lexical word. An example of the 'prosodic word' structure is 'pick up', where an enclitic attaches after the lexical word. For affixal clitics, 'need him' could be pronounced 'need him' or 'need 'im', which is why there are two separate structures.

These three structures are not all applicable to Singapore English, however. In Selkirk's model of Standard English, affixal clitics have variable pronunciation: for example, the 'him' in 'need him' may be pronounced in strong or weak form. Selkirk's analysis is that phrase-final object pronouns in Standard English may be realized as an affix or as a prosodic word. This means that the grammar has to decide that pronouns are different from other function words. Singapore English, in contrast, has no differentiation of this kind. As we will see later on in this chapter, all phrase-final object pronouns and function words in Singapore English are unreduced and pronounced with a H tone. Therefore, only the first two structures would be applicable to Singapore English:

Figure 20: Function word structures applicable to Singapore English



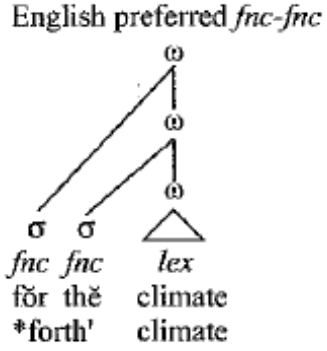
Looking provisionally at the above structures, Singapore English thus has only two main types of prosodic word structures, one in which the function word attaches to the left of the lexical word (for example an article and a noun, 'an apple') and the second in which an enclitic is attached to the right of

a lexical word (these cases are rarer, but they include prepositions and objects that cliticize to the right of a verb such as ‘pick up’ and ‘eat it’).

What happens when more than one function word is attached to the lexical word? For example, phrases like ‘pick it up’ and ‘in the room’ involve more than a single function word. A recursive model of the structure of the prosodic word has been proposed by Ito and Mester (2008, 2009) in which function words are ω-adjoined (adjoining to form a prosodic word) to the core prosodic word. This model further allows us to explain what happens when multiple function words are attached to the front or back of the lexical word. Function words and clitics are not independent entities but ‘dependent elements within an extended prosodic word structure’ (Ito and Mester 2008: 36), and a recursive approach allows for multiple function words attached to the left and right of the core prosodic word without having to distinguish different types of distinct phrasal categories such as the ‘accentual phrase’ and ‘intermediate phrase’ (e.g. Beckman and Pierrehumbert 1986) or having to posit a Clitic Group or PW’ (Peperkamp 1997).

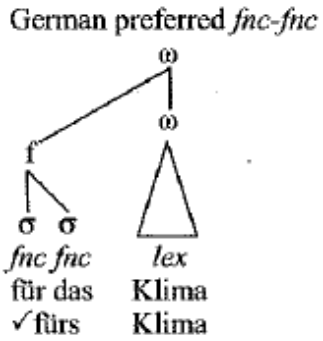
Multiple non-contracted function words have been described by Ito and Mester (2009) as adjoining separately to the core lexical word such as in the example below (Ito and Mester 2009:185):

Figure 21: Example illustrating that 'for the' is irreducible



This is in contrast to German, where the two function words are parsed into a foot before adjoining to the core lexical word, as presented below:

Figure 22: Example illustrating that German function words may be parsed into a foot (f)



Ito and Mester explain that this is because in German, the first function word always has prominence even in non-emphatic or non-focused contexts, allowing for the second function word to cliticize to it (producing 'fűrs'). In English, however, strings of stressless monosyllabic function words may adjoin separately leftward to the core lexical word which may not cliticize to each other (*'forth'). Ito and Mester propose that there is a HEAD TO LEX constraint that is ranked higher in English whereby prosodic heads have to be contained in the core lexical word only. This rule aims to capture the fact that function words prefer to remain non-prominent. Therefore, in English, function words fulfill this constraint by remaining weak unstressed syllables, avoiding headhood by adjunction.

We see that the main difference between Selkirk's (1994) model and Ito and Mester's (2009) model is that Ito and Mester's model allows for recursive parsing of individual clitics in Prosodic Words, while function words mostly adjoin to the Phonological Phrase in Selkirk's model. We will see in the next section how recursive Prosodic Words provide a better solution for Singapore English.

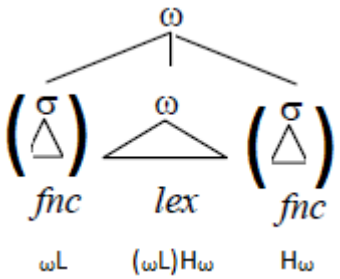
§3.4 The Prosodic Word: Formal Analysis

To recapitulate from the previous sections in this chapter, prosodic words consist of a core lexical word which contains the tones $(_{\omega}L)H_{\omega}$ underlyingly, and intermediary syllables are not specified for tone but have their pitch interpolated. In addition, leftward cliticizing function words receive an $_{\omega}L$ tone on the left boundary edge and rightward cliticizing function words receive a H_{ω} tone on the syllable. Following Ito and Mester's (2009) analysis of Standard English, I propose that each cliticizing function word is adjoined individually to the core lexical word, each forming its own prosodic word.

I will adopt a recursive prosodic word approach as proposed by Ito and Mester (2008, 2009) in which function words are ω-adjoined to the core prosodic word. This model further allows us to explain what happens when multiple function words are attached to the front or back of the lexical word. The benefit of adopting this approach is that it allows us to have fewer categories of prosodic words and also accommodate the fact that function words and clitics are not independent entities. As I show in this dissertation, there can be a number of function words that cliticize to the core prosodic word, and adopting a recursive approach allows us to impose multiple levels of structure both leftward and rightward without having to create new and different categories.

In this recursive approach, the core prosodic word forms a prosodic word ω, and can accommodate the cliticization of function words to the left or right of the core prosodic word. The cliticization or adjunction of function words either to the left or to the right of the core prosodic word produces the same maximal projection ω, as illustrated by the following structure:

Figure 23: Proposed structure of prosodic word with tones (part 1)



also represented as:

Figure 24: Proposed structure of prosodic word with tones (part 2)

[ω (*fnc*) [ω *lex* ω] (*fnc*) ω]
σ (σ.σ)σ σ
| | | |
ωL ωL Hω Hω

In these representations, 'lex' is the core lexical word which by itself has the status of a prosodic word (ω). It is important to note in the above representation which tones are attached to edges and which tones are attached to syllables. The ωL tones in Figure 24 are attached to the boundaries, while the Hω tones are attached to the final syllables. Therefore, proclitics, which are between boundaries, will always be pronounced with an L tone. The core difference between proclitics and intermediary syllables is that proclitics are always located between ωL boundaries and are thus always realized at a lower pitch than intermediary syllables, which are in between an ωL and a Hω, making them susceptible to raising. Additional function words ('fnc') may cliticize leftwards or rightwards of the core lexical word without changing the maximal projection of the prosodic phrase (the maximal projection always remains ω irrespective of the number of clitics adjoined).

Also, with this approach, function words that cliticize are not given prosodic word status by themselves, but receive it through adjoining to the prosodic word. When additional function words are

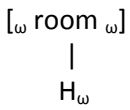
recursively projected, they receive the same boundary tones. This is illustrated in the following examples which show leftward and rightward recursive projections:

Example (2): Leftward and rightward recursion in Singapore English

§3.5 The Prosodic Word Structure Applied to Data

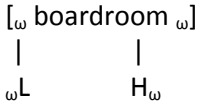
In general, prosodic words in Singapore English possess a lexical word at their core (except for special cases like function words in isolation). In addition, all lexical words have a H_{ω} tone assigned to their rightmost syllable. For example, a monosyllabic prosodic word will always be pronounced as a single H tone as the H_{ω} tone attaches to the rightmost (and only) syllable:

Example (3): Monosyllabic word



Crucially, the $_{\omega}L$ tone in the above word is not realized. In contrast, in disyllabic and polysyllabic prosodic words, there is always a $_{\omega}L$ realized on the left boundary edge in addition to the H_{ω} on all prosodic words. The pitch of all intermediary syllables are interpolated from their position between the L and H tones:

Example (4): Disyllabic word



Example (5): Polysyllabic word

$[_{\omega}$ certificate $_{\omega}]$
| |
$_{\omega}L$ H_{ω}

In Singapore English, function words can cliticize both to the left and to the right of the core lexical word. All function words or clitics that ω-adjoin to the left of the core function word are pronounced with and possess an L tone. Thus, a disyllabic prosodic word consisting of a function word and a monosyllabic lexical word is pronounced $_{\omega}L\ H_{\omega}$:

Example (6): Monosyllabic word with leftward cliticization

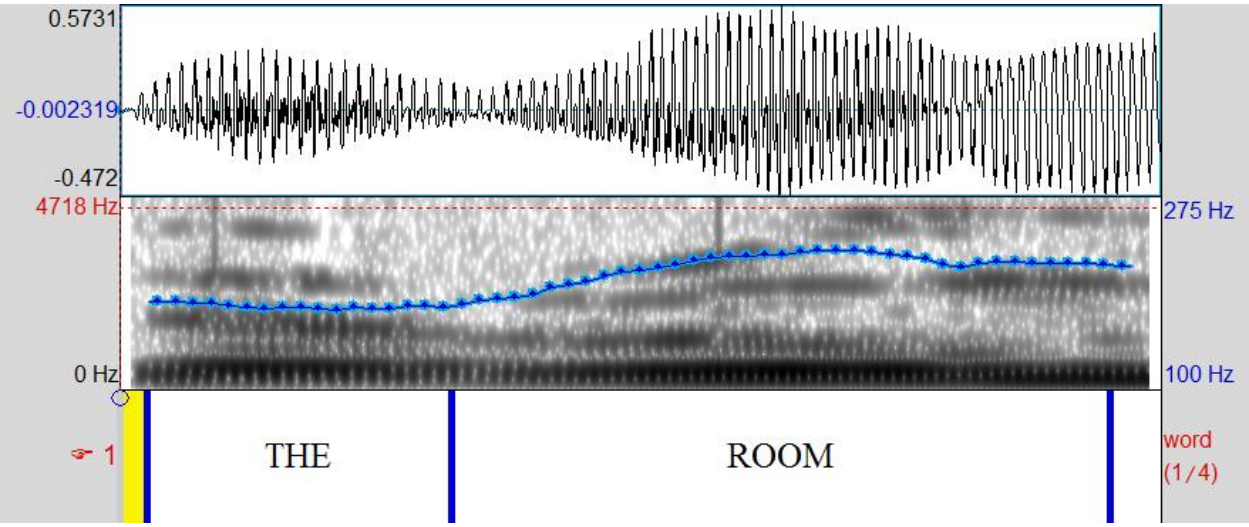
$[_{\omega}$ the $[_{\omega}$ room $_{\omega}]\ _{\omega}]$
| |
$_{\omega}L$ H_{ω}

Example (7): Disyllabic word with leftward cliticization

$[_{\omega}$ the $[_{\omega}$ boardroom $_{\omega}]\ _{\omega}]$
| | |
$_{\omega}L$ $_{\omega}L$ H_{ω}

The spectrograms in this section were written sentences read out by a native 30-year-old female speaker of Singapore English to illustrate the structures in this chapter. All of the phrases in this section are non-phrase final so that the final syllable is not affected by intonational boundary tones. These sentences have been judged as representative of Singapore English speech by the author. The spectrograms were annotated and captured from Praat.

Figure 25: Spectrogram of 'The Room' in the sentence 'I went into the room **yesterday'**

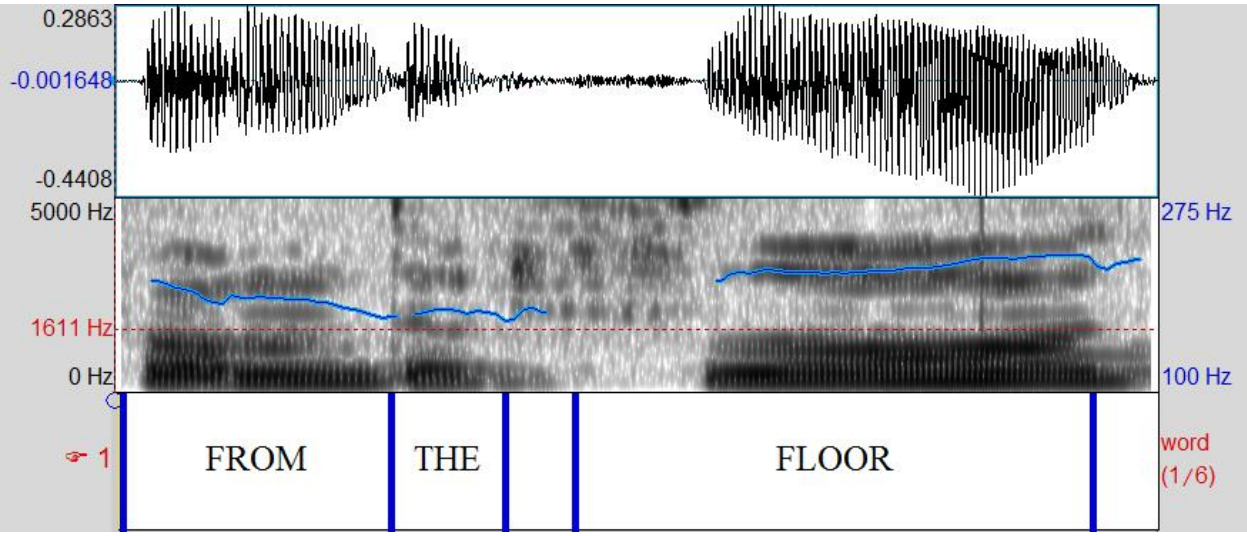


When more than one function word cliticizes to the core prosodic word, it creates an additional prosodic word, as seen in the following example:

Example (8): Monosyllabic word with multiple leftward cliticization

[ω from [ω the [ω floor ω] ω] ω]
| | |
ωL ωL Hω

Figure 26: Spectrogram of 'From the Floor' in the sentence 'I picked the book up from the floor **yesterday'**

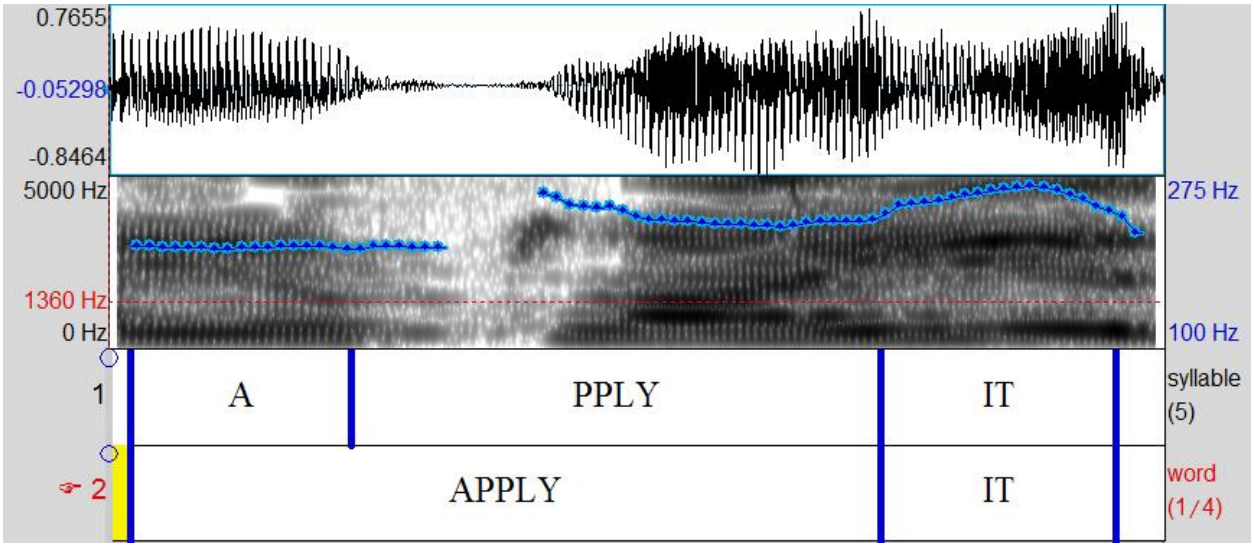


Function words may also cliticize to the right of the core lexical word, such as in the phrase:

Example (9): Disyllabic word with rightward cliticization

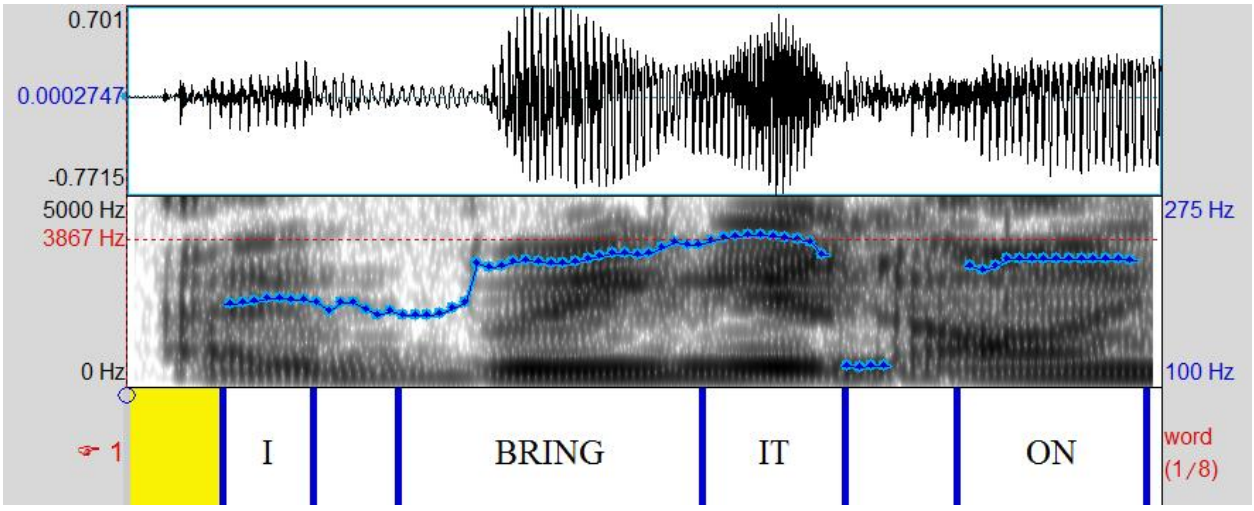
$[_{\omega}\ [_{\omega}$ apply $_{\omega}]$ it $_{\omega}]$
| | |
$_{\omega}L$ H_{ω} H_{ω}

Figure 27: Spectrogram of 'Apply It' in the sentence 'I apply it **to your hand'**



However, function words located to the right of the lexical word are pronounced with a H tone. When multiple function words are located to the right of the lexical word, all are pronounced with a H tone. In the phrase 'bring it on' in Figure 28, 'on' is an enclitic:

Figure 28: Spectrogram of 'I Bring It On' in the sentence 'I bring it on **yesterday'**

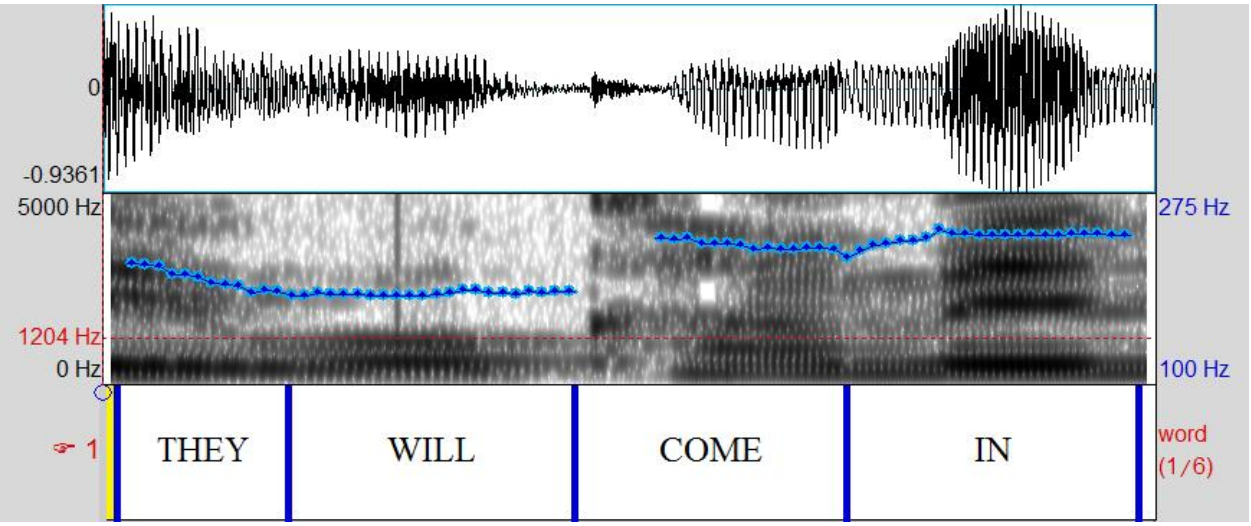


Example (10): Monosyllabic word with multiple rightward cliticization

[ω [ω [ωbring ω] it ω] on ω]
| | |
H_ω H_ω H_ω

The location of the function word in the syntactic structure determines which phrase it cliticizes to, and whether it receives an L or H tone. For example, in the phrase ‘they will come in’, ‘they’ and ‘will’ are located to the left of ‘come’ and thus receive an L tone. ‘In’ is positioned to the right of ‘come’ and thus receives a H tone.

Figure 29: Spectrogram of 'They Will Come In' in the sentence ‘They will come in **today’**

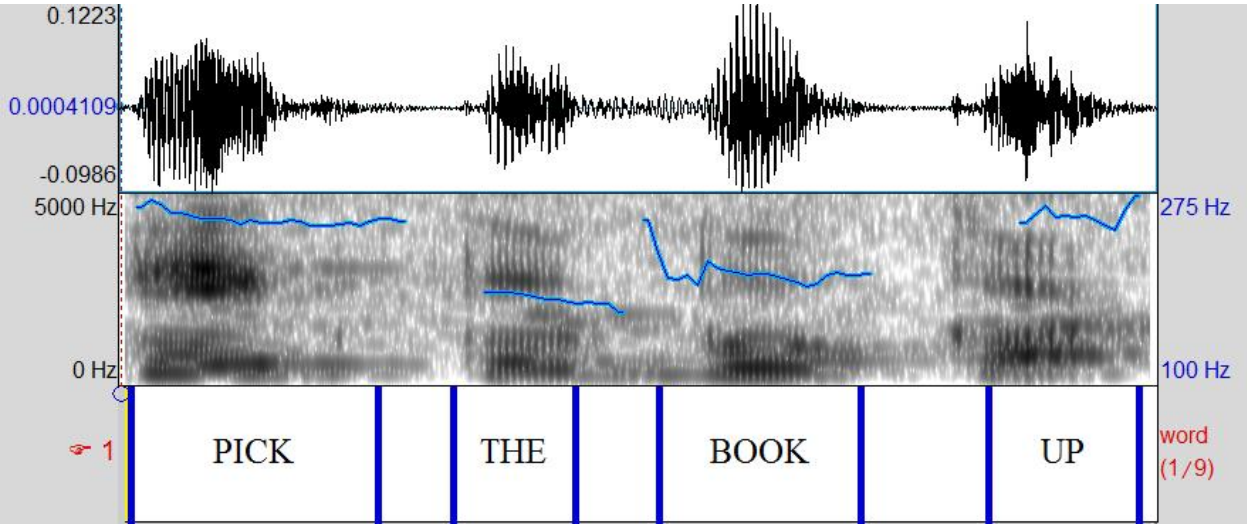


When a function word sits in between two lexical items, how it is pronounced depends on where the function word is located in the syntactic structure, such as in the following example ‘pick the book up’.

Example (11): Leftward and rightward cliticization

$[_{\omega}$ pick $_{\omega}]$ $[_{\omega}$ $[_{\omega}$ $[_{\omega}$ the $_{\omega}]$ book $_{\omega}]$ up $_{\omega}]$
| | | |
H_{ω} $_{\omega}L$ H_{ω} H_{ω}

Figure 30: Spectrogram of 'Pick The Book Up' in the sentence 'I pick the book up **yesterday'**



In the above example, 'the' is part of the noun phrase 'the book', and is thus pronounced with an L tone. 'Up' is phrase-final and attached to the right of 'the book', and is pronounced with a H tone.

Although I have demonstrated in this section the basic difference between proclitics and enclitics, there remains a number of questions. Firstly, do all proclitics and enclitics behave the same? Secondly, do all function words fall within the category of proclitics or enclitics - are there exceptions? Thirdly, what happens in polysyllabic function words? These questions will be addressed in the following sections.

§3.6 The Prosodic Word: Function Words

As mentioned in the previous section, we do not yet have a complete picture of how function words behave in regards to their tone. Siraj (2008) states that the following categories of function words receive an L tone by default: auxiliaries, monosyllabic prepositions and some disyllabic ones (e.g. into), expletives, personal and relative pronouns, conjunctions and some clausal connectives (e.g. whereby) and determiners. However, this is not an exhaustive list of function words. For example, Siraj does not include enclitics (as demonstrated above), and the intonational structure of function words has

not been studied extensively outside of these observations by Siraj. Therefore, the prosodic behavior of function words in Singapore English needs to be studied further in-depth.

There are two major aspects of function words that need to be addressed. Firstly, do all non-lexical words behave the same way in terms of prosody? That is, are all left-cliticizing function words pronounced with an $_{\omega}$L tone, and are all right-cliticizing function words pronounced with a H_{ω} tone without exception?

Secondly, do polysyllabic function words pattern like polysyllabic lexical words, or do they pattern differently (i.e. possess different tones or tonal patterns)? In addition, is there any variation amongst speakers, and if so, what is the extent of the variation across speakers? I will look at the answers to these two questions in the following section.

§3.6.1 Function Words: Methodology

The following experiment has been constructed to address the first issue above, which is to test the tonal properties of different types of function words. In order to elicit different types and categories of function words, speakers were asked to read out function words that have been inserted into frame sentences. Ten native Singapore English speakers, 5 male and 5 female, with no speech or hearing impediments aged 18-30 were asked to read out the following types of function words (sentence list below). The recordings took place in a soundproof booth in the phonetics laboratory in Nanyang Technological University with a Marantz PMD660 audio recorder and a condenser microphone. Each sentence in the list below was to be read out three times per subject. Praat was then used to measure the f0 of the function words studied. F0 was measured on the mid-point of the nuclei of the syllables. F0 was then z-normalized for each speaker to allow comparison of data across speakers.

The following sentence list is comprised of short sentences (around five words) containing the highlighted item. The sentences below have been designed to convey Singapore English syntax and contain Singapore English names such as 'Ah Beng' to elicit a Singapore English register of speech rather than a Standard English or more formal register that might be affected. This is essential, as reading (as opposed to casual speech) might cause speakers to adopt a more formal register, and the artificial environment will only exaggerate this. In addition, the words to be examined are not in a final position of the utterance as intonational effects might interfere with their prosody. The following sentence list contains two to three items from each functional category to be examined.

Figure 31: Sentence list for function word experiment

Negation

1. This one **not** mine
2. **No** chilli for me

Prepositions

3. Ah Kow go **to** market (Ah Kow is a Singaporean name)
4. I go **down** the stairs

Auxiliaries

5. **Do** you want to go makan
6. Ah Beng **will** go to sleep (Ah Beng is a Singaporean name)
7. Ah Kow **has** done army

Disyllabic function words

8. I shower **before** I go out
9. I do **myself** better
10. Must go **into** the market to find

Conjunctions

11. I like to eat durian **and** rambutan (durian and rambutan are common Singaporean fruits)

12. I find him **but** he not home

Pronouns (overlap with Experiment 2 below)

13. **He** go to market

14. Ah Beng hit **him** in the lift

Expletives

15. **There** is nowhere to eat in Woodlands (Woodlands and Clementi are names of places)

16. **It** was raining yesterday in Clementi

Articles

17. **A** mouse run into **the** house

Adverbial particles (two sentences required for context)

18. He eat first. **Then**, he go and bathe

19. He eat already. **However**, I haven't eat yet

Enclitics

20. What did you cook **for** that time?

21. Who did you think **of** that day?

22. He walk **off** yesterday.

Wh-words

23. **What** did you cook for that time? (20)

24. **Who** did you think of that day? (21)

Relative wh-pronouns

25. What did he say **when** he call?

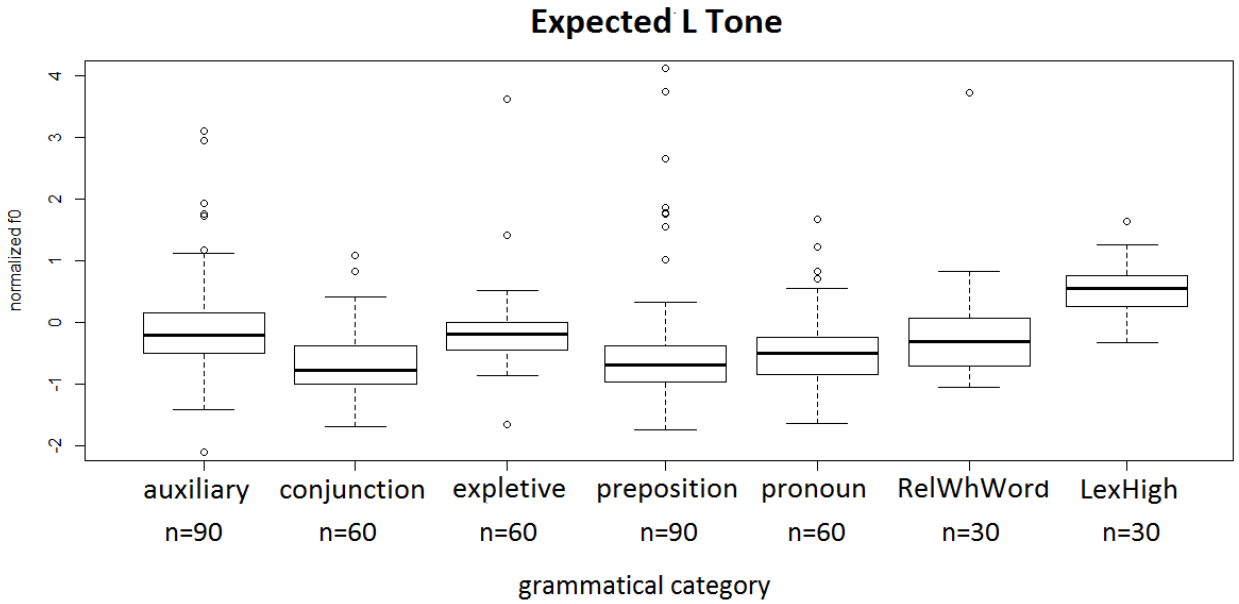
§3.6.2 *Function Words: Results and Discussion*

The function words recorded from the study can be grouped into four main categories: expected L tones, expected H tones, unexpected H tones and polysyllabic words. I will present data from the four categories and then delve into a more thorough explanation of the results in the general discussion section after the presentation of the results.

Expected L tones

The first category, expected L tones, encompasses all of the proclitics tested in the study. Proclitics, as mentioned in previous chapters, should be pronounced with an L tone. This is what the results bear out. Results below show boxplots of the z-transformed F0 measured on the midpoint of the nucleus of the syllable of the word in question. The results from all 10 speakers are aggregated. Figure 32 below shows the results from proclitics. LexHigh reports a z-normalized f0 measurement taken from the mid-point of the syllable of 'mouse' in the sentence 'A mouse went into the house', for reference only:

Figure 32: Boxplot showing the pitch height of proclitics

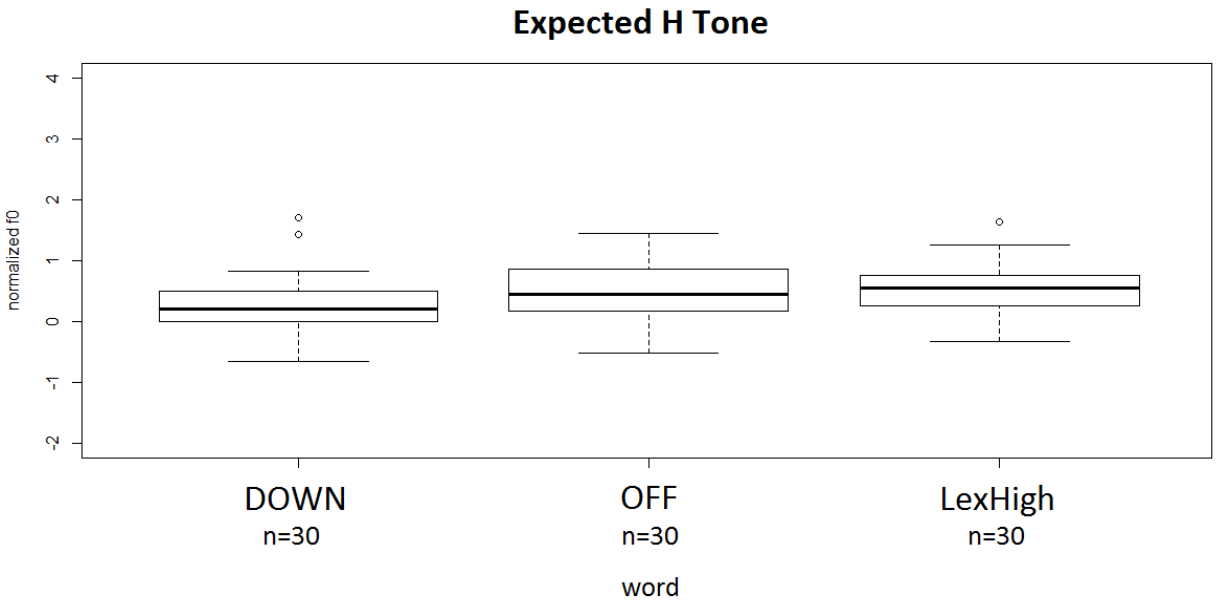


Across all of the proclitics, the averages are consistently below 0 across all speakers, which is what we would expect for an L tone. There is some variation in the ranges across proclitic types. However, an important point to note is that expletives, which average seems to be slightly higher, are always pronounced at the beginning of the sentence, which is when pitch is relatively higher due to downdrift over the utterance. The auxiliary 'do', included in the results, is also sentence initial, and this might have contributed to a slight heightening of the average compared to the other proclitics. However, besides this slight variation, the results seem fairly constant across all proclitic types.

Expected H Tones

The second group of results we will look at are the expected H tones, the enclitics, which we expect to be pronounced with a H tone. These are illustrated in the following boxplot:

Figure 33: Boxplot showing the pitch height of enclitics

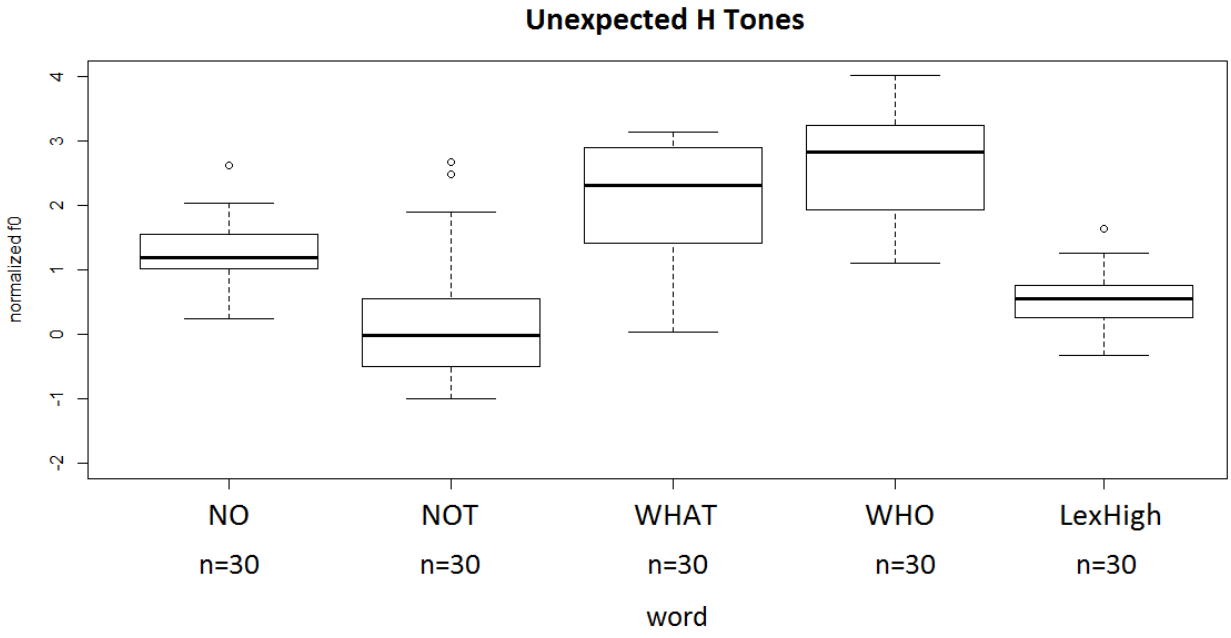


Enclitics are expected to be pronounced with a H tone, and this is what we see in general, with averages above 0 for all speakers. Enclitics crucially differ from proclitics because they are pronounced directly following a lexical word, while proclitics are pronounced before a lexical word. The difference between cliticizing to the left and cliticizing to the right is marked in Singapore English with different tones, as seen from the results above.

Unexpected H tones

The third category we will look at are the results which were not predicted by the hypotheses. There are two function word types that fall into this category, both of which will be discussed separately. The following boxplot shows results for the categories of negation and wh-words. The results for individual words are shown:

Figure 34: Boxplot showing the pitch height of unexpected H tones



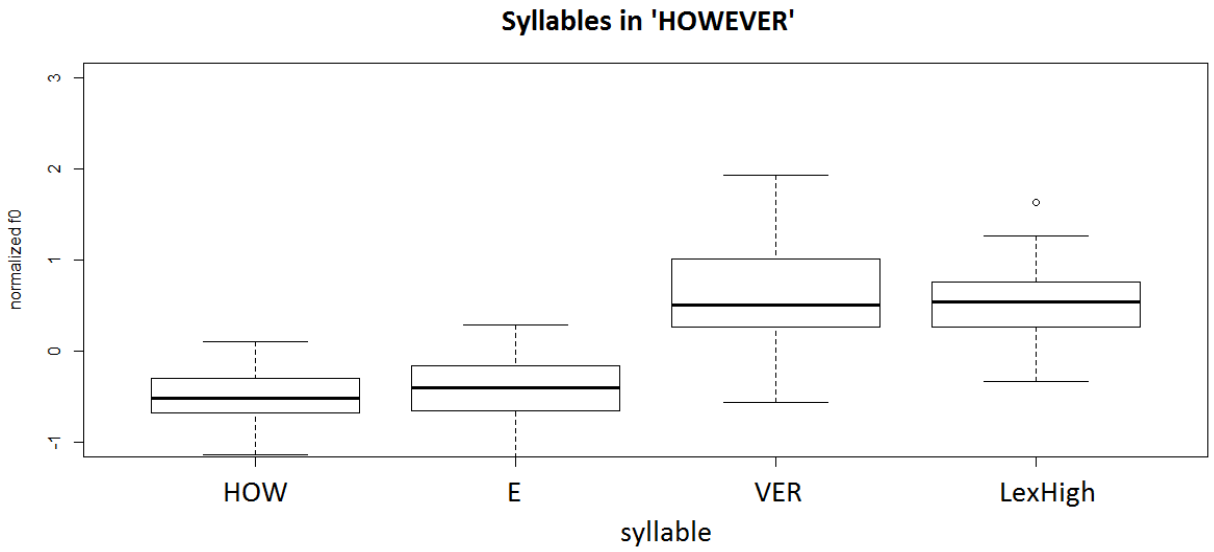
The data above show that negation ('no' and 'not') and wh-words ('what' and 'who') pattern very differently from the previous two categories. For negation, 'not' seems to be pronounced as a proclitic

(L tone), while ‘No’ is pronounced at an f0 very much above average. Note that this may be also due to initial raising, which will be discussed in detail in Section 5.1, as ‘no’ is always sentence-initial in this word list. The wh-words are pronounced at an extremely high pitch as well, at a pitch well beyond a standard H tone (compare with enclitics above). Both wh-words pattern very similarly (i.e. both have an extra high pitch) and there does not seem to be any difference across specific wh-word types.

Polysyllabic function words

We now look at the fourth category in the study, polysyllabic function words. We would expect that polysyllabic words, because of their length, would not be able to cliticize to the adjacent prosodic word and would have to form their own prosodic word. This is the result that we get with words that are three syllables long, such as ‘however’ below:

Figure 35: Boxplot showing the pitch height of the syllables in "HOWEVER"



We see from the boxplot above that the third syllable is markedly higher than the other two syllables in the word. Disyllabic words, in comparison, do not display a clear H tone on the second syllable. The following boxplots show the words ‘before’ and ‘myself’:

Figure 36: Boxplot showing the pitch height of the syllables in 'MYSELF'

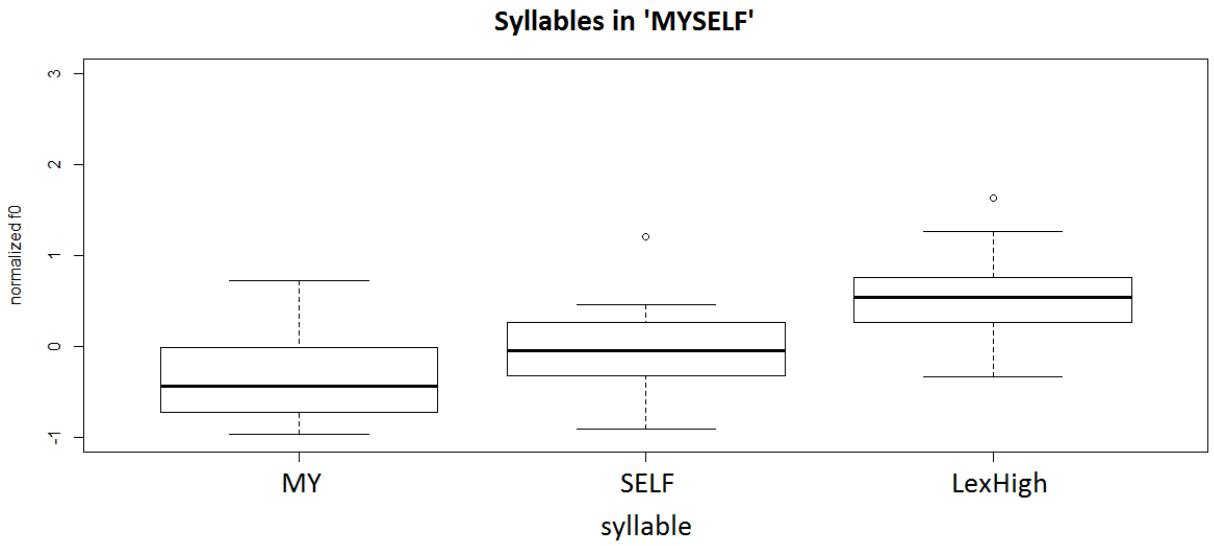
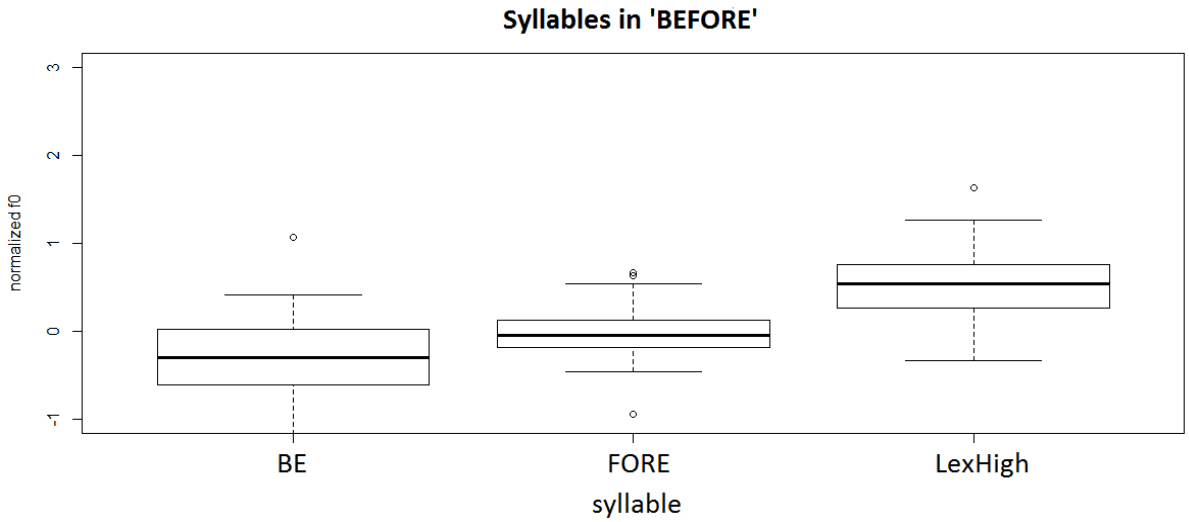


Figure 37: Boxplot showing the pitch height of the syllables in 'BEFORE'



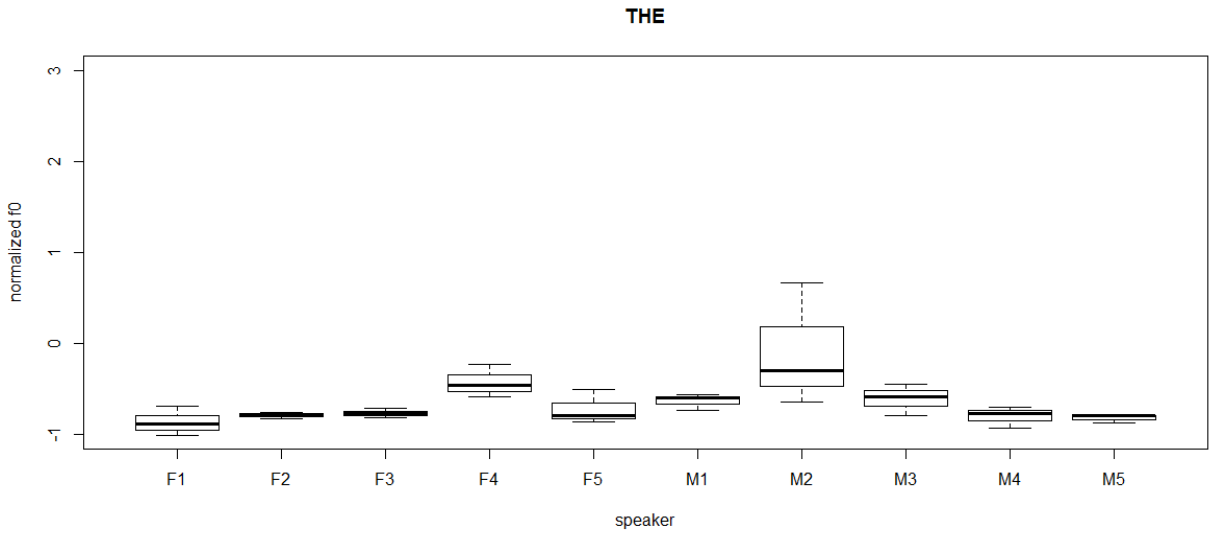
Both words ('before' and 'myself') appear to possess an LL tone (compare the boxplots to 'however', which has an LLH tone). Therefore, we see that disyllabic words display a LL tone, while trisyllabic words display a LLH tone pattern. The H tone in the trisyllabic word is expected if we posit that function words

that are too long to cliticize have to form their own prosodic word. The pattern found in disyllabic words is less obvious and will be discussed in greater detail later in this section.

Inter-speaker variation

One of the questions raised by the study was exactly how much variation speakers had and how consistently they pronounced the word tones. All things considered, speakers are consistent in producing similar tones in all contexts. There is less variation amongst speakers for L tones as compared to higher tones, as shown in the following boxplots. F1 to F5 refer to female speakers while M1 to M5 refer to male speakers.

Figure 38: Boxplot of normalized f0 across speaker for "THE"



Compare the variation across the word ‘the’ with the following two boxplots, which display the enclitic ‘off’ which has a H tone and ‘what’, which has an extra high tone:

Figure 39: Boxplot of normalized f0 across speaker for "OFF"

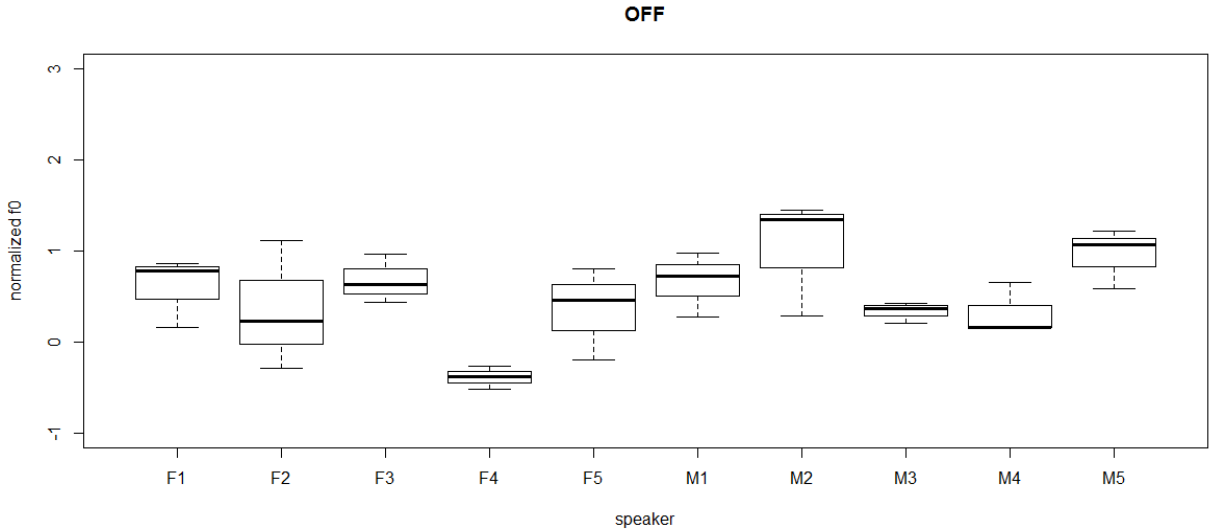
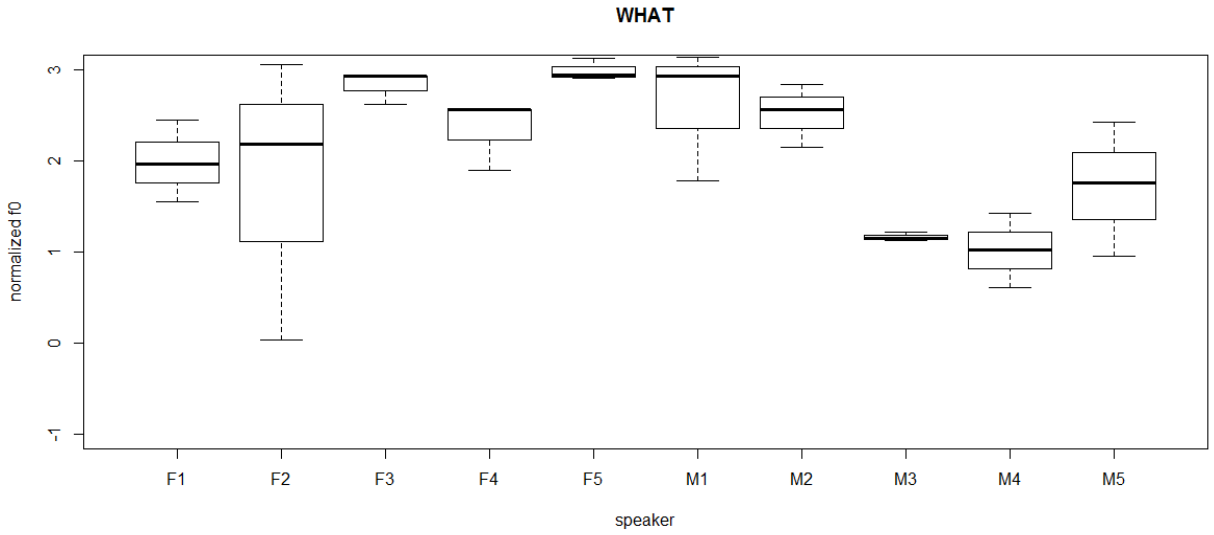


Figure 40: Boxplot of normalized f0 across speaker for "WHAT"



We see that there is a lot more variation across speaker with higher tones and less variation for L tones. This illustrates that when speakers pronounce extra high tones, their pitch range is expanded, whereas the pitch range is more constrained for L tones.

§3.6.3 Function Words: General Discussion

Looking at the above box plots, a general trend is that function words are generally pronounced as L, while enclitics are pronounced as H. Results for certain categories are clearer than others; for example, articles tend to have a lower L than other function words, whereas auxiliaries and expletives are pronounced slightly higher, possibly due to confounding factors such as being pronounced at the beginning of the sentence. Another salient trend is that while there is some inter-speaker variation, all speakers generally produce the same tone categories on all words.

We can sort the data into three categories: function words that are pronounced at a lower tone than the H tone (i.e. an L tone), those that are pronounced at roughly the same pitch as the lexical word (i.e. H tone), and those that are pronounced at a pitch above the high tone (we will use the term 'extra high'). Firstly, the function words that are consistently pronounced as a L (or lower) tone are: auxiliaries, conjunctions, expletives, articles, adverbial particles and relative wh-pronouns. The pronoun 'he' is also consistently pronounced at a lower tone. These function words follow the pattern laid out in the hypothesis: that function words generally are pronounced at a lower pitch than lexical words.

However, clearly not all function words are produced with a low pitch. There are a number of function words that are pronounced with a H tone, and these are mostly enclitics. These words include the enclitic category, 'down' from 'go down', 'him' from 'hit him', and all of these words directly follow the main verb in the sentence. Results revealed an additional category of function words which were pronounced at a pitch consistently higher than the lexical H tone in the sentence. A model was fitted to show the differences across all of the monosyllabic function words in different categories:

Figure 41: Linear mixed model comparing intonation type (fixed effect: word type, random effects: word and speaker)

Level of Fixed Effect	Est	Std.Error	t-value	p-value
Intercept	-0.04787	0.38184	-2.480	0.013
Conjunction	-0.25858	0.72180	-2.869	0.004
Enclitic	0.43993	0.15687	4.288	1.99e-05
Expletive	-0.13849	0.25201	0.635	0.525
Negation	0.75629	0.18616	2.783	0.005
Preposition	-0.4863	0.22411	0.331	0.741
Pronoun	-0.50251	0.13796	-4.080	4.87e-05
Relative Wh-Word	-0.20018	0.28228	-0.287	0.774
Wh-Word	2.3768	0.65112	15.045	2e-16

Note from this model that the estimates are all negative except for the categories of enclitic, negation and wh-word. These results can be further summarized in the table below where a 'yes' under the column for 'expected' means that the data falls within the proposed model and a 'no' requires further explanation. The sentences in which the words were framed in are also included in the table:

Figure 42: Table showing summarized results of the tones of function words

Function Word Type	Example Sentence	Results	Expected
Negation	This one **not** mine **No** chilli for me	H Extra H	No No
Prepositions	Ah Kow go **to** market	L H	Yes Yes
Auxiliaries	**Do** you want to go makan Ah Beng **will** go to sleep Ah Kow **has** done army	L L L	Yes Yes Yes
Disyllabic function words	I shower **before** I go out I do **myself** better Must go **into** the market to	LL LL LL	No No No

	find		
Conjunctions	I like to eat durian **and** rambutan I find him **but** he not home	L L	Yes Yes
Pronouns	**He** go to market Ah Beng hit **him** in the lift	L H	Yes Yes
Expletives	**There** is nowhere to eat in Woodlands **It** was raining yesterday in Clementi	L L	Yes Yes
Articles	**A** mouse run into **the** house	L L	Yes Yes
Adverbial particles	He eat first. **Then**, he go and bathe He eat already. **However**, I haven't eat yet	H LLH	No No
Enclitics	I go **down** the stairs Who did you think **of** that day? He walk **off** yesterday.	H H H	Yes Yes Yes
Wh-words	**What** did you cook for that time? **Who** did you think of that day?	Extra H Extra H	No No
Relative wh-pronouns	What did he say **when** he call?	L	Yes

In summary, most of the function words examined in the study follow the pattern proposed in the paper. Phrase-initial function words are left-cliticized to lexical words and are pronounced with an L tone, while phrase-final function words cliticize to the right edge and are pronounced with a H tone. These generalizations apply to the results of all speakers. However, the results from this study have shown that there are exceptions, and that not all function words behave in a cut-and-dried fashion. There is pitch variability across categories of function words, with some categories of function words

being pronounced at a higher f0 than other categories of function words. Most of this variability can be explained due to speaker variation, but crucially there are three categories of function words that do not follow the proposed pattern of leftward-L and rightward-H: wh-words, negation and disyllabic function words. These categories will be discussed in detail below.

Looking at the data for the above three categories, it appears that wh-words and negation have a H or extra high tone anchored to the last syllable. The wh-words (what, who) and negation (not, no) examined in this study are monosyllabic, and are pronounced across all speakers with an extra high tone except for 'not'. We will now look at each of these three categories in detail.

Firstly, let us look at why wh-words and negation are pronounced with a H tone. There is a clear and apparent tonal difference, for example, between relative wh-words (pronounced with an L tone) and question wh-words (pronounced with a H tone). Relative wh-words that function as complementizers are pronounced with an L tone, while wh-words that are replacements for nouns are pronounced with a H tone. This suggests that both words, while the same segmentally, are distinguished by speakers syntactically in the sense that one category is treated as a function word while one category is analyzed as something else syntactically, and this difference is encoded in the prosody.

We have to reflect at this point as to what kind of syntactic category negation and wh-words fall into. Negation and wh-words are pronounced with an extra high tone which is higher than that of regular lexical tones. Negation is a focus-sensitive operator and patterns with other focus-sensitive operators (Partee 1993), while wh-words contain a focus feature that make them inherently focused (Haida 2007). I will therefore propose that both negation and wh-words fall into the category of focused items, and as such have an inherently higher f0.

This extra-high tone was unexpected and the proposed account is admittedly a bit stipulative. However, a further look at negation reveals additional possible evidence: we see in the following two spectrograms pronounced by a thirty-year-old female speaker below that the difference between these tones distinguish ‘can’ and ‘can’t’ in Singapore English. Note that plosive deletion in Singapore English deletes the final ‘t’ in can’t, but the extra H tone is preserved, making the only difference between the two sentences the difference between the extra H tone and the L tone:

Figure 43: Spectrogram of 'I can do it for you' pronounced by a 30 year old female speaker

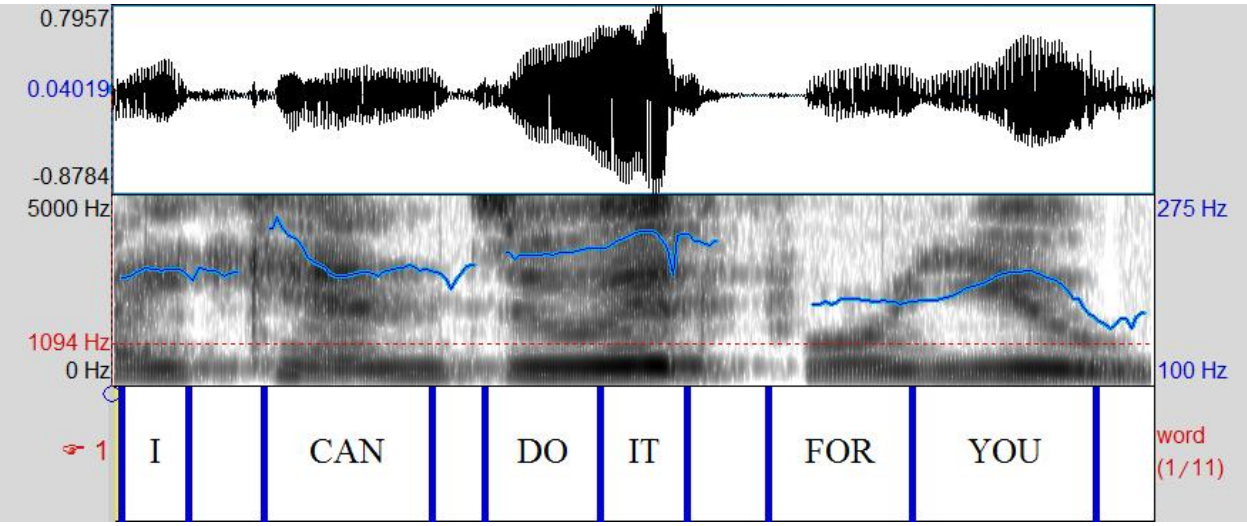
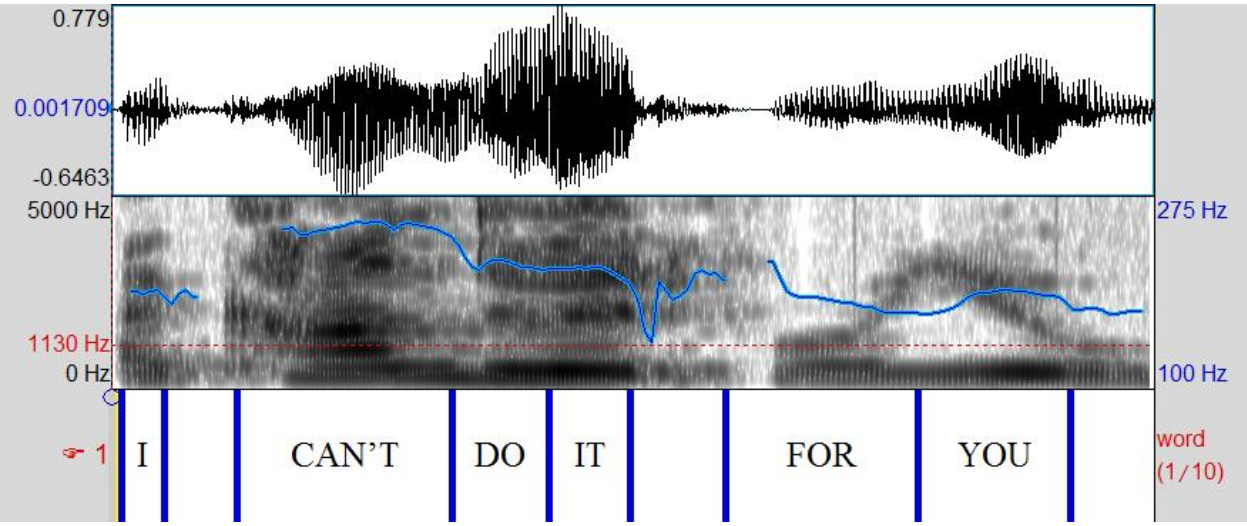


Figure 44: Spectrogram of 'I can’t do it for you' pronounced by a 30 year old female speaker



Note that in Figure 43 ('I can do it for you'), 'can' has a pitch very similar to 'I' because it bears the normal $_{\omega}$L tone assigned to proclitics, while in Figure 44, 'can't' is pronounced at a higher pitch than 'I'. In addition, it appears that the high tones that follow the focal extra-high tone seem to be slightly lowered, more evidence that negation carries a focal tone that compresses the range of following tones. More work is needed here, but the basic pattern uncovered in the experiment seems to hold. Although data was not recorded, we would expect that other sentential operators such as 'only' would possess an extra-high tone as well.

Irrespective of the motivation for the extra-high tone on wh-questions and negatives, the difference between 'not' (H tone) and 'no' has to be addressed. The difference between 'no' and 'not' in their respective sentences is that 'no' has a sentential negation (i.e. wider scope), while 'not' only negates the following proposition ('mine'). In addition, 'no' might receive initial-raising as it was located at the beginning of the sentence. This effect will be discussed later on in section 5.1.

Secondly, we will look at the tone system of disyllabic and polysyllabic function words. As we have seen from the results, disyllabic function words are pronounced as LL, and polysyllabic words ('however') are pronounced as ($_{\omega}$L)H$_{\omega}$. In regards to polysyllabic words, the word final H tone of polysyllabic words makes sense if we posit that a polysyllabic function word is too heavy to cliticize to a lexical word and thus has to stand on its own, creating its own prosodic word and consequently its own H tone. Recalling Selkirk's model for function words, there are two types of function words - function words that can cliticize and function words that form their own prosodic word:

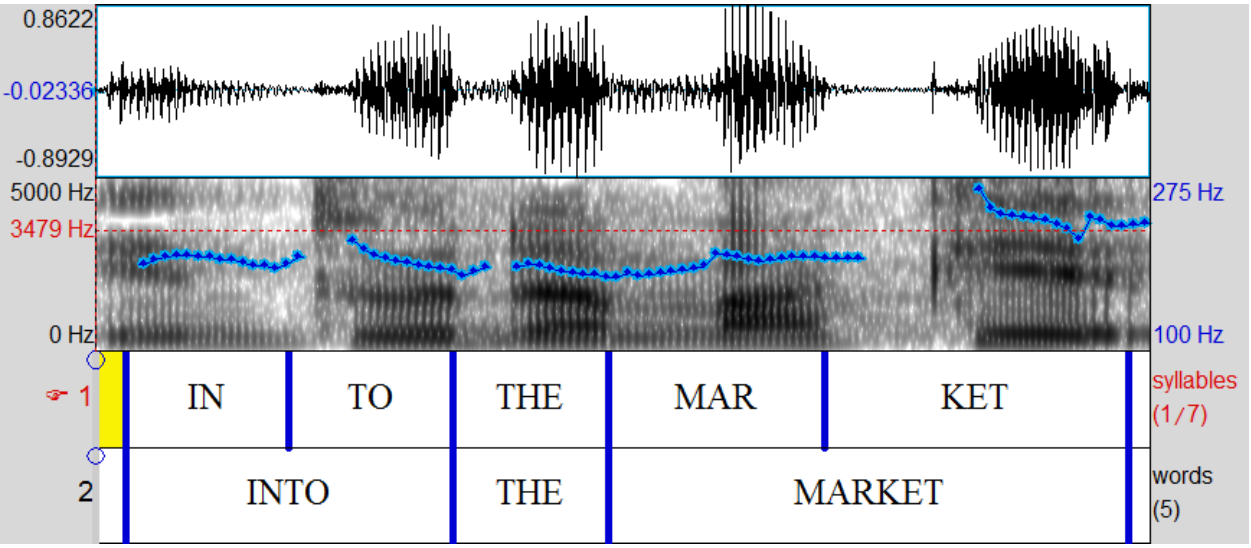
Therefore, I propose that polysyllabic function words also have a ($_{\omega}$L)H$_{\omega}$ pattern similar to lexical words, with an L tone anchored to the left edge of the word and a H tone on the rightmost syllable. In the case of monosyllabic function words, all instances of cliticization occur when the function word

consists of only one syllable. If we posit that polysyllabic words form their own prosodic word and that only monosyllabic words and individual syllables may cliticize to core prosodic words, then the only remaining case that is unexplained is the LL tone of some disyllabic function words. How then does the structure of LL disyllabic function words work? A possibility here is that both syllables of the disyllabic word are evaluated as separate function words, both cliticizing separately to the following lexical word, as illustrated in the example below.

Example (12): Disyllabic function word breakdown

[ω in [ω to [ω the [ω market$_{ω}$] ω] ω]
| | | | |
ωL ωL ωL ωL Hω

Figure 45: Spectrogram for 'into the market'



Thus, it appears that all cliticization to the core prosodic word has to take place in individual syllables. If a disyllabic function word cannot be parsed separately as two individual function words or clitics, it will also form its own standalone prosodic word (for example, a word like 'after' that cannot be reanalyzed

as two separate function words) and receive the standard ($_{\omega}$L)H$_{\omega}$ prosodic word tone. Two monosyllabic function words that derive from an original disyllabic function word would cliticize separately and are thus predicted to behave no differently from two monosyllabic function words.

To recapitulate, it appears that the majority of function words fit the prescribed pattern of being pronounced with an L tone if it attaches to the left of the core prosodic word, and a H tone if it attaches to the right of the core prosodic word. When function words are pronounced in isolation or if they are too long to be analyzed as individual monosyllabic function words, they form prosodic words by themselves and are pronounced like lexical words. There are also notable exceptions: negation and wh-words, which carry a focal extra high tone.

§3.7 The Prosodic Word: Additional Cases

There are three other categories of lexical words that do not strictly fit into the scheme that has been laid out above: compound words, long words, and tonal borrowings. We will explain in this section how these categories fit into our overall structure of the prosodic word.

Wee (2008) showcases the fact that a number of words in Singapore English may contain multiple H tones:

Example (13): Compound words

i. *strawberry* [H M H]
ii. *blackboard* [H H]
iii. *blackbird* [H H]
iv. *teapot* [H H]
v. *everything* [M H H]
vi. *everybody* [M H M H] (Wee 2008:491))

Wee (2008) explains this phenomenon by stating that when speakers identify words in a compound word that can be parsed separately, they will do so. In other words, 'straw' is parsed separately from

'berry'. In terms of our prosodic word analysis, morphemes that can be perceived as standalone lexical items or words are parsed individually as core lexical words. Thus, in our analysis, the word 'strawberry' actually consists of two prosodic words 'straw' and berry', as illustrated below:

Example (14): Parsing of compound words

$[_{\omega}$ straw $_{\omega}]$ $[_{\omega}$ berry $_{\omega}]$
| | |
H_{ω} $_{\omega}L$ H_{ω}

As we have seen from the disyllabic function word 'into', Singapore English speakers may not necessarily adhere to the spacing of the written word in the parsing of lexical and functional items. If they can identify and parse separate elements of the word, they will do so. Compound words can therefore be analyzed as words that comprise two core lexical words, and are pronounced by speakers as such.

We can thus see that the phenomenon of compound words is similar to the case of negation and wh-phrases in the sense that although they seem to be exceptional cases, they can be explained within the overall system. Another example of how speakers parse words differently in real life than from theory can be seen in how speakers break up the pronunciation of long words. In polysyllabic words with a large number of vowels of non-English origin such as 'Kinokuniya' (a Japanese bookstore), 'Takashimaya' (a Japanese department store), speakers either treat the entire string as one word ([takashima**YA]**$_{\omega}$ with a H_{ω} on 'ya') or break it up where they perceive a break could be present ([ta**KA]**$_{\omega}$ **[**shima**YA)**$_{\omega}$: a H_{ω} on 'ka' as well as 'ya') – both pronunciations exist. Even though there is variability here, the model proposed here is able to account for these exceptions as long as it is taken into account that loanwords could be parsed differently in Standard English and Singapore English.

As noted in Chapter 1, a number of Singapore English words retain vestigial tone, especially when pronounced by Chinese speakers. This has been noted in Chow (2009, 2011), and can be seen on

lexical borrowings from other languages spoken in Singapore such as Cantonese and Hokkien. These words have their own lexically-specified pitch from the language of origin. Examples of these are displayed again from Section 1.1.3:

Example (1) repeated

‘paiseh’ (to feel ashamed)	‘chin chai’ (easygoing)	‘pek chek’ (frustrated)
/pʌɪseɪ/	/tʃɪn tʃʌɪ/	/pɛk̚ tʃɛk̚/
H L	H HL	H L

There are two things to note here. Firstly, this is not code-mixing as these tones have changed from their language of origin, especially since a good number of Singapore English speakers now do not speak their heritage language or dialect and thus do not possess its original tonal inventory. The original tone letters for the surface forms of the Hokkien words are: pai seh [51 21], chin chai [33 21] pek chek [4 32]. We see that even though Singapore English speakers do not possess the exact tonal representation of the original language, they are still able to use the two tones in their prosodic inventory to approximate the original Hokkien tones (with variation amongst speakers). These borrowings are not just limited to Hokkien but other Chinese dialects such as Cantonese. Since the tone systems of Hokkien and Cantonese are more complex, the ‘borrowed’ tone system of Singapore English appears as though it has been approximated and incorporated into Singapore English prosody, and loanwords in Singapore English at most possess four different tones: L, H, LH (rising) and HL (falling). The specific tones on loanwords in Singapore English will have to be a topic of future research, but for the moment we can identify only these four distinct types.

Secondly, it is important to note that not all speakers pronounce these lexically-specified tones, especially Malay or Indian Singaporeans, if these words of Chinese origin are indeed in their vocabulary. Often, Malay and Indian speakers do not produce them with the same tones as Chinese speakers, but

rather to regularize them by using the default boundary tones. Therefore, Malay and Indian speakers would only produce the tones ascribed by prosody, not having access to the lexical knowledge of these tones. In this case, the usual Singapore English word tone (i.e. $(_{\omega}L)H_{\omega}$) will be pronounced on the word instead. In order to incorporate these words into our structure for prosodic words, we will propose that loanwords have lexical tones for some speakers (mostly ethnic Chinese), but that these lexical tones are gradually replaced with regular word tones by speakers less familiar with Chinese. For example, 'paiseh' may have a HL lexical tone for more Chinese-inclined speakers, but this lexical tone is lost or overridden by a more regular $(_{\omega}L)H_{\omega}$ tonal pattern in speakers who have less familiarity with Chinese.

Thus, it appears that when lexically specified tones for the prosodic word exist, these predefined tones replace syntactically defined word tones. The formalization provided in this paper therefore can also account for the tones on loanwords.

§3.8 The Prosodic Word: Summary

In summary, in this chapter we have defined and laid out what comprises a prosodic word in Singapore English, a crucial domain in the intonational structure of the language. A prosodic word consists of a core prosodic word, which is a lexical word, and may optionally contain monosyllabic function words that can cliticize both to the left and right of the core prosodic word. A core prosodic word has a H_{ω} tone assigned to its final syllable, and the left edge of the core prosodic word has an $_{\omega}L$ tone anchored to it if it has more than one syllable. All other non-final syllables in the core lexical word are unspecified for tone and bear an interpolated tone. This structure is recursive, and monosyllabic function words that cliticize to the right of the core prosodic word are phrase-final and receive a H_{ω} tone, and all monosyllabic function words that cliticize to the left receive an $_{\omega}L$ tone on their left boundary. In this chapter, we have also identified that only monosyllabic words may cliticize to core function words.

Polysyllabic (including disyllabic) function words that cannot be broken down into individual monosyllabic function words as well as function words in isolation form their own prosodic word, and thus obtain the standard ($_{\omega}$L)H$_{\omega}$ tone of the prosodic word. In addition, we have identified that some categories of function words (wh-words and negation) are interpreted and pronounced by speakers as focal words which carry an extra H tone. We have also seen in this chapter that Singapore English speakers do not adhere to Standard English morphological parsing and pronunciations, as compound words can be parsed into two separate prosodic words and disyllabic function words such as 'into' may also be analyzed as two separate words. We have also seen that if a prosodic word contains a lexical tone, the lexical tone overrides the syntactic word tone of the prosodic word.

One point that has not been fully addressed here in this formalization is the tone of initial syllables in polysyllabic (including disyllabic) words. Although most polysyllabic words have been identified to begin with an L tone, some words have been noted to begin with an M tone (Siraj 2008, Ng 2008, Wee 2008b). For instance, 'hibiscus' is claimed to start with an $_{\omega}$L, while 'elephant' would begin with an $_{\omega}$M. However, this issue will not be resolved here for two reasons. Firstly, from native speaker consultation and intuitions, there does not seem to be a salient perception or production difference between a word with an initial L syllable or a word with an initial M syllable. Whether L or M matters perceptually will have to be tested in future studies, but it appears that the crucial prosodic data in Singapore English is the location of the pitch accent H$_{\omega}$ in the prosodic word. Secondly, this difference might be variable from speaker to speaker. For example, it is not 'un-Singaporean like' to variably pronounce $_{\omega}$L [hibiscus] H$_{\omega}$ as $_{\omega}$MH$_{\omega}$ and vice versa: $_{\omega}$M [elephant] H$_{\omega}$ can also be pronounced as $_{\omega}$LH$_{\omega}$. Differences in tones in Singapore English do not produce lexical contrasts, and moreover the difference between L and M is harder to perceive than the difference between L and H. Therefore, the difference between initial surface $_{\omega}$L and $_{\omega}$M in Singapore English does not appear to be a significant one. A

speculative proposal as to why there is a surface difference between ‘elephant’ and ‘hibiscus’ are different would be that the microprosodic properties of the segments differ. Regardless, the formalization provided in this chapter, with a $_{\omega}$L tone anchored to the left edge of the word and a H_{ω} tone on the rightmost syllable, accounts for the crucial surface realizations.

§4 The Phonological/Intermediate Phrase in Singapore English

§4.1 Does an intermediate phrase exist?

The next level of the intonational structure of Singapore English to be explored is the intermediate phrase or phonological phrase level. In accordance with the Prosodic Hierarchy, the Intermediate Phrase or Phonological Phrase is a domain that falls between the Prosodic Word and the Intonational Phrase. However, it is far from obvious that such a level exists in Singapore English, and as previously mentioned, it is important to not assume that prosodic domains exist on this level purely based on a theoretical motivation: we should only posit the existence of a prosodic constituent if it is the domain of phonotactic restrictions, and if there are rules of the grammar that need to refer to it in their formulation (Nespor and Vogel 2007). To complicate things, Selkirk (2009) states that no phonological or phonetic properties apply universally prosodic constituents above the level of the foot.

In more recent work in prosodic phonology, it is now well-established that many languages lack levels previously assumed to be universal within the Prosodic Hierarchy or to have additional ones. For example, Serbo-Croatian has been noted to possess only one prosodic unit above the word (Zec 1993), while languages such as Bininj Gun-Wok and Farsi have been shown to have three (Jun 2005). Bickel et al (2009) show that languages may have as many as 7, with a considerable proportion of languages possessing 4, 5 and 6. Bickel et al (2009:64) also make the assertion that stress languages tend to possess more stress-defined domains, while there is no such correlation with tone languages. As we have claimed in this paper, Singapore English does not contain stress, and following this frame of reference, all things considered, it should thus stand to have less prosodic units than Standard English since it should lack any stress-defined domains. In addition, there is no phonetic evidence in Singapore English for feet, binary or otherwise, which already sets it apart structurally from Standard English.

Based on previous work, we would expect that an intermediate or phonological phrase would roughly match syntactic phrases (e.g. Selkirk 1986, Selkirk and Shen 1990, Selkirk 2009). I have therefore looked for two types of evidence for intermediate or phonological phrases matching syntactic phrases in Singapore English: first; segmental rules that appear to operate in these domains, and second, the existence of boundary tones on either edge of the constituent. In the first case, there simply does not seem to be any segmental process in Singapore English that occurs on a level higher than the syllable, and so there is no evidence in this regard. The second case will be explored further in this chapter: if there are indeed phonological or intermediate phrases in Singapore English, there should be phrase accents on the boundaries of these syntactic constituents. For example, Beckman and Pierrehumbert (1988) show that an intermediate phrase is edge-marked by a phrase tone, while an intonation phrase is edge-marked by both a phrase tone and a boundary tone.

As noted in section 2.2, Chong and Sneed (2015) have tried to locate acoustic evidence of an accentual phrase by testing the following three sentences:

Figure 12 (repeated): Different sentence conditions testing for phrasal boundaries (Chong and Sneed 2015)

He said he will (IP-final)

He said he will tomorrow (AP-final)

He said he will go tomorrow (Word)

The study found that IP-final, AP-final and non-final words all have different vowel durations. However, as previously noted, there are two glaring problems with this study. Firstly, it is not clear that 'will' in 'He said he will tomorrow' is in an AP-final position; rather, it appears to be in an IP-final position as 'tomorrow', an adverbial phrase, could be analyzed as a separate IP. Secondly, the use of the word 'will' in the study is problematic as 'will' can be analyzed and pronounced as both a function word and a

lexical word. In the sentences above, 'will' in AP-final position is treated as a prosodic word (pronounced with a H tone) while 'will' in non-final position is a function word, auxiliary 'will', cliticizing to 'go' and hence pronounced with an L tone.

However, there is one more test that can be done on the level of the intermediate phrase to see if a phrasal domain exists - to examine whether there is downstep in Singapore English. Downstep has been noted take place on the domain between the prosodic word and the intonational phrase (i.e. accentual phrase or phonological phrase) in Standard English (e.g. Pierrehumbert 1980, Ladd 1996, Gussenhoven 2004), and if there were clear evidence of downstep, that would demonstrate that there might be an effect of an intermediate phrase in Singapore English. In the next few sections, I will report results from a study designed to test for downstep in Singapore English.

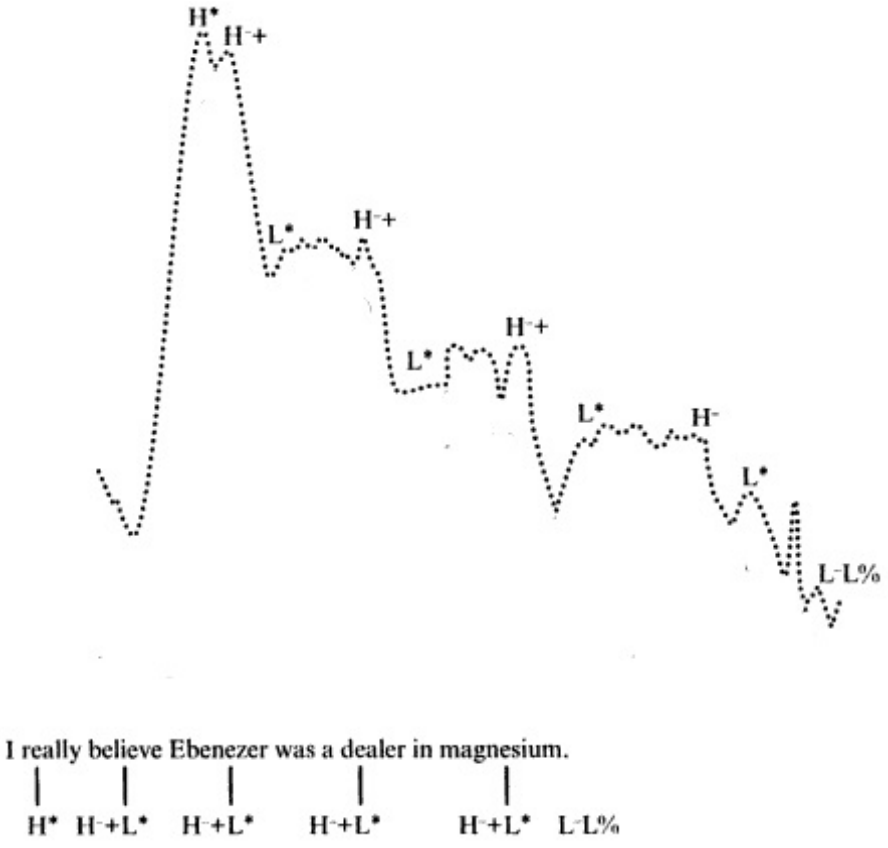
§4.2 Research Questions and Methodology

A crucial missing aspect of the intonational structure in Singapore English is whether it exhibits any phonetic or phonemic tonal processes such as downstep or upstep (upstep is much rarer and highly unlikely). A common feature of tone languages, or languages that utilize tones, is the interaction of H and L tones to create a downward or upward shift of pitch or tone across syllables. An example of downstep is when the second H tone in a HLH sequence is realized at a lower pitch due to the intervening L tone (Gussenhoven 2004:100). Another type of downstep (also known as non-automatic downstep) occurs when two H tones are next to each other and there is a lowering in the second H tone even when there is no L tone intervening. A feature of downstep is that once this lowering occurs, a new height ceiling is created and future tones may not exceed the pitch height of that ceiling unless there is a pitch reset. In the previously mentioned example sequence HLH, a H tone further along in the relevant domain may not exceed the pitch height of the downstepped second H tone. Downstep is distinct from declination, which is the general lowering of the fundamental frequency of the utterance

over time. Whereas downstep is caused by lowering of pitch due to interactions between tones, declination is the gradual modification (over the course of a phrase or utterance) of the phonetic backdrop against which the phonologically specified F0 targets are scaled (Connell and Ladd 1990:2). Declination has been claimed to be a universal effect, at least for declarative sentences (Connell 2001). The illustration of downstep in the previous paragraph can also be termed automatic downstep or downdrift, which occurs when the H tones in successive syllables are separated by an L tone (e.g. H L H), causing the second H tone to be lower than the first one.

An example of downstep is repeated here from Section 1.6:

Figure 6 (repeated): Example sentence of pitch accents and boundary tones in Standard English (Pierrehumbert 1980)



In this sentence, we see that the H tone in the words 'Ebenezer', 'dealer' and 'magnesium' are much lower than the H tones of the previous words respectively (i.e. the H tone in 'dealer' is much lower than the H tone in 'Ebenezer'), displaying that downstep occurs. If the difference in the heights of the H tones were a more gradual one, then it could be attributed to declination and not downstep.

The existence of these two types of downstep in Singapore English can be tested by eliciting sequences of the same tones patterns (e.g. HHHHHH or LHLHLHLHLHLH) across multiple syllables. Therefore, the following study will check for the presence of phonetic or phonemic downstep or upstep by testing repetitive tone sequences to see if there are any acoustic differences between the tones in the sequence. The experiment will examine the difference between H tones read out in the row (default condition) and H tones with interspersed L tones. This experiment could not be done with L tones as it is impossible to make up a normal sentence with only function words. The sequence of LHLHLHLHLHLH tones tests for automatic downstep, as the presence of L tones should theoretically terrace the H tones at a lower level than the H tones in the default condition. The sequence of HHHHHH tones controls for declination. Comparing the two patterns (i.e. in a HHH sequence compared to a HLH sequence) will show us whether there is automatic downstep in the LHLHLH pattern; if it is present, the second H in the HLH sequence should be lower than the third H in a HHH sequence.

A production study was carried out. 10 native Singapore English speakers with no speech or hearing impediments aged 20-40 were asked to read out the following sentences which contain sequences of tones in frame sentences (sentence list below). The recordings took place in a soundproof booth with a Marantz PMD620. A randomized order was created for the following sentence list which was be the same order for all subjects. Each sentence was be read out three times per subject. The suprasegmental properties of the words studied were then analyzed in Praat. Pitch values were normalized by speaker using z-score values.

Figure 46: Sentence list for downstep experiment

Sequences of H tones:

Big black cats eat small grey fish (H H H H H H H)

Ten strong men dig wide long roads (H H H H H H H)

Sequences of LH tones:

Many angry people bankrupt after market collapse (LH LH LH LH LH LH LH)

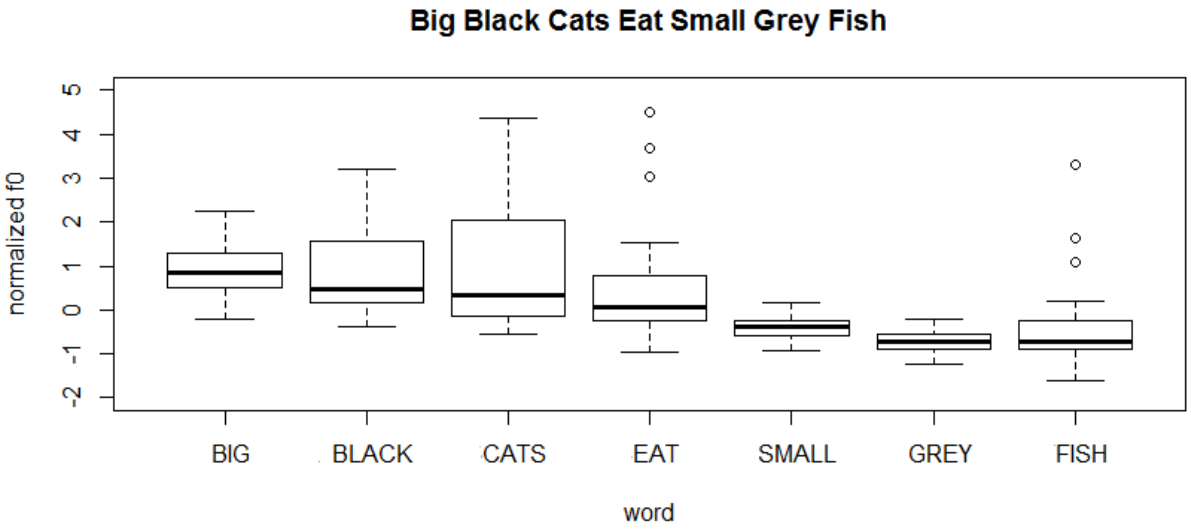
Twenty fishes calmly swimming around corals (LH LH LH LH LH LH LH)

Another goal of this study is to see if there is any pitch reset at the boundary between syntactic phrases, as this could also constitute evidence for the existence of a phonological or intermediate phrase.

§4.3 Results and Discussion

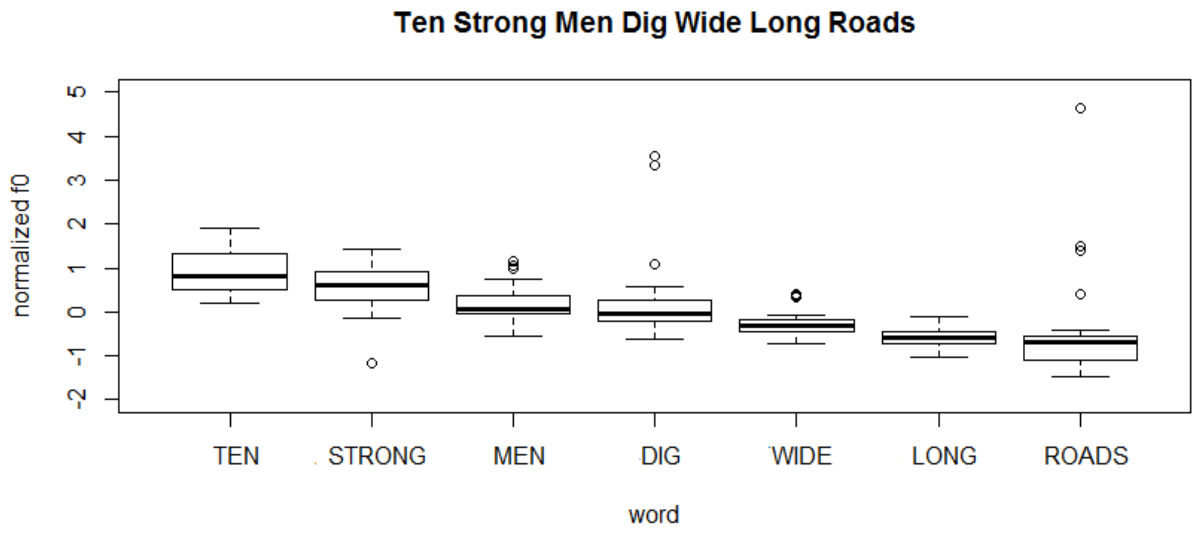
We will first look at the sentences that contain multiple H sequences. The boxplots below all contain normalized data taken from all 10 speakers (normalized through z-scores by speaker). The sentence below 'Big black cats eat small grey fish' contains a sequence of seven H tones in succession:

Figure 47: Boxplot showing normalized f0 of individual words in a 7-syllable HHHHHHH sequence



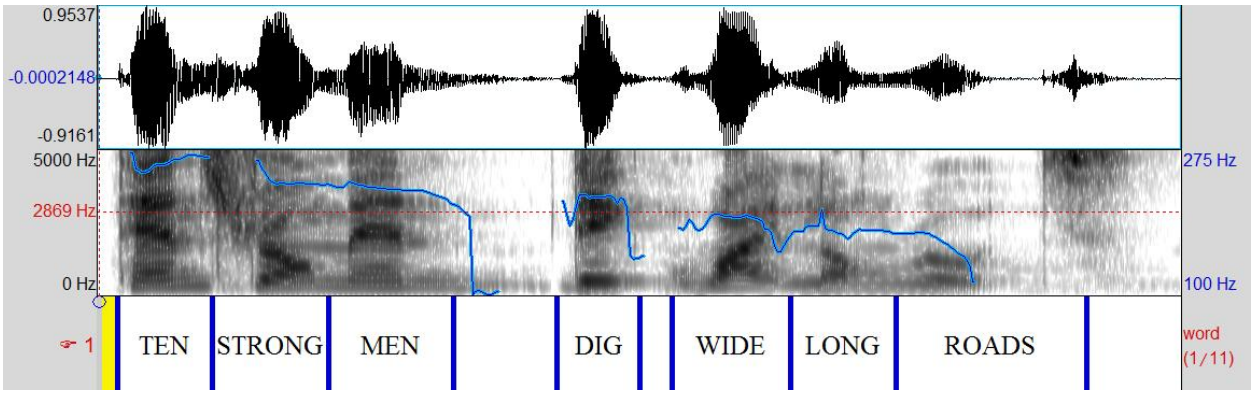
From the data above, we see that there is a general declination from 'big', the first word in the sentence, all the way down to 'fish', the last word. 'Big' is pronounced with the highest pitch, and 'fish' is pronounced with the lowest pitch, with all words in between being pronounced with a lower pitch than the word preceding it. There does not seem to be any interaction between the H tones besides this declination effect. The word 'cats' has a wider variability in pitch, with some speakers pronouncing it at a higher pitch. This could be due to some speakers placing a topic focus on the word 'cats', although in the example below with 'men', we do not see the same phenomenon happening so it may be merely an idiosyncratic tendency. We now look at another sentence with the same seven H tones to verify that these findings are similar:

Figure 48: Boxplot showing normalized f0 of individual words in a 7-syllable HHHHHHH sequence



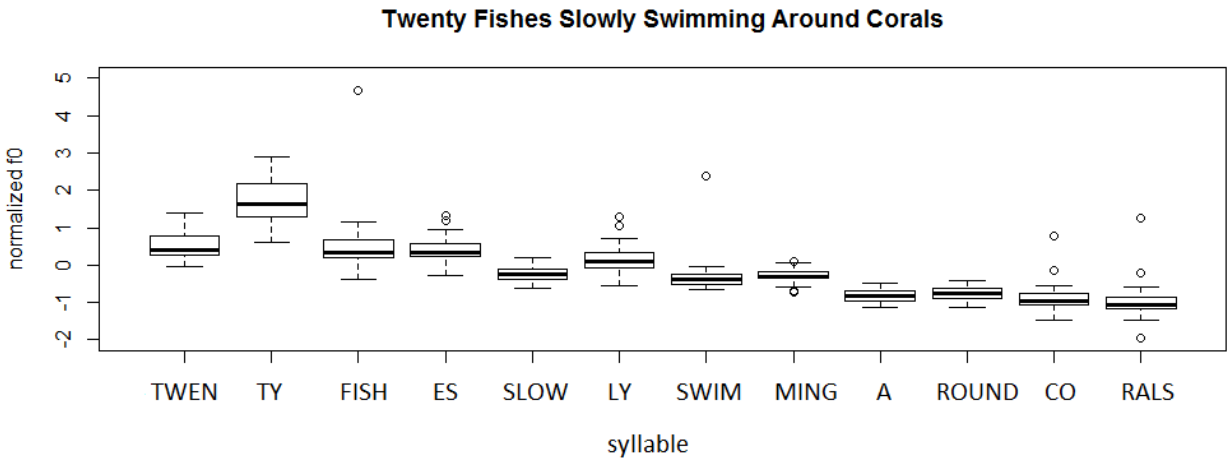
The data above is highly similar to the preceding boxplot, and illustrates further that there does not seem to be any interaction between the high tones in the sentence besides the gradual declination in the sentence. The spectrogram below is a sample individual result which reflects the trend of the aggregated data:

Figure 49: Spectrogram of 'Ten Strong Men Dig Wide Long Roads'



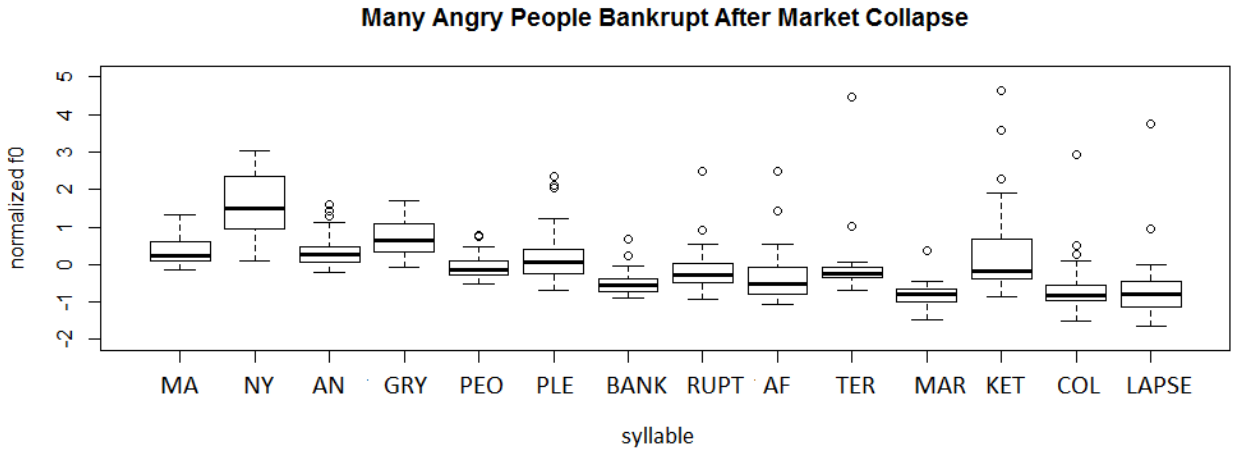
We now turn to sequences of LH tones to see if the presence of the $_{\omega}$L tones trigger downstep or the additional lowering of H tones.

Figure 50: Boxplot showing normalized f0 of a 12-syllable LHLHLHLHLHLH sequence



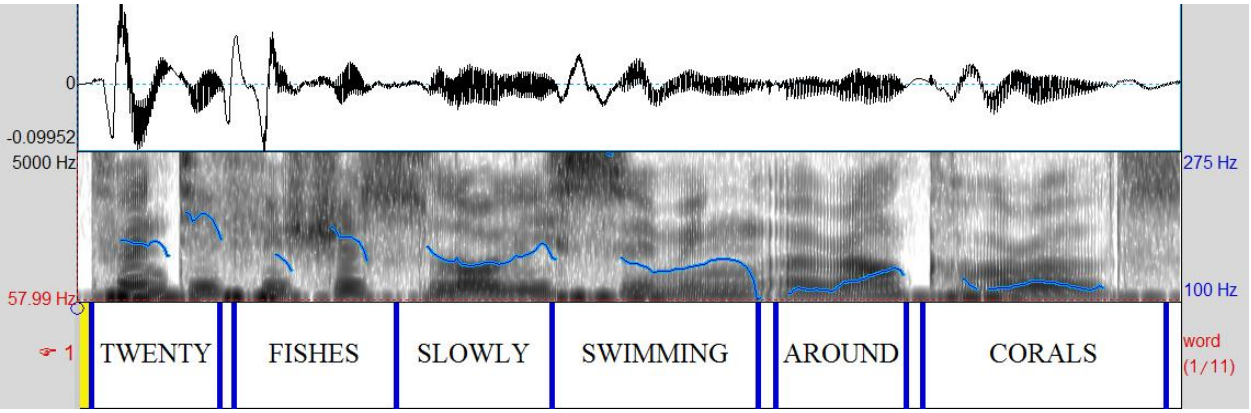
The boxplot above shows that again, there does not seem to be any obvious downstep triggering besides the gradual declination of fundamental frequency across the utterance. The following boxplot shows a similar result:

Figure 51: Boxplot showing normalized f0 of a 14-syllable LHLHLHLHLHLHLH sequence



The above results are highly similar to the previous boxplot, and show that there does not seem to be any interaction between tones besides the gradual declination. Again, individual results reflect the aggregated data as shown from the following spectrogram:

Figure 52: Spectrogram of 'Twenty Fishes Slowly Swimming Around Corals'



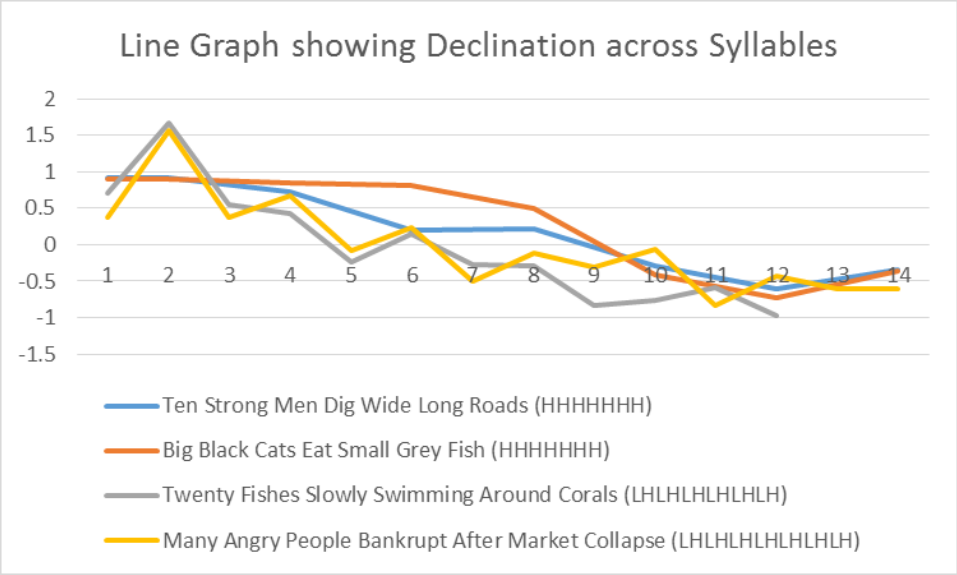
An unexpected observation from these results is that the first H tone (e.g. 'ten', 'big', and the second syllable in 'twenty' and 'many') seems to be higher than all the other H tones in the sentence, even after accounting for declination. We will look at this initial increase in pitch in more detail in the following chapter.

Another salient point that can be observed from this study besides the absence of downstep is the absence of pitch reset. Looking again at the above figures (47-51), there is no evidence for a sudden raise or reset in pitch throughout any of the four sentences. The fact that there is no evidence for resetting at the edges of syntactic phrases further reinforces the possibility that there are no intermediary domains between the prosodic word and the intonational phrase.

The absence of downstep and pitch reset can be further observed in Figure 53 which shows the mean speaker-normalized f0 for each syllable of the four sentences together in one graph (with z-normalized f0 on the y-axis and syllables on the x-axis). Even numbers on the x-axis show the location of the H tones in the LH sequences. H sequences were stretched by interpolating the odd numbers for the H sequences. Besides the peaks of the H tones in the longer disyllabic sentences, there does not seem to be any downstep or upstep of any sort, and there appears to be only a gradual decline due to

declination. There also does not seem to be any pitch reset, which would point to evidence for an intermediate phrase:

Figure 53: Line Graph showing Pitch Declination Across Syllables



This reinforces the narrative from the rest of this chapter that there does not seem to be any intermediate phrase in Singapore English. The only notable behavior from the study seems to be evidence for initial raising at the beginning of IPs, which is a property of the intonational phrase and which will be discussed in-depth in the next chapter. In conclusion, I claim that for lack of evidence, we cannot propose that there is an intermediate domain between the prosodic word and the intonational phrase in Singapore English. In the next chapter, we will look at the largest prosodic domain in Singapore English, the intonational phrase.

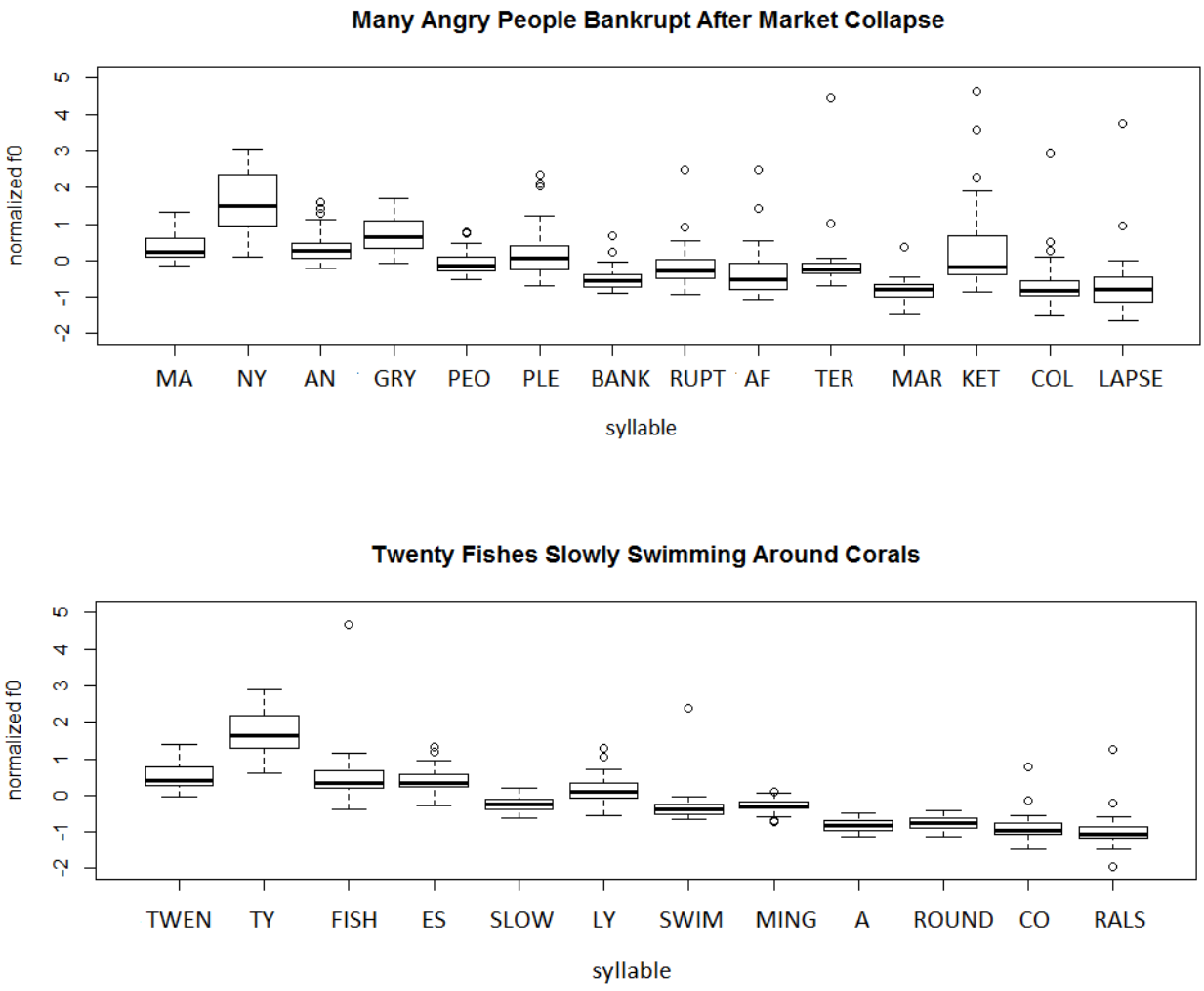
§5 The Intonational Phrase in Singapore English

In this chapter, I will look at tonal phenomena which occur in the domain of the intonational phrase. Firstly, in Section 5.1, I will present a study on the initial boost at the beginning of the intonational phrase, and will show that this initial boost affects lexical, but not function words. Secondly, in 5.2, I will show how the overall pitch of an intonational phrase is affected by different communicative functions, and show that intonation mostly affects the rightmost syllable in the intonational phrase. In addition, I will show how the pitch curves of boundary tones can mark different communicative functions. Thirdly, in section 5.3, I will look at how utterance-final particles in Singapore English are part of the intonational phrase and show how the rightmost syllable effect bears out on these final particles. I will then end by showing an example in 5.4 of how a formalization of these combined intonational phrase phenomena can describe and explain the pitch of a given sentence.

5.1 The phrase-initial boost in Singapore English

On the level of the intonational phrase, previous literature has noted that there is an 'exaggerated' raising of pitch at the beginning of an utterance, usually on its first prosodic word (see section 2.3.4). In the previous experiment in section 4.3, we have also seen that the first word in the utterance has a pitch boost compared to other words in the sentence. In particular, in the sentences with disyllabic words, we see that the initial H tone is what gets boosted in the sentence:

Figure 54: Illustration of pitch boost in 'Many' and 'Twenty'



In the above sentences, the H tone on /ni/ in 'many' seems to be notably higher than the other H tones, even after factoring in declination. We also see this phenomenon on /ti/ in 'twenty' in 'Twenty fishes slowly swimming around corals', so this is not an isolated incident. More examples of this initial pitch boost cited in section 2.3.3 are repeated below:

Figure 15 (repeated): Examples illustrating initial pitch boost from Deterding (2007:35)

and actually I would like to visit there one day

basically it's a good combination ah

I think they are quite…nice and interesting magazines

so I guess I will try to go to the park to cycle

According to Doyle and Deterding (2005), the underlined words ('actually',' basically' and 'I' in the last two examples) are pronounced with a sharply rising pitch over the entire word.

Although there is evidence that the initial-position in English is accompanied by an increase in energy on the initial vowel (Cho and Keating 2007) as well as articulatory strengthening (i.e. increase in linguopalatal contact) at the initial-edge of prosodic domains (Fougeron and Keating 1997, Cho and Keating 2007), there is to my knowledge no such corresponding boost in pitch at the beginning of prosodic domains in Standard English. This is therefore a prosodic feature that is present in Singapore English but absent in Standard English.

In addition to the front of the sentence being prominent in terms of prosody, it also appears to be discursively prominent in Singapore English speech. Singapore English speakers very often utilize syntactic fronting as a way to lend emphasis or discourse prominence to an object. Some examples of this include: 'Certain medicine we don't stock in our dispensary' (Platt and Weber 1980:73), and 'This one I like'. These sentences are also possible in Standard English with the appropriate contexts, but in Singapore English these are common sentences which are not as marked and are much more widespread. Alsagoff and Ho (1998) state that this object preposing is directly influenced from Chinese grammar, in which an object can gain topical prominence through moving it to the beginning of the utterance. This shows that the beginning of the sentence is prominent both in terms of pitch and in terms of discourse in Singapore English. Perhaps these two aspects are related: the initial pitch prominence leading to sentence-initial objects being prominent, or vice-versa. The following experiment will seek to test for the existence of this initial-boost, and to examine how this initial boost affects both function words and lexical words in Singapore English.

§5.1.1 Research Questions and Methodology

This experiment aims to examine the effects of intonation-phrase initial effects in Singapore English. A sentence list was constructed in which both lexical and function words were kept constant, but sentential position was manipulated to test its effect on word tones. For example, in the two sentences 'Lee went to market' and 'Ah Beng hit Lee', 'Lee' has two distinct positions and should illustrate initial boost in the former case. The variables that will be examined in this experiment are:

1. Sentential position – whether the position of the word in the sentence affects the prosodic properties of the word. Note that the words cannot be placed directly in an utterance-final position as the intonational boundary tone is likely to affect the inherent tone of the word.

2. Function words versus lexical words – Both function words and lexical words will be studied in this experiment so as to determine if the presence of an initial boundary tone affects both function words and lexical words equally. In order to reduce the influence of microprosodic effects, function words and lexical words with the same rhyme have been chosen (e.g. he versus Lee). If there is a prosodic effect that affects only one category, the results should be apparent and comparable.

In this production study, 10 native Singapore English speakers with no speech or hearing impediments aged 20-40 were asked to read out the following sentences in Figure 55. The recordings took place in a soundproof booth in Nanyang Technological University with a Marantz PMD660. A randomized order was created for the following sentence list which was the same order for all subjects. Each sentence was read out three times per subject. The f0 of the target words were then analyzed in Praat.

Figure 55: Sentence list for Initial Boost Experiment

Utterance and IP initial (subject position)

1. **He** went to market and bought a fish

2. **Lee** went to market and bought a fish

Clause initial non-IP initial (subject position)

3. I told him that **he** went to market and bought a fish

4. I told him that **Lee** went to market and bought a fish

Object position, non-utterance final

5. Ah Beng hit **him** and ran away

6. Ah Beng hit **Lim** and ran away

In isolation in a frame sentence (Isolating a function word will cause speakers to treat and pronounce it as a lexical word)

7. Ah Beng say the word **Lee** to me

8. Ah Beng say the word **he** to me

9. Ah Beng say the word **Lim** to me

10. Ah Beng say the word **him** to me

In sentences 7-10, the words were placed in a citation frame to see if it had any effect on pitch. In theory, placing function words in citation frame should produce a H tone, since function words in a citation frame are promoted to prosodic wordhood. It is possible that the lexical frame creates a new intonational phrase (and thereby a boundary tone), and this will also be tested.

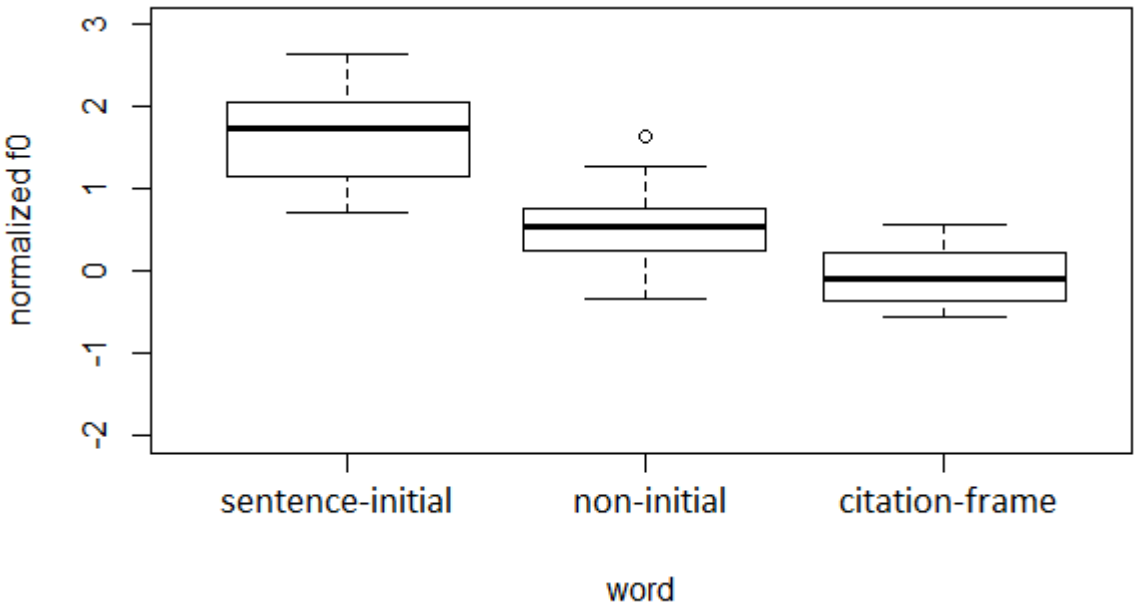
§5.1.2 Results and Discussion

Firstly, we will look at whether sentential position has an effect on f0. The boxplot below compares the word 'Lee' in the sentences '**Lee** went to market to buy a fish' (sentence-initial condition), 'I told him that **Lee** went to market to buy a fish' (non-initial condition) and in the framed reading 'Ah Beng say the word '**Lee**' to me' (citation-frame condition). All of these words should have a H tone in theory as they are monosyllabic prosodic words. However, we see that sentence-initial position has an

effect on raising the H tone. I postulate that this is not because it is sentence-initial per se, but because it is IP-initial. The other two conditions can be argued not to be IP-initial. It has been proposed for English that only the root clause corresponds to intonational phrases (Downing 1970, Downing 1973, Nespor and Vogel 1986), and that relative clauses do not create new intonational phrases. For example, the sentence 'I know the artist that painted the picture of the woman that wrote the book that won the acclaim of many' is treated as only one intonational phrase (Nespor and Vogel 2007:203). Therefore, in the sentence 'I told him that **Lee** went to market to buy a fish', 'Lee' does not create a new intonational phrase.

There is also good evidence that citation frames do not create new intonational phrases, as there is no evidence for new intonational boundary tones in citation frames. Words in the citation frame (the bolded words in Figure 55:7-10) were read out with a regular H tone, including both function and lexical words. For example, in figures 56 and 57 to come, we see that value of the normalized citation-frame tone is around 0, which is about what we would expect as it is a H tone near the end of the sentence. In Figure 56, we see IP-initial 'Lee' compared with non-initial 'Lee' and citation frame 'Lee':

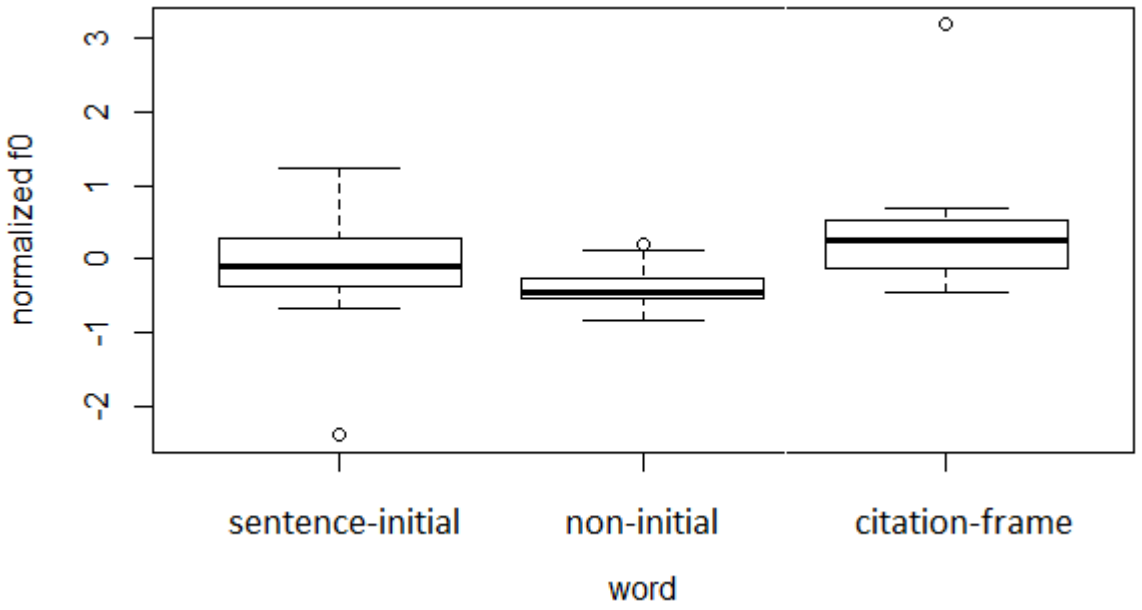
Figure 56: Boxplot of 'Lee' in different sentential positions



Even though these three words all bear a H_{ω} tone, keeping syntactic and segmental factors constant, words that come earlier in the utterance are pronounced at a higher pitch than words that come later in the utterance. There are two possible reasons for this: the sentence-initial boost discussed above and a declination effect. The declination effect can be seen from the third 'Lee' in the lexical-frame, since the word 'Lee' comes relatively later in the sentence 'Ah Beng say the word '**Lee**' to me' as compared to the sentence 'I told him that **Lee** went to market to buy a fish'.

Let us now look at the effect of IP-initial raising and declination on function words. The boxplot below shows the word 'he' in the sentence '**He** went to market to buy a fish' (sentence-initial condition) versus 'I told him that **he** went to market to buy a fish' (non-initial condition). This is compared to 'he' in a citation reading: 'Ah Beng say the word '**he**' to me' (citation-frame condition). All of the boxplots and data displayed below include normalized data from all 10 speakers.

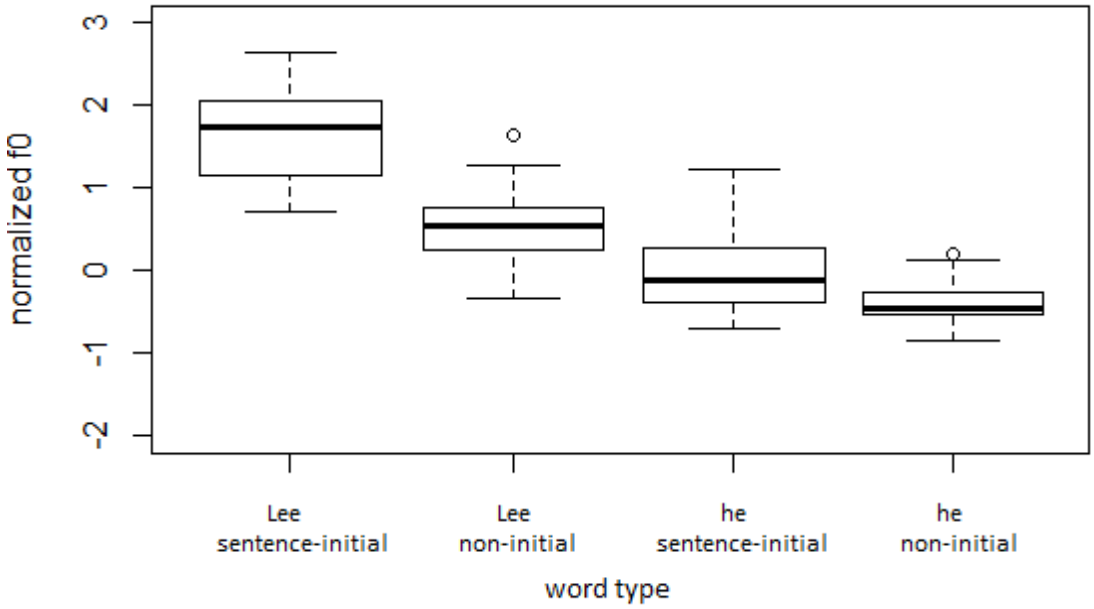
Figure 57: Boxplot of 'he' in different sentential positions



As we have seen in section 3.6, procliticized function words should have a $_{\omega}$L tone. In the chart above, although sentence-initial 'he' has a higher overall pitch than the non-sentence initial position, and a slightly expanded pitch range, the effect is not as great as what we saw from the contrast of lexical words in sentence-initial and non-initial position. There is therefore no evidence of IP-initial raising. However, due to the effects of declination, we would regardless expect that the non-initial function words would be pronounced with a lower f0 than in the sentence-initial condition, so this difference in f0 could be attributed to that. 'He' in the citation-frame becomes a prosodic word and is therefore pronounced with a H_{ω} tone, but as it is located further along in the utterance, declination also has an effect on its f0, which is barely higher than the f0 of the sentence-initial word.

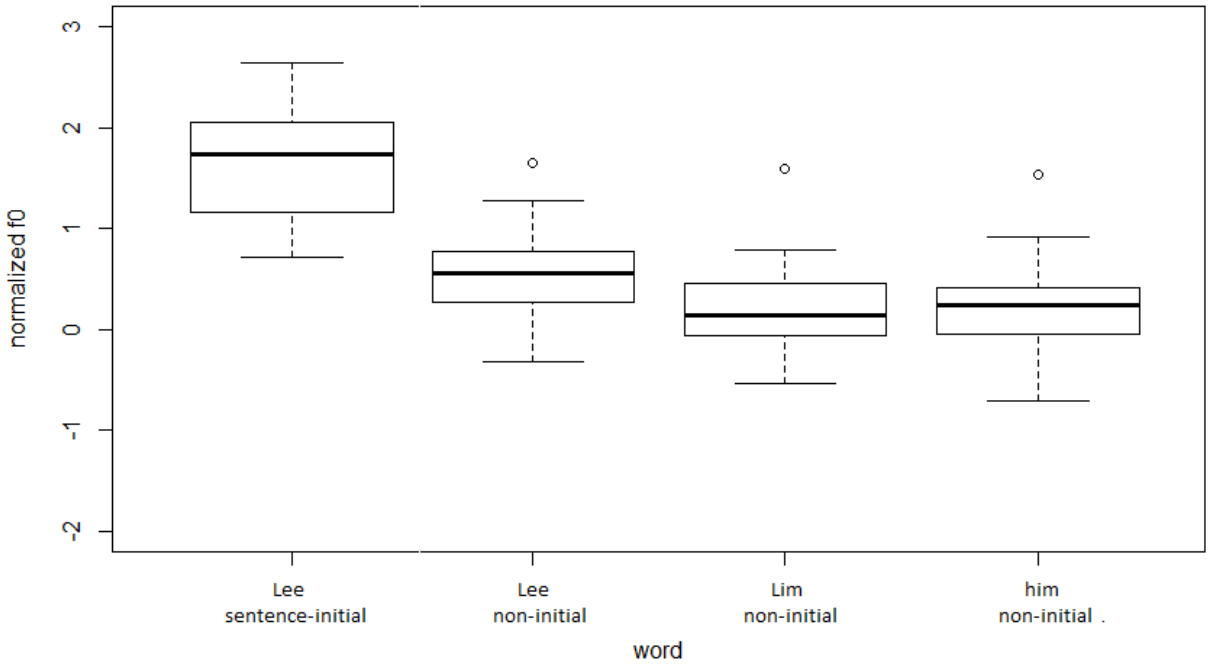
In Figure 58 below, the difference between the pitch-initial boost across lexical and function words is illustrated:

Figure 58: Boxplot of 'he' versus 'Lee'



In general, we see that the sentence-initial condition causes the word to be pronounced with a higher f0. However, the difference between lexical words is greater than the difference in function words, which could be partly attributed to initial raising, while the difference in function words is smaller and seems limited to declination. Figure 59 compares the difference between 'Lim' and 'him', along with the two instances of 'Lee' discussed above:

Figure 59: Boxplot of 'Lee' versus 'Lim'



This boxplot compares 'Lee' in both sentence-initial and non-initial position (**Lee** went to the market to buy a fish' and 'I told him that **Lee** went to the market') and 'Lim' and 'him' in a non-initial position ('Ah Beng hit **Lim/him** and ran away'). As there are no distinctions between tense and lax vowels in Singapore English, there should not be any intrinsic f0 effect and the vowels in non-initial 'Lee' and 'Lim' should be comparable. Here, we see that non-initial 'Lee' and 'Lim' are pronounced with a relatively similar pitch, showing that it is the initial position that results in the boost. We also see that there is no significant difference in pitch between 'Lim' ('Ah Beng hit **Lim** and ran away') and 'him' ('Ah Beng hit **him** and ran away'), demonstrating that enclitics and lexical words have the same H tone, and again it is the position of the word in the sentence that determines the relative pitch.

The data from this study also offer us a bit more insight into the topic of intermediate phrases in Singapore English. If we assume that 'Lim' is VP-final in the sentence 'Ah Beng hit Lim and ran away', following Chong (2013), technically there could be a phrase accent tone (e.g. a H tone) pronounced on

'Lim', since 'Lim' should be positioned at the edge of the VP or XP. We see that this is not the case, and that there are no such phrasal effects. Even though we cannot draw any hard conclusions from this data, this constitutes additional negative evidence that there are no intermediate phrases in Singapore English.

In summary, we have seen from data above that there is evidence for initial raising in lexical words. There is an initial boost on the H_{ω} tone on the rightmost syllable on the first prosodic word in the IP (seen in Figure 54). In contrast, there is no strong evidence for initial raising of $_{\omega}L$ tones. However, we have also seen that there is gradual declination throughout the utterance in Singapore English (shown initially in Section 4.2 on downstep). This declination effect affects the f0 of both H_{ω} and $_{\omega}L$ tones, causing words later in the utterance to be pronounced with a lower f0.

§5.2 The Final Syllable in the Intonational Phrase

A number of conclusions have been drawn about the final syllable of the intonational phrase in the literature on Singapore English (Section 2.3.1). Firstly, the final syllable has been noted to be the most prominent syllable in the intonational phrase in Singapore English, especially in terms of length and pitch. This has been noted in numerous studies including Deterding (2007), Goh (2005), Low and Grabe (1999) and Low (2000). Secondly, there have been numerous studies on sentence-final particles in Singapore English, including a number of studies that have argued for the presence of different 'tones' on these sentence-final particles (Kwan-Terry 1978, Loke and Low 1988, Platt 1987, Lim 2004). In addition, in section 2.3.1, we have shown that in many other East Asian and South East Asian languages, the last syllable of the utterance is where we see the greatest effect of intonation. The following study attempts to determine if these intonational effects are indeed concentrated on the final syllable, and also tests for the intonational effect of different communicative functions.

§5.2.1 Final Syllable: Research Questions and Methodology

Two important questions related to Singapore English intonational phrases have not been adequately addressed in the literature. Firstly, to what extent is the intonational phrase in Singapore English affected by communicative function or intonation? Does intonation affect the f0 of all words in the sentence or does it only affect the final syllable of the phrase? Secondly, how is communicative function reflected through intonational pitch? Do different communicative functions result in different pitch curves in Singapore English? This study strives to answer the above questions by testing the effects of different communicative functions on the Singapore English utterance in the absence of a final particle. This experiment aims to see (1) whether there is indeed a boundary pitch resulting from intonation; (2) if there is a boundary pitch, whether it mainly or only affects the final syllable in the utterance in absence of the final particle; (3) to see whether the communicative functions laid out in this study can map to specific pitch contours.

This study will explicitly test the following pragmatic intonations: (a) declarative (b) yes-no question (c) challenge (d) exclamation (e) uncertainty (f) exasperation. These intonations are not meant to be exhaustive, but rather to look at the types of intonational targets involved in differentiating sentential modes and attitudes. The sentence list also crucially distinguishes between utterances ending with an adverb (now) and utterances ending in a lexical word (cow). The aim of this distinction is to see whether the lexical category of the utterance-final word might affect the surfacing of boundary tones.

The sentences in the sentence list in the following section were read in the order that is displayed. This order was kept constant for each speaker. As seen from the sentence list, all words were kept constant while communicative function varied from sentence to sentence (i.e. the same communicative function was not repeated twice in a row). This way, the reader had to produce a

different intonation each time, with the aim to maximise contrasts across different intonation types. The sentence list is reproduced below:

Figure 60: Sentence List and Instructions for Final Syllable Experiment

Instructions

Imagine yourself talking to your Singaporean friend Ah Beng.

Read and understand the following sentences and their contexts (written in brackets). Only after fully absorbing the context, read the sentences in bold out loud, as if you were saying it to your friend with the intended meaning in the brackets. Repeat the task three times.

1. **Ah Beng, we gonna eat now.** (Declarative reading - you're telling your friend that we are going to eat)

2. **Ah Beng, we gonna eat now?** (Questioning if we are really going to eat now or not)

3. **Ah Beng, we gonna eat now?** (You were 100% certain that you were going to eat later, but suddenly your friend says you are going to eat now so you are challenging his proposition)

4. **Ah Beng, we gonna eat now!** (You're scolding him because you really want to go eat now!)

5. **Ah Beng, we gonna eat now?** (You are not sure if you guys are going to eat now and want some confirmation)

6. **Ah Beng, we gonna eat now!** (You are frustrated - this is the tenth time you're telling him that we are going to eat now!)

7. **Ah Beng, we gonna eat cow.** (Declarative reading - you're telling your friend that we are going to eat cow)

8. **Ah Beng, we gonna eat cow?** (Questioning if we are really going to eat cow)

9. **Ah Beng, we gonna eat cow?** (You were 100% certain that you were going to eat chicken, but suddenly your friend says you are going to eat cow so you are challenging his proposition)

10. **Ah Beng, we gonna eat cow!** (You're scolding him because you really want to go eat cow!)

11. **Ah Beng, we gonna eat cow?** (You are not sure if you guys are going to eat cow and want some confirmation)

12. **Ah Beng, we gonna eat cow!** (You are frustrated - this is the tenth time you're telling him that we are going to eat cow!)

Four native speakers of Singapore English (3 male and 1 female) read out the sentence list on the preceding page. Recordings were made in a soundproof booth with a Marantz PMD660 Solid State Recorder and a Shure SM10A head-mounted microphone in the University of Ottawa Sound Patterns Laboratory. Care was made to ensure that speakers were comfortable with reading the sentences before recording, and all the sentences on the reading list were read out loud for practice at least one time before recording. Although the recording setting was not spontaneous, the experimenter made sure that the sentences sounded natural and Singaporean.

Results were collected and analyzed in Praat. F0 (Hz) was measured at 5 evenly-spaced sampling points in every word and every syllable. The duration of each word and syllable was also measured. A Praat script was run to extract these measurements and pitch-tracking errors were corrected by hand where there was f0 pitch doubling or halving.

§5.2.2 Results and Discussion

Firstly, we will look at the normalized f0 across the sampling points of all words across all intonation types. The following sentence shows the tones that we would expect to obtain without any intonational influence (intonational phrase boundaries are distinguished in bold). Note that the 'na' in 'gonna' is most likely an enclitic, which is why it is expected to be pronounced with a H tone and part of the same prosodic word as 'we gonna'.

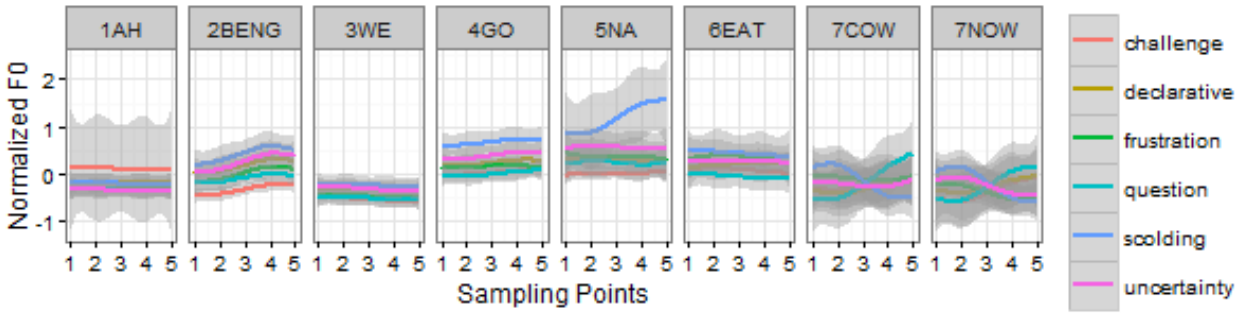
Example (14): Word tones for the sentence 'Ah Beng we gonna eat cow/now'

[[Ah Beng]$_{\omega}$**]$_{\iota}$ [**[we gonna]$_{\omega}$ [eat]$_{\omega}$ [cow/now]$_{\omega}$**]$_{\iota}$**

$_{\omega}$L	H$_{\omega}$	$_{\omega}$L	H$_{\omega}$	H$_{\omega}$	H$_{\omega}$	H$_{\omega}$

The following results in Figure 61 show the actual tones that were pronounced:

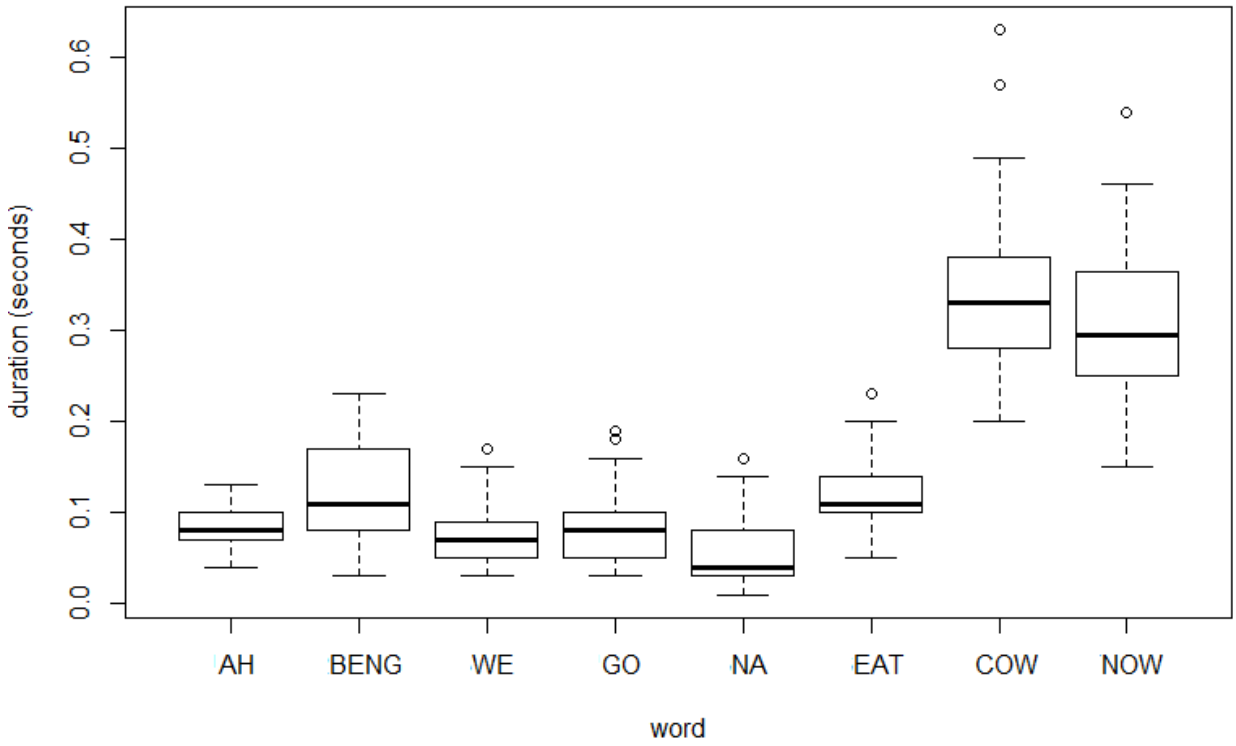
Figure 61: Normalized F0 Slope Across All Words



From the chart above, we see that in general, the tones were produced without any confounding effect of intonation, except for the intonational phrase final syllables ('Beng', 'cow' and 'now'). Non-intonational phrase-final syllables in the sentence do not display any clear differences across intonation type, and their tones are very similar to what was presented in the tonal representation. There is one notable exception: the rise on 'gonna' for the scolding intonation. The rise on 'na' could possibly be explained by an extra rise in pitch to mimick being angry. We now look at the intonational phrase final syllables ('Beng', 'cow' and 'now') to explain the results in the above chart. According to the formalization, we would expect a H_{ω} on 'Beng'. However, we see a continuative non-final rising intonational contour on 'Beng', rather than the level H_{ω} tone that we expect. In regards to 'cow' and 'now', we see that the pitch curve on these final syllables exhibit a wide variation in pitch across the different intonational conditions. This shows that the intonation mainly affects the pitch slope of the last syllable, with little perturbation or variation in pitch on all of the other syllables. On 'Beng', 'cow' and 'now', there is no longer a H_{ω} tone, and it appears that instead there is a LH% tone for 'Beng' and different intonational contours on 'now' and 'cow' depending on the intonational context.

In terms of duration, the final syllable is also the most prominent. The chart below demonstrates how much longer final syllables are in comparison to the other syllables in the utterance:

Figure 62: Average duration of word length across all words for all speakers

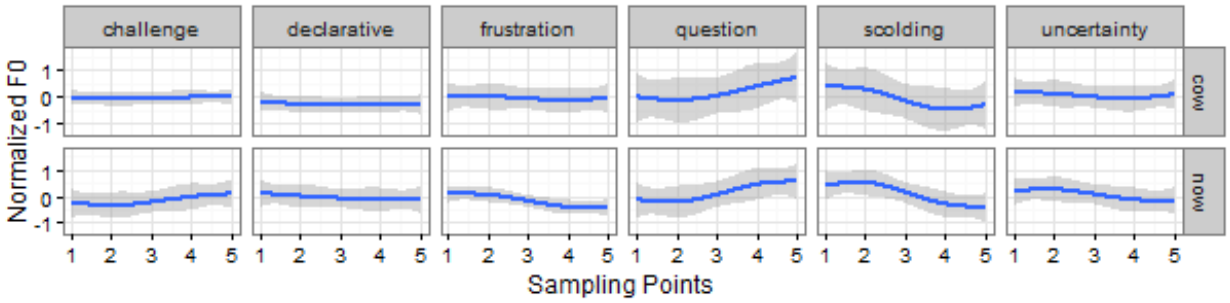


From the data the chart above, it appears that 'Beng', 'now' and 'cow' are the three longest words across all speakers. Not surprisingly, 'Beng', 'now' and 'cow' are all at the end of intonational phrases, showing that intonational phrase-final syllables are markedly longer than non-intonational phrase-final syllables. This substantial difference in length is most likely due to phrase-final lengthening. This is consistent with the literature and has been detailed and corroborated by previous studies such as Deterding (2007), Goh (2005), Low and Grabe (1999) and Low (2000).

The second major research question of this study was how different intonational types affect the suprasegmental properties of the final syllable, and if different communicative functions lead to identifiable pitch properties. Results from the study show that different communicative functions do indeed lead to differences in pitch, but that these are mostly localized on the final syllable of intonational phrases. The graph below sorts the f0 contours of final syllables by communicative function,

with the y-axis normalized f0 from all speakers and ordered time from the 5 sampling points on the x-axis. 'Now' and 'cow' were separated to see if there was any difference across both words. The different pitch curves on the final syllable demonstrate that different intonational types have different f0 slopes:

Figure 63: Box chart illustrating f0 slope across communicative function (final syllable)



We can see that there is no real difference between 'cow' and 'now', so there is barely any effect of word type. However, from the chart above, we can spot a few trends that distinguish communicative functions. Firstly, we can see that declarative and question intonation are generally what we would expect in Standard English, with declaratives slightly trending downwards while the yes/no question intonation has a rising slope. The other slope that is distinct is the scolding intonation, which demonstrates a falling curve. The other intonations tested in this study are not as clearly defined as these three, possibly due to an absence of consensus across speakers. However, in general frustration and uncertainty have a falling slope, and challenge seems to have a rising slope. These make sense in the bigger picture, as frustration and scolding correspond to similar emotions, as well as questioning and challenging a proposition. Gradience in intonation is well-established (e.g. inn English by Gussenhoven 1983, in German by Fery and Stoel 2006), and studies have shown that acceptability of intonational contours are gradient rather than categorical. We see from this experiment that there could be slightly different slopes with a gradience in slope distinguishing different types of intonation. This will have to be tested in a perception study in the future, as well as with a larger number of speakers.

Therefore, it seems that we can identify general trends that distinguish each communicative function. There appears to be three major types of pitch curves – rising, falling and declining. A rising pitch curve could be used for unsure, question and challenge intonations, a falling pitch curve signifies scolding and frustration, while declarative appears to be the one pitch curve that is distinct from the others.

A question to pose here is what happens to the post-lexical H_ω tone of the final syllable in the words 'now' and 'cow'. Both words have been shown to behave similarly in terms of pitch curve and length when an intonational boundary tone is imposed on it. It appears that the last tone of a prosodic word is completely overridden by the boundary tone of the intonational phrase. If a H_ω tone were still present, we would expect it to surface in some form (for example, a declarative L tone would be HL or LH rather than just L).

In summary, the results from the above experiment has shown us two phenomena in regards to the intonational phrase. Firstly, it is the final syllable that varies the most in terms of pitch curve as well as duration across communicative functions. Non-final syllables were shown to not vary significantly in pitch while in contrast, communicative function plays a highly significant role in the f0 slope of the final syllable. Further evidence for the pitch prominence of the final syllable is demonstrated from the fact that it is possible to discern most communicative functions given a specific pitch curve on the final syllable. In addition, the final syllable of the intonational phrase is greatly lengthened as compared to the length of all other syllables in the utterance, possibly due to the fact that it has to accommodate the full realization of the pitch curve. Secondly, there are three major types of pitch patterns that can be imposed on the final syllable - falling, declining and rising. These patterns and pitch curves seem to correlate to specific communicative functions, with declining corresponding to declaratives, falling corresponding to scolding and frustration, and rising with questions and clarification. In the next section

we will look at final particles in Singapore English and see how the final-syllable effect may come into play in regards to the tones of final particles.

§5.3 Final Particles in Singapore English

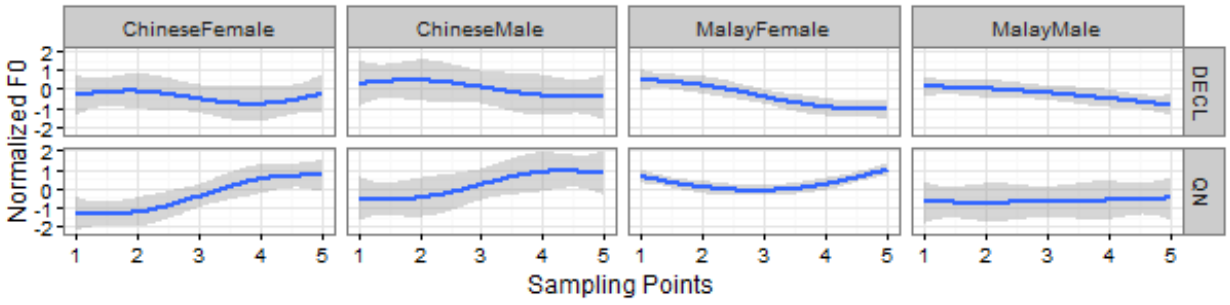
In section 2.3.1, we noted that utterance-final particles are ubiquitous in Singaporean English everyday speech, and that these particles carry distinct discourse pragmatic information. Singapore English particles always occur at the end of the intonational phrase, and have been noted to carry the major pitch movement of the intonational phrase (Platt 1987, Lim 2004). Gupta (1992, 2006), for instance, states that particles carry the intonation contour of the utterance. In addition, all of these particles are monosyllabic and only one may attach to any given utterance (i.e. they cannot co-occur with each other, for example '*He very unreasonable lor wat' (Wee 2003:9)). In this section, we will explore the relationship between final particles and their tones. I claim that there are a number of particles (but not all) which have a lexical tone in Singapore English, and that these lexical tones interact with intonational boundary tones.

Firstly, several particles in Singapore English have been observed to contain identical segmental materials but carry different tones (Kwan-Terry 1978, Loke and Low 1988, Platt 1987, Lim 2004). Lim (2007, 2009) claims that these variants correspond to different particles with a fixed tone. For example, Lim (2007: 460-1) notes that there are two 'la's, la24 (LH) that is more persuasive, and la21 (L) that is more matter-of-fact. Similarly, ah24 (LH) signals continuation or softens an interrogative, while ah21 (L) marks a question requiring response.

These lexical tones appear to match the functions and semantics of the particles, as well as their boundary tones. Figure 64 shows how the tone of /a/ varies when only the sentential context is changed 'You going to the bbq **ah**.' (*declarative* intonation, illustrated on top), contrasted with 'who should I invite to the bbq **ah**?' (*question* intonation, shown on bottom). The chart displays f0 on different points

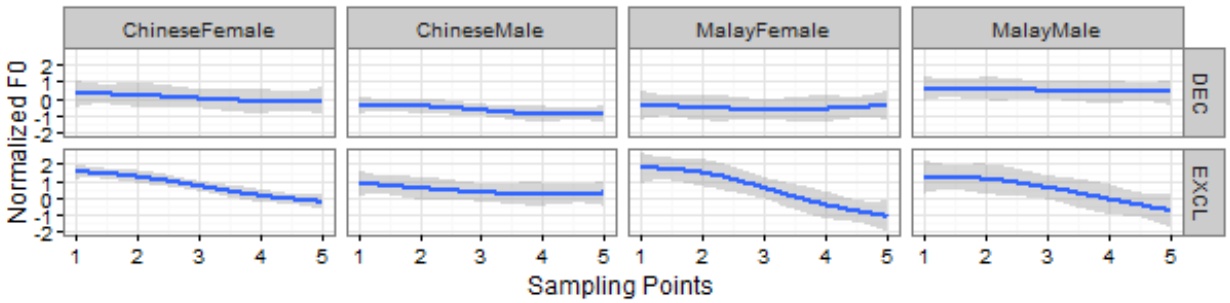
of /a/ plotted for four different speakers of Singapore English from different ethnic backgrounds (1 Chinese male, 1 Chinese female, 1 Malay male, 1 Malay female). The data was recorded by a Marantz PMD660 in a soundproof booth in Nanyang Technological University. The average of four readings per speaker are shown below:

Figure 64: Pitch slope of /a/ across two different sentential contexts



We see that the change in sentential context elicits the change in tone, and while the Malay male does not display as much differentiation between the two contexts, the other three speakers have a clear differentiation across them. Another example here illustrated with the same subjects is the difference between *declarative* low 'lah' (/la/), and *exclamative* falling 'lah'. The first (top) 'lah' was elicited from the sentence 'Don't be so like that **lah**.', while the second (bottom) was read out in the sentence 'Who is the one who play us out? He **lah**!' Therefore, it appears as though there are no lexical tones on 'lah', but rather three different intonational tones introduced by different intonational contexts.

Figure 65: Pitch slope of /la/ across two different sentential contexts



Thus, we have seen that particles with the same segment can have different contours marking different semantics and boundary tones.

The following table (Figure 66) provides an impressionistic sample of commonly-used particles in Singapore English and their possible pitch contours (note that this is not an exhaustive list, and that its aim is only to look at particles of different origins and different contexts). These particles are sorted by their possible semantic contexts: declarative, yes/no question, open question and exclamative. If a particle cannot be used in a specific context, a dash is entered in the table.

Figure 66: Table showing possible pitches on Singapore English particles

	Declarative	Y/N question	Open question	Exclamative
ah	-	L	LH	-
hor	L	LH	-	-
leh	L	-	H	-
lah	L, LH	-	-	HL
siah	LH	-	-	-
mah	L, H	-	-	-
one	-	-	-	HL
what	L	-	-	-
know	-	LH	-	-

There are some general patterns that can be perceived here. We see that the contour of declarative particles are mostly low and declining, while question particles are mostly rising and exclamatives are mostly falling. As we have seen in the immediately preceding section 5.2, intonational boundary tones

often replace the final word tone in the intonational phrase. We have also seen that, for example, a rising pitch curve could be used for unsure, question and challenge intonations, and we see in this table that LH tones are also used for question contexts. A falling pitch curve signifies scolding and frustration, which corresponds to the HL tone in the exclamative context in the table. We see in general that there is a delimited and restricted set of tones that can occur (L, H, LH, HL) (also note that this is very similar to the borrowed tone system). These four tones appear to pattern with the intonational boundary tones we have seen in the last section, i.e. declining, rising and falling (L, LH, HL respectively). If we were to posit that all of the tones were borrowed, the trends that we see here would surprisingly coincidental (i.e. declarative mostly has L tones, LH mostly corresponds to question, and HL goes with the exclamative context).Therefore, these patterns hint that boundary tones have played or are playing a role in the determination of the pitch contour of final particles.

Another argument for boundary tones playing a part in the determination of the pitch contour of final particles comes from the contours on particles of Malay and English origin. 'La', for example, has been proposed to originate from Malay, and a number of particles have roots in English words such as 'one', 'what' and 'know'. Since these particles did not originate from a lexical tone language, they should not have any vestigial lexical tone. However, these particles are associated and pronounced with specific contours; for example, 'one' has a HL contour, 'know' has a LH contour, and 'what' has a L contour. This suggests that boundary tones have played a role in determining the contours of these particles, since they do not have any inherent contours from lexical tones.

This effect of intonational boundary tones influencing the contours on final particles can either be synchronic, meaning that speakers can systematically override lexical tones with boundary tones at the end of intonational phrases, or diachronic, meaning that this change took place earlier and has been grammaticalized by speakers. At the moment, it is hard to tell whether this change is synchronic or diachronic, but there is some evidence for grammaticalization, which would support the latter. Firstly, some particle tones do resist boundary tones, such as 'sia', which has a LH tone even in a declarative context. Secondly, as we have seen, there are many particles that have pitch contours that match up with boundary tones. Thirdly, these contours seem to have standard pronunciation amongst Chinese speakers, with very little or no variation across speakers.

We have seen in this section that there are a number of particles that maintain their lexical tone (such as 'sia', 'leh' (H) and mah (H)). This is exactly the same as what we have seen for lexical words, where certain lexical borrowings from Chinese have retained a vestige of tone from Chinese. Other particles either did not come with a lexical tone (such as the English and Malay particles), or perhaps had a lexical tone which it lost, and these have been replaced by grammaticalized boundary tones.

§5.4 Summary and Formalization of the Intonational Phrase

In this chapter, we have seen that there are two phenomena that occur on the level of the intonational phrase. Firstly, we have seen that there are boundary tones imposed on the initial and last syllable of the intonational phrase, and the other syllables in the intonational phrase seem to be relatively unperturbed in terms of f0. Final boundary tones replace the H_ω tone of the last syllable of the last prosodic word. Secondly, there appears to be an intonational phrase-initial pitch boost that affects the first prosodic word of the intonational phrase. The H_ω tone in this phrase-initial word is boosted. Following the ToBI system adopted by Jun (2005, 2014), we will represent boundary tones at the edge of the intonational phrase with the symbol % and a boost with the symbol ^.

The sentence 'a mouse run into the house', devoid of any intonational phrase effects, would contain the following tones:

Example (15): 'A mouse run into the house' without intonational tones

[a [mouse]$_\omega$]$_\omega$ [run]$_\omega$ [in [to [the [house]$_\omega$]$_\omega$]$_\omega$]$_\omega$
| | | | | | |
$_\omega$L H_ω H_ω $_\omega$L $_\omega$L $_\omega$L H_ω

We have seen from previous sections in this chapter that the initial prosodic word in the intonational phrase receives a boost in pitch. In addition, the boundary pitch overrides the pitch of the last syllable. Thus, the even though there is a H tone on the word house, that tone is completely overridden by the L boundary declarative tone. This H tone is not preserved and is delinked and deleted, as if it were still present, there would be a HL% contour on the final syllable, which we do not see.

The example below illustrates both these intonational phrase effects (i.e. the phrase-final boundary tone and the initial boost) on the sentence 'A mouse run into the house':

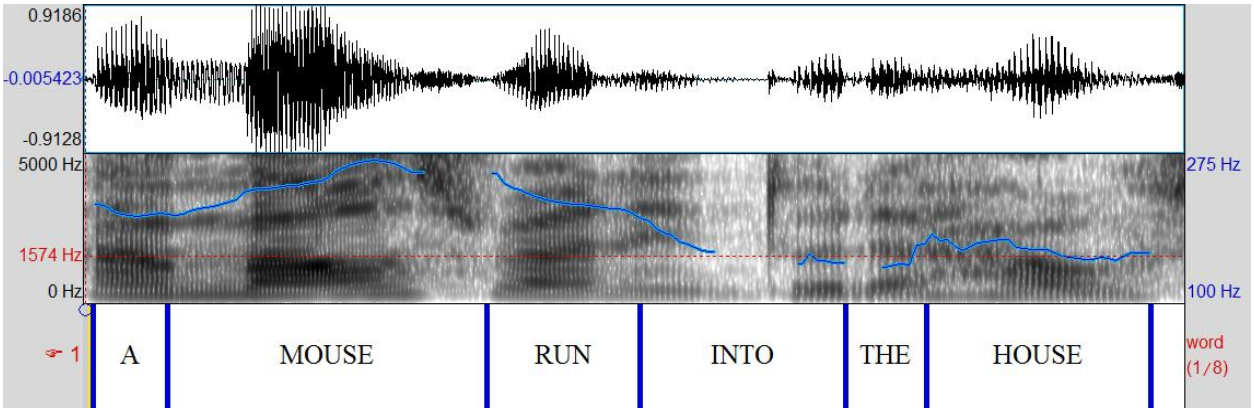
Example (16): 'A mouse run into the house' with intonational tones

[$_\iota$ [a [mouse]$_\omega$]$_\omega$ [run]$_\omega$ [in [to [the [house]$_\omega$]$_\omega$]$_\omega$]$_\omega$ **]**$_\iota$

| | | | | | | |
ωL H^ω Hω ωL ωL ωL L%

There is a phrase initial boost on the H tone in the first prosodic word of the IP and a L% boundary tone that notes a declarative sentence. We can see these tonal effects from the spectrogram below:

Figure 67: Spectrogram of 'A Mouse Run Into the House'



§6 The origins of Singapore English prosody

This chapter will discuss the possible origins of the various aspects of the prosodic system of Singapore English. As we have seen in this dissertation, Singapore English has an entirely different prosodic structure and system from that of Standard English. A number of scholars have already posited claims about how various aspects of Singapore English prosody originated, such as Lim (2011) who believes that the tonal system and tonal properties of Singapore English have been influenced by Bazaar and Baba Malay, and Ng (2011) who similarly claims that the word-final high tone was brought about by contact and analogy with Bazaar Malay. I will begin this chapter with an introduction to New Englishes and look at how English came into Singapore. Subsequently, I will look at the defining features of Singapore English prosody and discuss how they might have been influenced by the language environment of Singapore. Before we begin, it is important to note that contact-induced change is notoriously hard to prove and pinpoint, and that we have no access to pre-contact or non-contact varieties of Singapore English in order to scientifically verify the arguments in this chapter. In fact, contact-induced change is not an 'inevitable, nor possibly even a common, outcome of language contact' (Poplack and Levey 2010), it is highly possible that the prosodic system of Singapore English evolved internally and independently of other languages. The aim of this chapter is thus to guide the reader through possible explanations and parallels to other Singaporean languages rather than to insist on an outright account of its history.

§6.1 The Language Situation in Singapore

At this point, it would be valuable to have a brief history of the language situation in Singapore, which, due to the different populations and multiple languages and dialects spoken by immigrants from a variety of regions, was and is a complex picture. We will first begin with a more detailed look on the development of English itself in Singapore. As previously mentioned, English was the language of power

in the British territories in South East Asia (Crystal 2003:104). The British had administrative control over Singapore for more than a hundred years until 1959, when Malaya became independent from Britain, and during this time, the British government established English primary schools towards the latter half of the 19th century (Low and Brown 2005). However, Gupta states that it is a 'wrong supposition' to assume that English speakers who came to Singapore came from the British Isles and spoke late twentieth-century Received Pronunciation (RP) (Gupta 1998). Gupta also states that there is 'no serious doubt' that Singapore English has its origins in the English-medium schools of the Straits Settlements, a proposition echoed by Platt and Weber (1980) and Bloom (1986). Her analysis suggests that there were two distinct phases in the development of Singapore English: firstly a stable period in which a high proportion of children in English-medium schools were from English and Malay speaking homes. In this period, there was a high proportion of Europeans and Eurasians as pupils, and relatively few Chinese and almost no Malays. During this period, teachers were mostly Eurasians from India or Ceylon, and Europeans were only in senior positions. A high proportion of children would have spoken English and Malay on arrival in school, while English was sometimes taught through Malay. Secondly, in the first decade of the twentieth century, there was a sudden influx of Chinese-speaking children. There was a progressive reduction in both Malay and English speakers, while Hokkien and Cantonese speakers formed an increasingly high proportion of English-medium school attendees. At this point, Chinese teachers started teaching in English-medium schools, while Malay was still used to teach English.

Since only a quarter of teachers were Europeans of British ancestry, and most teachers were Eurasian from India and Ceylon, Gupta states that it must be their pronunciation and their variety which has to be the 'principal starting-point' for Singapore English. Crystal (2003), on Singapore English, states that 'it is not surprising' that the British English linguistic model was influenced by local factors since it was a highly multilingual environment. Therefore, it is important to note here that 'English' prosodic

features that we take for granted, such as stress, may not even have been a target of Singapore English speakers right from the beginning.

We will now consider the other languages which contributed to the linguistic environment in which Singapore English prosody developed. As mentioned, the language situation in Singapore is impossible to adequately describe since not only was a myriad of languages spoken but also multiple dialects of these languages, and by different subsets of the population. For example, we cannot just say that Singapore English was influenced by 'Chinese' and 'Malay' because there were many Chinese dialects present at the time which were widely spoken, including Hokkien, Cantonese, Teochew and Hakka, as well as different dialects of Malay including Baba Malay, Bazaar Malay, and Indigenous Malay (which itself can be separated into a standard variety, Bahasa Baku, and colloquial, Bahasa Pasar, registers) (Ng 2011). Gupta (1998) states that many lexical items of Hokkien and Malay origin are used in Singapore English, and they may have come in from one of two contact varieties of Malay, or may have come direct via Hokkien or Malay – and we 'often cannot reach a firm conclusion about the route by which a feature reached Singapore English'.

The two Malay varieties that probably had the most influence on Singapore English are Bazaar Malay and Baba Malay, two non-native varieties of Malay that were largely spoken by Chinese immigrants to Singapore. As such, they are heavily influenced by Southern Chinese dialects. Bazaar Malay has been described as a 'pidgin' language as it is a simplified contact variety of Malay that was used between Chinese, Malay and Indian speakers. Baba Malay has been classified as a 'creole' that mixes aspects of Hokkien phonology with the Malay lexicon (Holm 2000). Baba Malay was a language that originated from Chinese settlers who intermarried with local Malay women, creating a mixed ethnic group known as the Peranakans (also known as Babas or Straits Chinese). At home, they communicated in an 'admixture of commonly used Malay words combined with Hokkien Chinese dialect words' (Gwee

2006:9). The main difference between Bazaar Malay and Baba Malay is that the former is primarily a lingua franca spoken at the markets and for commercial purposes that was employed all the way from precolonial times to the middle of the twentieth century, while the latter was a language spoken at home and was the native language for the Peranakan people. Phonologically and syntactically, however, the two languages were similar and mutually intelligible as they were both varieties of Malay with Chinese influence.

In contrast, the Chinese dialects were usually not mutually intelligible. There were three major different Min dialects spoken by the Chinese in Singapore: Hokkien, a Southern Min dialect that comes from Southern Fujian; Teochew, a Southern Min dialect also known as Chaozhou or Chiuchow spoken in the Chaosan region of Canton; and Hainanese, a coastal Min dialect spoken in the southern Chinese island of Hainan. Even amongst these three varieties of Min Chinese, the dialects were phonologically different due to geographical isolation. Other Chinese dialects that were widely spoken in Singapore were Cantonese, a Yue dialect spoken in Canton; and Hakka, a different branch of the Chinese tree entirely that is spoken in Canton and diasporas around China. All of these varieties of Chinese were thus linguistically dissimilar to begin with and only the Min dialects were barely mutually intelligible. Therefore, even though the Chinese made up the majority of the population, Bazaar Malay was employed as the lingua franca in Singapore not only between the Chinese and other ethnic groups but also sometimes amongst the Chinese themselves. Bazaar Malay lasted as the lingua franca in Singapore for over a hundred years from precolonial times to the middle of the twentieth century.

Lim (2011) identifies the three languages that had the most influence on Singapore English: Hokkien, Bazaar Malay, and Cantonese. Hokkien was spoken by the most prestigious Chinese traders as well as the intra-ethnic lingua franca for Chinese, and it was also spoken by over 90% of Chinese in 1974 (Platt 1980). Bazaar Malay, as mentioned above, was the inter-ethnic lingua franca for most of the

history of Singapore. Lastly, Cantonese was the second most dominant Chinese variety after Hokkien. Gupta (1998) and Ansaldo (2004) also come to the conclusion that Hokkien and Malay are the two languages that have exerted the greatest influence on Singapore English. In contrast, Deterding (2007) claims that all of Singapore English's distinctive features can be traced to Chinese dialects and denies Malay any role.

§6.2 New Englishes

Kachru (1985) came up with the term 'inner circle' and 'outer circle' Englishes to describe the difference between Englishes that are natively spoken by a population and varieties of Englishes that are non-native but spoken in societies where English is a crucial language. These terms have been replaced by 'New Englishes' and 'Older Englishes' (Kandiah 1998). The crucial difference between these two types of Englishes is that Older Englishes developed through normal transmission, whereby the newly transplanted population already spoke English (with the exception of England itself). In contrast, New Englishes did not develop through normal transmission. At some point in the history of all New Englishes, English was learnt by a non-native English speaking population. In this respect, New Englishes are similar to pidgins and creoles, which are also languages that developed through a break in normal transmission. Pidgins are contact languages that develop between two communities within the first generation of contact while creoles are languages that develop from a generation of speakers speaking pidgin as one of their first languages. This break in normal transmission thus creates the opportunity for linguistic change in New Englishes, since there exists at least one generation of non-native English speakers who are influenced by their own mother tongues. Vernacular varieties of Older Englishes are different from each other (for example Scottish and American English), but it could be argued that some new Englishes have evolved phonological and syntactic systems that are radically different to the point that it

encroaches on unintelligibility from other varieties. The prosodic system of Singapore English is one such system that has diverged to the point that it has become unique from other varieties.

Following Schneider's (2003) classification of New Englishes, Singapore falls into a 'phase 4' variety in the 'life cycle' of a New English, the other phases being (1: Foundation, 2: Exonormative stabilization, 3: Nativization, 4: Endonormative stabilization and 5: Differentiation). Endonormative stabilization, according to Schneider, is reached when there is the stabilization and homogeneity of norms throughout the language, such as its 'distinctive phonology' and 'rules and patterns' (Schneider 2003:265). The prosodic system of Singapore English is one such feature of the language that has reached 'endonormative' stabilization, but how the prosodic system developed most likely has roots in phase 1 of the cycle, where Schneider notes koineization and toponymic borrowing occurs.

§6.3 The Difficulty with 'Contact'

In the literature on creole and pidgins, there are two main theories for the origins of language change and new language features. The first is the 'substratist' approach, which states that language change is caused only from existing features from the speakers' native languages, and the second is the 'universalist' approach. In the case of Singapore English, the primary difference between the two is that 'substrate' explanations would ascribe prosodic innovations to language contact, while 'universalist' explanations would ascribe the same innovations to self-motivated, internal change that took place without interference from other languages.

The first approach, the substratist approach, was championed first by Lucien Adam dating back to 1883 who asserted that the phonology and grammar of Guiana French was solely attributable to the languages of Guiana. The term 'substrate' itself has negative connotations as it makes a distinction

between languages which are socially inferior (the 'substrate') and socially superior (the 'superstrate'), even though it is possible that a pidgin or creole develops in a situation where both languages have the same social status. We will use the term 'substrate' here to refer to the languages that shaped the development of Singapore English. The second theory is the 'universalist' approach, first described by Adolpho Coelho (1880), which claims that languages have a 'lowest common denominator', and that when new language features develop out of contact, they default to these simple properties. A century later, Bickerton's *Roots of language* (1981) developed upon this idea to formulate the language bioprogram hypothesis (LBH), claiming that there are a number of basic features that all languages share. The term 'substrate' and 'substrate languages' has been used often in the literature on Singapore English to describe the languages spoken by the Singaporean population that has influenced the development of Singapore English, and for that reason I will continue to use these terms.

One of the complicated aspects about Singapore English is determining the 'substrate' language, or the language that directly influenced the development of Singapore English. Going back to the terms 'substrate' and 'universal', borrowed from pidgin and creole studies, where 'substrate influence' refers to an exact influence from a specific language while 'universal influence' refers to a general simplification of the language, the distinction between these two terms are clear-cut in theory but very difficult to distinguish in practice.

An example that illustrates this overlap is the vowel system of Singapore English. The vowel system of Singapore English differs from Standard English in the respect that there is no longer a tense-lax contrast. This has been reported by Tay (1982) and Hung (1996). Singapore English has a five vowel system /i u ɛ ɔ ɑ/ plus schwa /ə/, which includes two high vowels, two mid vowels and one low vowel. There is no length or tense-lax distinction across vowels. Therefore, there is no distinction in word pairs such as dean/din [din] and beat/bit [bit]. Standard Malay has a very similarly structured vowel system /i

u e o a/ plus schwa /ə/; again, two high vowels, two mid vowels and one low vowel. It could be posited that due the similarities in vowel systems, Singapore English has been influenced by Malay. However, a closer look at other contact-variety Englishes reveals that this five vowel system is highly common amongst New Englishes as well as other pidgins and creoles. For example, Tok Pisin, a pidgin English spoken in Papua New Guinea, has the vowel system /i u e o ɑ/ and Sranan, a creole English spoken in Surinam has the system /i u e o ɑ/, both five vowel systems with two high vowels, two mid vowels and one low vowel. Thus, it is hard to decide whether changes in the new phonology have been brought about by influence from other languages or from a process of universal simplification, or perhaps even from both. Another example is word-final devoicing in Singapore English. While it could be posited that word-final devoicing is caused by influence from Malay, it could also be attributed to dialects of Chinese, which also have it. However, word-final devoicing is not a process that is unique to Malay and southern Chinese dialects - it is a common cross-linguistic phenomenon and many New Englishes such as Nigerian English, Ghanaian English, Cameroon English, and Tok Pisin also exhibit word-final devoicing. Therefore, even basic examples from Singapore English phonology such as these show that it is often difficult to ascertain whether influence comes from a 'substrate' language, universal simplification or a mixture of the two.

Another example comes from syntax. Singapore English has been noted to be a topic-prominent language in which a discourse topic heads the sentence (*The book* I read), in contrast to a subject-prominent language in which the subject takes sentence-initial position (*I* read the book). This topic prominence has been noted by Alsagoff and Ho (1998), Ansaldo (2009) and Tan (1999, 2003) who notes sentences such as 'Which item can't remember' and 'Model answers they have'. Both Chinese (e.g. Shi 2000) and Malay (Poedjosoedarmo 2000) are noted to be topic-prominent languages. Subsequently, it is not possible to ascertain which language most directly influenced this aspect of syntax.

Lim and Ansaldo (2012) further note that we need to rethink the role of 'simplification' in contact-induced change rather than assume a normative Anglocentric view of Asian English grammars, and not just assume, for example, that a language has 'changed' or 'simplified' just because it contains a non-standard phenomenon. For example, in Singapore English, two of the dominant languages, namely Bazaar Malay and Hokkien, have typological congruence in a number of aspects such as zero copula, predicative adjectives and topic prominence. Therefore, when a Singaporean speaker says something like 'Careful, laksa very hot' (Ansaldo 2009:140), they may not be 'simplifying' anything, but merely accessing the 'standard' topical structure of the surrounding Malay and Sinitic varieties that have determined discourse patterns.

§6.4 The Reinterpretation of Stress into Word Tone

The first aspect of the prosodic structure of Singapore English we will look at is how the stress system from Standard English could have been reinterpreted into the word tone system that we see in present day Singapore English. In English, the majority of words have stressed first syllables. The most important acoustic correlates of English stress are the presence of pitch-accents, length, intensity and unstressed vowel reduction.

New Englishes appear to not share the same type of stress timing as their language of origin, Standard English. In fact, practically all the New Englishes surveyed by Mesthrie and Bhatt (2008:129), including Indian English, Pakistani English, Philippine English, Nigerian English and Ghanaian English had syllable timing and very rarely had vowel reduction. All of these varieties have different 'substrates', but a commonality is the lack of stress, or at least an altered form of stress from British English. There are many countries in the present day that have adopted English as a secondary language, and in which English is often used. However, even in these countries where English is socially and economically valued, the stress system is imitated but not replicated, even with modern day learning aids. Therefore,

we see that the stress system of English is not easily replicated. In addition, none of the substrate languages that surround the environment of Singapore English possesses a stress system that could be used as a parallel. Lim and Ansaldo (2012) note that there is an emergence of tonal features in Asian Englishes, including the reinterpretation of stress and intonation through tonal values, and the retention of tonal distinctions in subsets of the lexicon (as we have seen in this dissertation in Singapore English loanwords). They observe that there are tonal features in Singapore English, and state that other language ecologies where tone languages co-exist with Englishes, tonal features may also develop, such as Thailand, Vietnam and Northern China.

Standard English is a stress language which is classified by Gooden et al (2011) as a focal prominence language. A focal-prominence language associates focus-marking tones to the stressed syllable of the head word of the focal constituent and subsequently suppresses or reduces comparable tones on all analogous tone-bearing units in following constituents (post-focal compression). This contrasts with edge prominence, defined by Gooden et al (2011:162) as the prominence associated with the peripheral positions in a prosodic domain, and what we see in Singapore English with high tones being associated with the right edges and low tones being associated with the left edges of prosodic words. In other words, English in Singapore evolved from a focal-prominent language to an edge-prominent language. An explanation for this is as follows: languages with stress systems often use a constrained distribution of stress to demarcate lexical words. These stressed syllables which are of a higher pitch and intensity often get reanalyzed as markers of edge prominence in languages without stress accent, and this is a very common contact-induced reanalysis (Gooden et al 2011:171). However, if we assume that pitch height was the prominence marker that was reanalyzed into Singapore English as a high tone, we should expect that Singapore English would mark stressed syllables in Standard

English with a high tone (more often the first syllable than the last syllable) and not uniformly place a high tone on the last syllable.

Interestingly, the reanalysis of stress as a high tone is exactly what we see in Hong Kong English. Hong Kong English developed in a less complex situation, where the 'substrate' language is clearly Cantonese and the target language to be acquired is Standard British English. In addition, since Cantonese is the common native language of the overwhelming majority of the population, English never became a common native language. Examples from Wee (2008) illustrate the tone system of Hong Kong English (the original tone numbers have been replaced by tone letters for ease of reference):

Figure 68: Tones in HKE words (Wee 2008:488)

cat	H
intend	LH
manage	HL
managing	HLL
origin	HLL
original	LHLL
originally	LHLLL
dictionary	HLLL

Wee shows that the H tone is associated to the location of the stressed syllable in Standard English, and calls this a 'tonal manifestation of the loci stress in the Standard English source' (Wee 2008:488). This is not unique to Hong Kong English, and other Chinese Englishes such as Chinese Mandarin English have been noted to reflect stress through high pitch (e.g. Wang 2008, Zhang et al 2008). From my personal impressions (and also noted by Ng 2011:11), Singapore Mandarin English (that is, the isolated English words - often names or loanwords - added to Singapore Mandarin speech) has a tonal system different

from that of Singapore English which is similar to other Mandarin Englishes such as Taiwanese Mandarin English and Chinese Mandarin English. This is another big clue as to the origins of Singapore English word tone prosody: even though Singapore English is mostly spoken by speakers of Chinese ethnic origin, Singapore English word tone prosody is different from Englishes spoken by other populations that speak the same Chinese languages as Singaporeans do (like Cantonese by Hong Kong and Taiwanese Hokkien by Taiwanese).

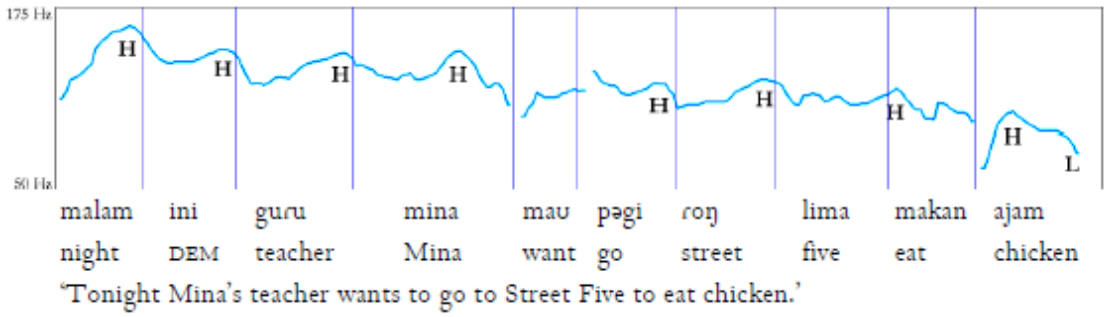
Perhaps for these reasons, Lim (2011) and Ng (2011) have both posited that Malay, rather than Chinese, has been the influencing language that has resulted in the development of word tone in Singapore English. However, it is not the prosodic system of the Malay spoken by the indigenous Malays that was the influencing factor but rather the Southern Chinese influenced varieties of Malay (Bazaar Malay and Baba Malay) that had a prosodic word system similar to that of Singapore English.

Lim (2014) has stated that Baba Malay, and not Bazaar Malay, was the main contributor to the prosodic system of Singapore English. Her primary point for choosing Baba Malay over Bazaar Malay is that the timing of the emergence of Bazaar Malay does not coincide with transfer to Singapore English, although she acknowledges that 'some Malay variety or varieties' are the source for word/phrase-final prominence in Singapore English.

I believe that Bazaar Malay should not be dismissed over Baba Malay as the primary source of influence for two reasons. Firstly, Bazaar Malay was the Malay spoken as a lingua franca by Chinese, Malays and Indians, which makes it a much more common and widespread language, while Baba Malay was only spoken as a family language. Since Bazaar Malay was spoken from the 'earliest era until as recently as the 1970s', overlapping with much of the time frame in which Singapore English has existed, the timing of its existence should not be as crucial an issue as discussed by Lim (2014). Second, there is

evidence of word-final high tone in Bazaar Malay while there has yet to be clear consistent evidence of this in Baba Malay. An example sentence of Bazaar Malay is illustrated below from Ng (2011:9):

Figure 69: Example sentence of Bazaar Malay from Ng (2011:9)



As seen from the above sentence, it appears that Bazaar Malay has a word final H_{ω} similar to that of Singapore English. Although the system is not identical to Singapore English (e.g. 'want' would be analyzed as a lexical word with a H in Singapore English), there are definitely parallels to be drawn. Therefore, while there is no clear-cut evidence that Bazaar Malay is the primary source of influence, I would argue that it also had a strong role to play in shaping the prosody of Singapore English.

Tone is often acquired in a non-tonal language either by borrowing or by interpolating tone from the broader linguistic environment (Gussenhoven 2004:44). In the case of Bazaar Malay, it seems like the word final high tones have been imposed by speakers of a tonal language (southern dialects of Chinese) speaking a variety of Malay that already had clear word-final boundary tones because native speakers of Malay do not have this tonal pattern (Ng 2011:10). Ng states that although Malay does not have word final high tones, it does have utterance-final high tones, and if Malay speakers tried to maximise Chinese immigrants' comprehension by using very short phrases, this would be heard as high tones at the end of each word. In addition, Ng postulates that some Bazaar Malay speakers were not completely fluent in the language and only spoke in shortened phrases. Since intonational phrases in Malay carry a high tone on the rightmost syllable, these shortened phrases may have been mistaken for

individual words having a high tone on the right edge. In a similar vein, Clynes and Deterding (2011:265) observe that in Standard Malay, there is a pitch movement that may create an impression of lexical word stress on the final syllable of a word, a phrase-final H tone that they term as a 'signal of something more to come'. This, they note, is common in reading word lists and in words uttered in isolation.

It does not appear, however, that Bazaar Malay has L tones on proclitics like Singapore English. For example, 'I' and 'you' in Bazaar Malay are not pronounced with a L tone, but a H tone. Therefore, the process of pronouncing proclitics with L tones seems to have only taken place in Singapore English itself. Further, the recursive aspect of Singapore English prosody is not seen in any of the surrounding languages. For this reason, we can surmise that recursion and the tones on proclitics and enclitics are innovations of Singapore English itself and are not due to influence from other languages.

A possible explanation of the development of this structure could be that since the right edge of lexical words have a H tone, the left edge has a L tone in order to make the right edge more prosodically prominent: since all tones are relative, they can only be perceived as H tones if there are other L tones in contrast. In addition, proclitics are not prosodically prominent cross-linguistically (including in Standard English), and the L tone may be perceived as less prominent.

It is harder to pin down why enclitics have a high tone but there are a few possible explanations. Firstly, since there seems to be rightmost prominence in general in Bazaar Malay, pronouncing an H tone rather than an L tone on items to the right of the verb could be a generalization of this pattern. There is also a second, more functional explanation: since an $_{\omega}$L tone is associated with the start of a new prosodic word, the assignment of a H_{ω} tone may mark the fact that they adjoin to the lexical word on their right and facilitate syntactic interpretation. The next chapter will delve into how phrasal prosody might have been affected by contact as well as summarize all of the features of the Singapore

English intonational structure that might have arisen through contact and which ones may have developed by themselves.

§6.5 The Development of Phrasal Prosody

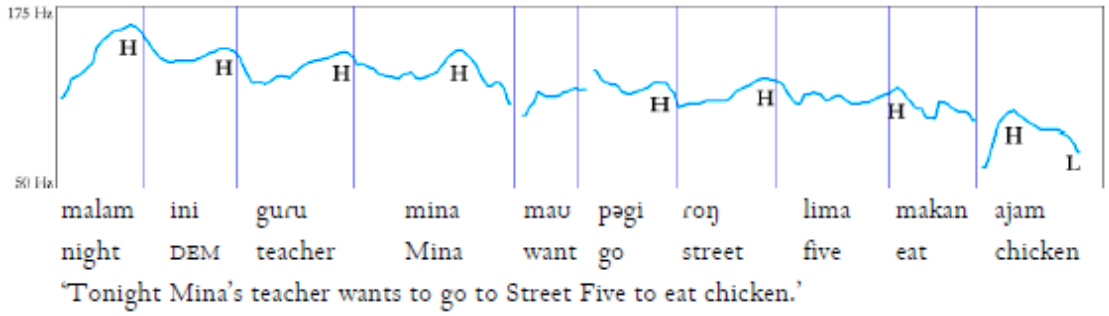
According to Mesthrie and Bhatt (2008:129), most varieties of New Englishes that they surveyed report a smaller range of intonational contours than Standard British English. Can we generalize this to claim that the phrasal prosody of Singapore English is attributable to contact? There are three aspects of phrasal prosody that we will look at here: the lack of an intermediate phrase, the utterance-final prominence of Singapore English, and origins of individual utterance-final particles.

Firstly, it is difficult to ascribe the lack of an accentual or intermediate phrase to any of the languages in contact with Singapore English. All things equal, it seems more likely that a language would not develop an intermediate phrase when there would be no reason to do so, as that would create an unnecessary layer of phonological structure. Pierrehumbert and Beckman (1986) investigate the accentual phrase in English in comparison to Japanese, looking for the culminative domain of the pitch accent. They note that the arguments for an accentual phrase in English are 'rather theory-internal', and in comparison to Japanese, the existence of the accentual phrase is 'less firmly supported' as 'it is not delimited by any boundary tones' (Pierrehumbert and Beckman 1986:289). In comparison to Japanese, which has tones both at the accent location and at the edge of the accentual phrase, English only has tones at the location of the accented syllable. Therefore, since there are no obvious phrasal tones or acoustic cues for English at the level of the accentual phrase, and that learners of Singaporean English did not have this prosodic category in their source languages, it seems unlikely that it was learned by speakers or transmitted into Singapore English. In addition, as we have seen, Singapore English speakers do not utilize the stress system of Standard English. Since the accentual phrase in Standard English requires knowledge of stress placement and stress clashes, it is highly unlikely that Singapore English

speakers would incorporate knowledge of an accentual phrase system without knowledge of pitch accents and stress placement.

The second important characteristic of Singapore English phrasal prosody is the fact that intonation is largely confined to the presence of boundary tones on the final syllable of intonational phrases. An obvious fact that must be pointed out is that even if Standard English intonation is not limited to intonational phrase-final boundary tones, they are an especially salient part of the system. It is therefore likely that Singaporean English boundary tones were simply borrowed from the L2 target. However, could we attribute the loss of other Standard English intonational units (mostly the pitch accents and the nuclear structure) to contact? If we look at languages that may have affected Singapore English, we can first note that Malay also has phrase-final boundary tones but limited word-level intonation (Clynes and Deterding 2011). Since it is likely that it is the Bazaar Malay variety that most contributed to the development of structural word tone in Singapore English, Bazaar Malay could logically be a strong candidate for the origin of the final boundary tones of the intonational phrase. Looking back at the Bazaar Malay sentence above (repeated below), the last word in the sentence 'ajam' demonstrates that there is a strong depressing effect of the declarative intonational tone, but other words show no sign of intonational pitch accents.

Figure 60 (repeated): Example sentence of Bazaar Malay from Ng (2011:9)



This suggests that Bazaar Malay has a similar intonational structure to Singapore English, one in which a boundary tone is realized on the rightmost syllable of the utterance. That said, Chinese dialects are not markedly different: from the earliest studies of intonation in Chinese (Chao 1933a, 1933b), the utterance-final syllable has been recognized to be the primary location for the realization of intonational features, a feature that has also been confirmed for Cantonese (Ma et al. 2006, Fox, Luke and Nancarrow 2008) and Hokkien (Bodman 1987). In short, all major languages spoken in Singapore possess intonational phrase structures in which the boundary tone falls on the last syllable of the intonational phrase and lack intonational pitch accents. For this reason, it is difficult to ascribe the intonational phrase structure to any one language, as there is no way to determine which language was the most dominant influencer for this particular aspect of the intonational phrase structure. In any case, since all of the surrounding languages have IP-final boundary tones and lack lexical pitch accent, it is not surprising that Singapore English exhibits the same intonational properties.

A third point to be studied is the pitch-initial boost in Singapore English, which is here analyzed as a phrase-initial boundary tone. There is again no clear path to its origin, but we can conjecture a number of possibilities. As we mentioned in section 5.1, the initial-position in English is accompanied by an increase in energy on the initial vowel (Cho and Keating 2007). It is possible that this increase in energy could be interpreted or mimicked by a higher pitch. In addition, we have seen that there is sentence initial prominence in Singapore English from the fact that syntactic fronting is a very common discursive strategy to lend emphasis or discourse prominence to an object (e.g. 'This one I like'). This object preposing (which has been claimed to be directly transferred from Chinese grammar (Alsagoff and Ho 1998)) demonstrates that the beginning of the sentence is prominent in terms of discourse, and this may be related to the initial pitch boost since we have seen that a boost in pitch lends prominence to discourse as well.

The fourth important point is that Singapore English has a large number of sentence-final particles, one of its hallmarks. We will try to trace the origins of individual sentence final particles back to different languages of origin to see if that sheds any light on the influence of different languages on these particles. Gupta (1992b) states that all particles in Singaporean English come from the Southern varieties of Chinese. However, the particles in Singaporean English are not merely cut-and-pasted borrowings from Chinese languages as the most commonly used particle 'lah' /la/ as well as 'ah' /a/ also has origins and counterparts in Malay (Lim 2007). Furthermore, there are particles in Singaporean English that do not come from either Malay or Chinese. Wong (2005) shows that in regards to the particle 'one', although there is a semantic counterpart in Chinese, 'one' appears to be borrowed from by English. Wee (2003) also points out the birth of the particle 'know', evolved from English 'you know', which has no counterpart in Chinese dialects or Malay.

Lim's (2007) analysis of the origin of eight Singapore English particles looks at the possible Chinese dialects that the particles may have stemmed from. Lim notes that Singapore English particles are much more similar to Cantonese (Lim 2007:463), and that 'lor', 'hor', 'leh', 'meh' and 'ma' are almost direct borrowings from Cantonese. Other particles, such as 'lah' and 'ah', are harder to place although Lim proposes that these were borrowed at an earlier stage from Hokkien and/or Bazaar Malay. In addition, Ma et al. (2006) demonstrated that the intonational effect of questions in Cantonese can override lexical tone, showing that the utterance-final syllable is intonationally prominent in ways very similar to Singapore English. Fox, Luke and Nancarrow (2008) found that there were four distinct patterns for the utterance-final boundary tone in Cantonese (neutral, falling, rising and rising-falling), similar to the results we have shown for Singapore English.

The system of final particles of Singapore English therefore seems very Cantonese. In contrast, Singapore Hokkien is reported to have about ten particles (Tay 1968), which typically occur with neutral

low tone (Bodman 1987). This is similar to what is reported in Mandarin, as particles in Singapore Mandarin are noted to have neutral tone and be unstressed (Lock 1988). Furthermore, Cantonese particles (Kwok 1984, Matthews and Yip 1994) are longer in duration and fuller in vowel quality than other Cantonese words, a characteristic that is different from other Chinese dialects. Therefore, it appears that Singapore English is most similar to Cantonese in terms of sentence-final particles, and also in its propensity to impose a boundary tone on the rightmost syllable.

That said, the structural properties of Singapore English particles are not identical to Cantonese. The tendency for boundary tones to override lexical tone is possibly even stronger in Singapore English than Cantonese, as we see that Cantonese particles borrowed into Singapore English have a greater propensity to be pronounced with boundary tones than in Cantonese itself. For example, 'hor' is noted to have a rising tone in Cantonese (Matthews and Yip 2009), but it can be pronounced with a low declining tone in Singapore English in declarative sentences, such as in 'You then stupid hor'. Furthermore, particles have not only been borrowed from Cantonese, but also from other Chinese dialects and Malay, and they can even be derived from English lexical items such as the particles 'one' and 'know' discussed above.

In summary, in this chapter we have looked at the complex situation in which Singapore English developed as well as the difficulty that scholars have had in pin-pointing the exact origins of phonological features. We have seen that there are a number of possibilities that could explain the development of the prosodic structure of Singapore English: either by influence from Malay, from southern varieties of Chinese, from a universal simplification, from internal development, or all of the above.

In particular, it appears that word final tone could be attributed to Bazaar Malay. Bazaar Malay is the closest relative to Singapore English that exhibits word final H tone, and for that reason the development of word final H tone seems to have been influenced by Bazaar Malay. However, origins of the other aspects of the prosodic structure do not have such a clear answer due to the multilingual landscape that surrounds Singapore English. In fact, it is highly possible that a number of features of Singapore English developed through internal simplification, such as the loss of the accentual phrase, or internal structural development, such as the tones for proclitics and enclitics.

The large inventory of final particles of Singapore English has been contributed to by Cantonese, seen from the fact that a large number of individual particles exhibit Cantonese origin. However, Cantonese is far from the sole source of final particles, as Singapore English has a number of particles that originate from Malay and Chinese dialects and even from English words.

§7 Conclusion

In this dissertation, we have described a complete picture of the prosodic structure of Singapore English. We have looked at the levels of intonational structure that exist in Singapore English (i.e. the syllable, the prosodic word, and the intonational phrase), as well as seen that there is a lack of evidence for others (i.e. the foot and the intermediate phrase). Recalling the initial prosodic hierarchy in section 2.4, we see that the provisional structure that we proposed can be regarded as the final intonational structure for Singapore English:

Figure 16 (repeated): Intonational structure of Singapore English

ι (intonational phrase)
|
ω (prosodic word)
|
σ (syllable)

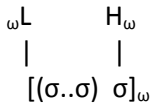
This structure goes against the standard view of the Prosodic Hierarchy in which it is claimed that all languages have the same universal hierarchy, and follows the path taken by Bickel et al (2009) in which prosodic structure should only be proposed if there is evidence for such domains.

On the first tier of the hierarchy, we have seen that most segmental processes take place on the domain of the syllable, such as devoicing in codas and plosive deletion. In addition, we see that the word final level H_{ω} tone docks to the final syllable of prosodic words.

On the level of the prosodic word, we have argued in section 2.1.3 that there is no word stress in Singapore English. This falls in line with previous literature which has noted the absence of reduction and schwas (Deterding 2005, 2007), syllable-timing (Low 1994, 1998, Low and Grabe 1998, Low et al 2000, Deterding 2001, Ling 2006) and general absence of predictable stress (Deterding 1994, Low 2000, Low and Brown 2005) in Singapore English. In lieu of word stress, there is a word tone system (Ng 2008,

2009, Siraj 2008, Wee 2007, 2008a, 2008b, Chow 2009). In this dissertation, we proposed a ($_{\omega}$L) H$_{\omega}$ default tonal structure for prosodic words, where the L tone in polysyllabic words is docked to the left edge of the prosodic word and the H tone is anchored to the rightmost syllable, such as in the diagram below.

Figure 17 (repeated): Word tone structure for Singapore English



We have also proposed that this structure is recursive, following Ito and Mester (2009), and this recursion is reflected from the repetition of tonal targets. This recursion is exclusive to function words, which may cliticize recursively to the left and right of the core prosodic word. All leftward cliticizing syllables (i.e. proclitics) receive a L tone, while all rightward cliticizing syllables (i.e. enclitics) receive a H tone. This is illustrated in the following examples:

Example (2) repeated: Leftward and rightward recursion

While we have seen that most function words and lexical words adhere to this default recursive prosodic word tonal structure, there are a number of words that do not fall into this category. We have seen in section 3.6 that there are some function words (negation and wh-words) that are inherently focused and which receive an extra H tone. In addition, polysyllabic function words that cannot be broken down into monosyllabic function words form their own prosodic word, such as 'however'. There

are also a number of compound or complex polysyllabic words which are parsed and analyzed differently from Standard English.

The word tones that exist in Singapore English are systemic and assigned by the syntax-prosody interface, rather than lexical. We have also seen that some function words such as negation and wh-words have a lexicalized extra H tone. Besides these function words that carry a lexicalized focal tone, the only cases of lexical tone that we have seen in Singapore English are Chinese borrowings that retain simplified, approximated vestigial tones. These lexical tones in Singapore English appear to be simplified and regularized as they get integrated into the system. In addition, it is possible and likely that non-Chinese speakers do not even pronounce these lexical tones.

In regards to phrasal prosody, we have argued that there is no evidence for an intermediate prosodic domain between the prosodic word and the intonational phrase, even though an accentual phrase level has been proposed by Chong (2013) and Chong and Sneed (2015). In addition, from experimental data, we have seen that there is no downstep in Singapore English, but only a gradual declination of pitch.

On the level of the intonational phrase, we have described a number of distinct phenomena. Firstly, we have seen that there is a phrase-initial boost that occurs on the first prosodic word in the intonational phrase, raising the f0 of the H tone in the first prosodic word of the intonational phrase. This phrase-initial boost affects both function words and lexical words. We have proposed that these pitch boosts can be represented by the symbol ^.

Secondly, we have seen that the final syllable is the most prominent syllable in the intonational phrase in terms of duration and pitch. This pitch prominence is due to the imposition of a boundary tone on the final syllable of the intonational phrase, which entirely replaces the default H tone. We have

proposed that these boundary tones can be represented by the symbol %, following TOBI conventions (Jun 2005, 2014). From an experimental study, we have seen that there are at least three main intonational boundary tones: low declining (L%), falling (HL%) and rising (LH%). Low declining corresponds to declarative contexts, falling corresponds to scolding and frustration, while rising corresponds to uncertainty, question and challenge intonations.

Thirdly, we have seen that although it has been claimed in the literature that particles possess lexical tone (Kwan-Terry 1978, Loke and Low 1988, Platt 1987, Lim 2004), we have shown that these tones can be largely attributed to intonational contours imposed by phrase boundary effects. However, there are at least a few particles which have retained their vestigial lexical tones.

Finally, in the last chapter of this dissertation, we have discussed how different features of the prosodic system of Singapore English could have originated, showing parallels between specific features of Singapore English and its surrounding languages. We have seen that the development of word tone is most likely due to contact with Bazaar Malay, which in turn was developed through the interpretation of Malay by Chinese speakers. Cantonese, one of the dominant Chinese dialects spoken in Singapore, seems to have had an effect on the system of final particles of Singapore English. Other aspects of the prosody, such as intonational-phrase final boundary tones and the lack of an intermediate phrase have parallels in surrounding languages, cannot be as clearly assigned to specific donor languages due to the large number of possible surrounding and competing influences.

§7.1 Limitations and contributions of the dissertation and directions for future research

This dissertation has mainly drawn and relied on spoken recorded data for exposition of its main points. Due to the nature of the dissertation (i.e. the need to look at non-frequently occurring data), recordings of specific sentences had to be used rather than spontaneous speech. Although care was

taken to make sure that the recordings used in this dissertation were as close to natural speech as possible (e.g. through use of Singapore English syntax and names), since Singapore English is a spoken vernacular rather than a written variety, there would still be a difference between sentences read off a page and sentences spoken in everyday spontaneous speech.

My main hope from this dissertation is to show that if we adopt a non-Anglocentric way of viewing prosody in varieties of English (as discussed in Lim and Ansaldo 2012), we can demonstrate that different varieties of English possess unique prosodic systems that are possibly entirely independent of English itself. I believe that the methodology adopted in this dissertation could be adapted to other varieties of New Englishes and perhaps even other similar languages to describe different aspects and layers of their prosodic systems. Singapore English, as I have shown in this dissertation, has a prosodic system which does not possess the layers assumed to be universally present in the Prosodic Hierarchy, and thus this will hopefully be a piece of evidence in the gradual progress towards discovering universality.

Finally, there are areas in this dissertation which merit future research. Firstly, as mentioned from the onset, the variety of Singapore English employed in this dissertation is that of the majority spoken by Chinese Singaporeans. More work has to be done to tease apart the prosodic differences between the Singapore English spoken by Chinese Singaporeans and the Singapore English spoken by Malays, Indians, and other minority ethnic groups for a fuller, richer picture of the prosody of Singapore English. Secondly, loanwords deserve a study on their own, especially a study that looks at the vestigial tone on these loanwords. Since we know that Singapore English does not have the tone system of Cantonese, Hokkien, or other influencing Chinese dialects, there needs to be a study that shows exactly how tone has been adopted, and to what extent the tone system from Sinitic languages has been simplified. Thirdly, I did not do justice in describing the focus system in Singapore English due to limited

non-spontaneous data. A later study will have to show the focus system in its entirety, and how the corresponding pragmatics and syntax relates to prosody, as well as ideally utilize a corpus to identify clear examples of the system in use.

§8 Bibliography

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