MANDARIN TONE AND ENGLISH INTONATION:

A CONTRASTIVE ANALYSIS

by

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ABSTRACT

Mother tongue interference in second language learning is often cited as a major source of learner error. It has been theorized that a thorough investigation of the mother tongue and a comparison of it with the target language can yield information on significant differences that may account for observed learner errors and offer insights to second language teachers which might allow these teachers to successfully correct interference-caused error. It is postulated that the system of English intonation is a major source of observed errors in English speakers attempting to master the Mandarin Chinese tone system.

In Chapter 1 the difficulties of English speakers attempting to learn Mandarin are addressed, the role of contrastive analysis as a viable theory in applied linguistics is defined, and the theoretical basis of this investigation is stated.

In Chapter 2 the English intonation system and the Mandarin tone system, as well as the Chinese intonation system are described.

In Chapter 3 a contrastive analysis of the two systems is made in terms of the phonetic, syntactic, and pragmatic aspects. Pedagogical suggestions for teachers of Mandarin are offered.

In Chapter 4 the conclusion that certain observed learner errors in English speakers attempting to learn Mandarin can be attributed to interference from English intonation is stated, and a suggestion that revisions be made in the teaching of Mandarin tone is offered.

CHAPTER 1

SOME THEORETICAL CONSIDERATIONS

1.1 The Problem of Mandarin Tones and English Speakers

Teachers of any dialect of Chinese (or of any language which has phonemic tones) have often been heard to lament that English speakers will never learn to speak the language correctly because they cannot learn the tones. The extreme difficulty English speakers experience in learning to speak tonal languages is widely attested. Any student who has struggled through three years of Chinese has probably been heard to say, at one time or another, that he would never learn the tones. To the native speaker of Mandarin, the mispronunciations of English speakers speaking Mandarin are perceived as a random jumble of wrong tones often resulting in total lack of communication.

The thesis presented in this paper is that these observed tone-pronunciation errors of English speakers attempting to learn Mandarin do not simply represent random, confused use of "wrong tones," but are systematic errors which can be partially traced to speaker transfer of English intonation patterns onto Mandarin sentences. The reason for the extreme difficulty in overcoming this type of interference may stem from the nature of intonation in English. Most English speakers are only mildly aware, on a conscious level, of intonation in their utterances. Because intonation is not represented in English orthography, the impetus for recognizing its very important role does not exist, at least

for the average English speaker. Before an English speaker can overcome the errors in speaking Mandarin which are caused by interference from English intonation he must be made aware of the nature of the interference and the reality of it in his speech. In order for this to occur, the Mandarin teacher must be aware of it and attempt to share this awareness with the student.

Through a comparison of the systems of Mandarin tone and English intonation, many observed learner errors can be linguistically accounted for and suggestions can be made for solutions to the problems. Implicit in this statement is a claim for the validity of the assumption that many learner errors are caused by mother tongue interference. This assumption is one of the major bases upon which the theory of contrastive analysis is built. Before discussing the investigation in this paper, I shall explore the role of contrastive analysis, its strengths and weaknesses, and its viability as a means of language analysis.

1.2 A Justification for Contrastive Analysis

Following the publication of Linguistics Across Cultures (Lado 1957), the theory of contrastive analysis enjoyed a period of great popularity among applied linguists but has since been criticized as a means of language analysis and, more seriously, for inadequacies in its ability to account for error. The theory of contrastive analysis (CA) is based upon "the assumption that we can predict and describe the patterns that will cause difficulty in learning, and those that will not cause difficulty, by comparing systematically the language and culture to be learned with the native language and culture of the student"

(Lado 1957: vii). The motivation behind the theory is primarily pedagogic: the need for the language teacher to understand the major differences between the language being taught and the native language of the students. DiPietro (1971: 1) argues that in addition to its obvious pedagogical contributions, CA should not be overlooked as a way "to evaluate the postulation and claims of linguistic theory itself." It can be argued that any analysis of a language is necessarily based upon the comparison of it with some level of the native language of the investigator.

Briefly stated, the CA hypothesis is that certain difficulties second-language learners encounter are caused by interference of the mother tongue. It is theorized that through the systematic comparison of the two language systems, these areas of great difference can be isolated and the difficulties of learners predicted. Material for teaching the target language can then be prepared on the basis of these differences.

Both the claim that CA can yield new information on areas of student difficulty and the validity of the theory as a basis for language analysis have come under attack. One criticism of a contrastive analysis is leveled against its claim that mother tongue interference is the cause of learner errors. Newmark and Reibel (1968, cited in James 1971) insist that errors are not caused by mother tongue interference but by insufficient knowledge of the target language. While insufficient knowledge or, more likely, over-analogy of one aspect of the target language is not discounted as a source of learner error, the evidence for mother tongue interference is too strong to ignore.

James (1971: 65-66) makes the case against the "insufficient knowledge" theory nicely in his hypothetical case of the Italian attempting to learn Spanish or Chinese. If mother tongue transfer (either positive or negative) does not play any role in the learning of a second language, then the only explanation of the Italian's relative ease in learning Spanish and of his difficulty in learning Chinese is that Spanish must somehow be a more logical language than Chinese ". . .which is an anathema in modern linguistics!" Moreover, if failure to correctly internalize the phonological system of English is the reason that so many learners have difficulty pronouncing the English interdental fricatives [θ, ð], how can we explain that Cantonese speakers will almost certainly pronounce them [f, v], French speakers [s, z], and Spanish speakers [t, d]? We simply cannot argue that the mother tongue is not a significant factor in second language learning errors, particularly at the beginning level.

A far more serious criticism leveled against contrastive analysis is that it has not been consistently able to do what it claims to be able to do; that is, to <u>predict</u> learner errors through a systematic comparison of the mother tongue and the target language. Wilkins (1972: 199-200) asks three very important questions regarding this claim.

> First, are all errors to be anticipated cases of transfer from the mother tongue? Secondly, are there cases where transfer does not occur as predicted? And thirdly, are there cases where a comparison will predict positive transfer and therefore no error, but where error does in fact occur?

Wilkins cites the case of parallel constructions in Czech and English where errors systematically occur, and Sciarone (1970) points to the case of Dutch speaking children learning French. Error in the use of

the French verbs avoir and être occurs regularly although these two verbs correspond to the Dutch equivalents hebben and zijn. It is obvious that the answer to Wilkin's (1972) first question is negative, but contrastive analysis has never claimed that all error is attributable to mother tongue interference. All practicing language teachers will attest to the presence of some errors which almost all learners will make, regardless of mother tongue. The positive answers to the second two of Wilkin's questions and the evidence cited above point to the more serious failure of contrastive analysis--the inaccuracy of predictions based on comparison.

Both Wardhaugh (1970) and Sciarone (1970) address this problem in their articles. Wardhaugh sees the failure of the claim of contrastive analysis as the result of confusion between what are really two hypotheses: a strong, highly abstract and unattainable version and a weaker, more practical version. The strong hypothesis is the claim that errors can be predicted. That is, previously unknown problems can be discovered through a comparison, while the weaker hypothesis is the claim that known errors can often be accounted for through a comparison. The problem, he says, is not that the entire theory fails but that studies which are in fact based on the weak hypothesis are being criticized on the basis of the claims of the strong version. Sciarone (1970: 127) also sees this claim of the strong hypothesis as the principle problem with contrastive analysis. He says: ". . .we need not cherish the illusion of discovering by some means of CA problems of learning which are yet unknown. Practice has revealed them all." Sciarone is correct in his assertion that a contrastive analysis will

not reveal any unknown problems; however, once observed errors have been isolated and attributed to mother tongue interference through a contrastive analysis, these errors can be predicted for speakers of the first language who are attempting to learn the second language in question. That is, a teacher of Language B may, on the basis of a contrastive analysis, predict the areas for which any group of speakers of Language A will encounter difficulty. This does not mean that these errors were unknown; it means that these errors have been shown to be result of systematic differences between the two languages and will occur when most speakers of Language A attempt to learn Language B.

In the cases for which a contrastive analysis has not revealed the cause for consistently occurring error, and for which incorrect analogization can be ruled out as a cause for learner error, the problem may lie not in the failure of the theory but in inadequate comparison. When the speakers of Language A consistently encounter difficulty with certain areas of Language B where no other learners experience problems, then the cause of the difficulty must be interference from Language A.

Interference operates on many levels, and a contrastive analysis must consider the possibility of interference from levels other than the surface level. When a contrastive analysis of the syntactic systems of two languages fails to reveal the source of interference, then a thorough analysis of the semantic systems of the problematic area must be made. I strongly suspect that a semantic comparison of the French verbs avoir and être and the Dutch verbs hebben and zijin will reveal the source of the difficulty described above.

1.3 The Theoretical Basis of this Investigation

It is Wardhaugh's (1970) weaker hypothesis which forms the basis of the investigation undertaken herein. Learner error of English speakers attempting to learn Mandarin tones, as stated in Section 1.1, is widely attested. The task of a contrastive analysis of the system of Mandarin tone with the system of English intonation is: first, to isolate those consistently occurring errors which can be attributed to interference at some level; and second, to identify the specific source of the interference. Once the source of interference is identified and related to a specific type of error, pedagogical implications can be made, and the teacher can, hopefully, set about correcting these errors.

CHAPTER 2

THE SYSTEMS OF ENGLISH INTONATION AND MANDARIN TONE

2.1 Introduction

When linguists make divisions among languages on the basis of typology, one of the distinctions often made is that between tone languages and intonation languages. Chinese is a tone language. Variations in pitch and contour are attached to monosyllabic morphemes and are phonemically distinctive. English, on the other hand, is an intonation language in which variations in pitch may occur over any number of syllables and serve to add additional shades of meaning to an already meaningful utterance. This distinction incorrectly implies that tone and intonation are mutually exclusive systems. Tone languages almost always have an intonation system superimposed on the tone system, and Chinese is no exception.

In this chapter, I shall summarize the systems of English intonation and Chinese tone in as much detail as necessary to pursue the contrastive analysis of the systems.

2.2 English Intonation

Every sentence in English is spoken with variations in pitch and stress. That these variations in pitch are formalized and recognized as having some meaning by speakers of English is widely accepted. These meaningful changes in pitch are called intonation although intonation includes such elements as stress and juncture as well.

All speakers of English will verify that there is a very real difference between the utterance "John's leaving" pronounced with a rising contour and the same utterance pronounced with a falling contour. Pike (1974), Crystal (1969), Halliday (1963a, 1963b), Halliday and McIntosh (1966), Lindström (1978) and others working on English intonation point to such distinctions as evidence of the distinctive nature of intonation in English, and most of the work done in the field centers around the isolation and description of such intonational contrasts.

2.2.1 The Tone-Unit Model

Most linguists working from a prosodic analysis of English intonation accept the definition of the tone-unit originally proposed by Palmer (cited in Crystal 1969) as the largest intonational unit. Studies of English intonation by Crystal (1969) and Lindström (1978) which are based on large bodies of empirical data, support this analysis. Crystal (1969: 205-206) defines the tone-unit as follows:

> In English there seem to be regular definable phonological boundaries for tone-units in normal (here meaning "not too hurried") speech. Given that each tone-unit will have one peak of prominence in the form of a nuclear tone there will be a tone-unit boundary which is indicated by two phonetic factors. Firstly, there will be a perceivable pitch-change, either stepping up or stepping down, depending on the direction of nuclear tone movement--if falling, then step-up; if rising, then step-down; if level, either, depending on its relative height. . . . The second criterion is the presence of junctural features at the end of every tone-unit.

The internal structure of the tone-unit includes one obligatory element, the <u>nucleus</u>, and three optional units, the <u>head</u>, the <u>prehead</u>, and the <u>nuclear tail</u>.

The tone-unit must contain a minimum of one syllable which must end with a pitch glide of some type. This element is called the nucleus and is followed by some type of junctural feature, usually a pause. "The presence of the nucleus," according to Crystal (1969: 207), "is what accounts for our intuition of 'completeness' at the end of the unit: if it is omitted, the auditory effect is one of 'being cut short'."

The head refers to the section of the utterance consisting of any number of stressed or unstressed syllables from the first stressed (and usually pitch-prominent) syllable (called the onset) up to the nucleus. The degree of stress and prominence in the head syllables can never be more than that of the nucleus.

The prehead precedes the onset syllable with any number of unstressed syllables. Crystal points out that the prehead may also consist of slightly stressed syllables, but the stress can never be greater than the onset, nor can it have pitch prominence.

Any number of stressed or unstressed syllables which follow the nuclear syllable and continue the pitch movement until the boundary (usually a pause) may make up the nuclear tail.

The tone unit may be described simply as (P)(H)N(T).

The examples in Table 1, taken from Lindström (1978: 42), illustrate the various types of tone-unit. In addition to Lindström's tone marks, I have indicated the elements of the tone-unit (prehead, head, nucleus, and tail). The underlined syllable is the nuclear syllable of the tone-unit and carries primary stress. The tone-unit is delimited by double slash-bars. Tone marks are placed before prominent syllables

Table 1. Examples of English Tone-Units.*

TONE MARKS

double grave accent (ˋˋ) = high-fall; single grave accent (ˋ) = mid-fall; low grave accent (ˏ) = low-fall; high vertical mark (') = stepping head; single slash bar (/) = wide high-rise; low acute accent (ˎ) = low rise; single acute accent (´) = narrow high-rise; haček (ˇ) = fall-rise; low vertical mark (ˌ) = level head; circumflex (ˆ) = rise-fall; low grave accent and single slash (ˏ/) = broken high-rise

(1) [H] 'Staying [N] ˏ/in [T] tonight?//

(2) [N] ˋNo.//

(3) [H] 'Couldn't you 'put 'those 'things somewhere [N] ˎelse?//

(4) [P] They've [H] 'been 'there for [N] ˋdays.//

(5) [H] 'No [N] /sale?//

(6) [H] 'No [N] ˏsale.//

(7) [H] ˌThat's ˌhappening ˌrather [N] ˆoften, [T] isn't it?//

(8) [P] May´ [N] be.//

(9) [P] If [H] 'I 'can't [N] ˇsell [T] the stuff//

(10) [P] it's because [H] 'people are 'learning a bit of [N] ˋsense.//

(11) [H] ˌNot so ˌgood for [N] ˎus, [T] is it?//

(12) [N] Anyway [T] //

(13) [N] ˋDo [T] ˎ move them.//

(14) [H] /I thought [N] ˋˋSally [T] might like some of them.//

(15) [P] What [H] /ever [N] ˋˋfor?

(16) [P] Her [N] ˋˋkids//

(17) [P] at [N] ˋˋschool.//

(18) [P] She [H] 'won't be [N] ˋat [T] that school much ˎlonger.//

*Lindström 1978: 42.

only, and the first tone mark in the tone-unit usually indicates the beginning of the head.

The four elements of the tone-unit are further subdivided and classified. The most important of these are the nuclear tone and the various tones which occur in the head. Tones may be either static or kinetic. The static tone is also called the level tone, and the kinetic tones are contoured. There is considerable disagreement as to the number of contours; however, four, the rise, the fall, the fall-rise, and the rise-fall are most frequently identified. Various combinations of these basic types are also identified. The elements of the tone-unit are further subdivided and classified.

2.2.2 The English Stress Cycle

Chomsky and Halle (1968) in The Sound Pattern of English proposed that English stress was predictable through cyclic application of one or the other version of a formalized rule. While Chomsky and Halle deliberately avoid a discussion of pitch, the fact that pitch and stress are very closely related elements indicates the predictability of pitch contours as well.

Briefly stated, the rules for stress application in English, the Compound rule, which applies to lexical items (N-, A-, V-labeled) and the Nuclear Stress rule, which applies to phrases (anything except N-, A-, or V-labeled items) can be applied cyclically until all the elements of an utterance have been assigned stress. The Compound Rule assigns primary stress to a primary-stressed vowel which is followed by another primary-stressed vowel in a lexical item; the Nuclear Stress rule assigns

primary stress to a primary-stressed vowel which is preceded by another primary-stressed vowel in a phrase. The rule is formalized by Chomsky and Halle (1968: 18) as follows:

$$\begin{matrix}[1\ \text{stress}] \\ [\quad V \quad]\end{matrix} \rightarrow [1\ \text{stress}]/\ \left\{ \begin{matrix} \underline{\qquad\qquad}\ldots\overset{1}{V}\ldots] \\ \overset{1}{V}\ldots\underline{\qquad\qquad}\ldots] \end{matrix} \right\} \begin{matrix} \text{NAV} \\ \text{NAV} \end{matrix} \qquad \begin{matrix} \text{Compound Rule} \\ \text{Nuclear Stress Rule} \end{matrix}$$

When these rules are applied, so is the convention which states: "when primary stress is placed in a certain position, then all other stresses in the string under consideration at that point are automatically weakened by one" (Chomsky and Halle 1968: 16-17). The rules are applied cyclically from the innermost bracketed items (the placement of the brackets specified by the surface structure) to the outermost brackets. The syllable which receives the primary stress assignment should correspond to the nuclear syllable of the tone-unit model described in Section 2.2.1.

2.3 Mandarin Tone

Mandarin Chinese has four phonemic tones which are attached to monosyllablic units that may or may not constitute an entire word. The four tones are described as level, rising, falling-rising, and falling. The pitch level and contour of the tones give meaning to otherwise meaningless utterances. The only differences among the pronunciations of mā 'mother,' má 'hemp,' mǎ 'horse,' and mà 'scold' are the tones. The level, or first, tone is a high-level tone and is indicated by the macron in the transcription. The rising, or second, tone begins near the mid-level of the speaker's range and rises to the high level. It is indicated by an acute accent mark in the transcription. The

falling-rising, or third tone, is the lowest and longest of the four tones and is marked with the haček in the transcription. The falling, or fourth, tone begins high and falls sharply. It is marked with the grave accent in the transcription. Chao (1930) first proposed a system of tone letters and a five-level pitch range for Mandarin which has since been confirmed by acoustical machine tests (Dreher and Lee 1966; Wang and Li 1967). Table 2 presents the tone letters, pitch level numbers, and diacritics of the four phonemic Mandarin tones. The vertical line of the tone letter represents the pitch range, and the connected line represents the pitch level and contour of the tone.

Acoustical measurements in tests conducted by Dreher and Lee (1966) and Wang and Li (1967) show that the third tone is the longest and that the first and fourth are the shorter tones. This difference in duration will be shown to be important in Section 3.2.3 in the perception by English speakers of tones one and four as stressed.

In addition to the four phonemic tones, a number of phonetic realizations, or allotones, are readily identifiable. Furthermore, tone sandhi, the modification of a tone from its phonemic shape to some different phonetic realization, acts on tones in combination in Mandarin.

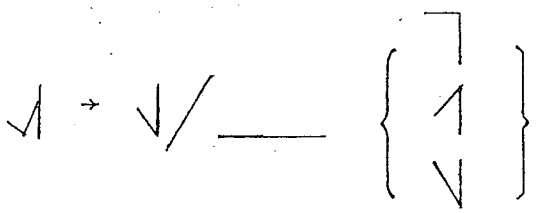
2.3.1 Systems of Tone Sandhi

The third tone in Mandarin is particularly susceptible to sandhi in combinations. Whether this is because of its relative length or because of its low pitch has not, to my knowledge, been investigated. The only time a third tone is fully realized in speech is in isolation or before a pause. The third tone followed by any tone except another third tone loses its rising "tail" and becomes a low falling tone, often

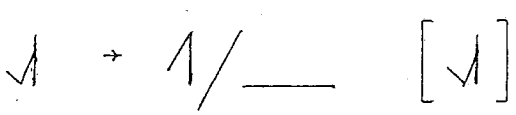
Table 2. The Four Phonemic Tones of Mandarin

Tone	Description	Tone Letter	Pitch-Level Numbers	Diacritic
1st	high-level	˥	55	(¯) macron
2nd	high-rising	˧˥	35	(´) acute accent
3rd	low falling-rising	˨˩˦	214	(ˇ) hăcek
4th	high-falling	˥˩	51	(`) grave accent

referred to as the "half-third tone." This modification of the third tone can be illustrated using the following tone letters:



When followed by another third tone, the third tone becomes a rising tone with properties which are indistinguishable from those of the second tone. There have been a number of attempts to determine if this changed third tone is acoustically different from the second tone. According to an experiment conducted by Wang and Li (1967), it is perceived as being identical to the phonemic rising tone leading to the conclusion that for pedagogical purposes, at least, the sandhied third tone is identical to the phonemic second tone. This type of sandhi can be illustrated as:



According to Cheng (1973), a series of third-tone syllables will become a series of second-tone syllables up to, but not including, the final syllable which remains a full third tone. This sequence may undergo further sandhi if the speed of articulation is increased.

In addition to the four phonemic tones and the types of third-tone sandhi discussed previously, there is another type of tonal modification often found on the second syllable of disyllabic bound forms or on certain syntactically specified elements. This tone is unmarked in the transcription and generally called the neutral tone. Cheng (1973)

describes the neutral tone as short and lax and cites the acoustical studies of Dreher and Lee (1966) and others which indicate that the length of the neutral-zone syllable is about one-half that of a full-tone syllable. The neutral tone is not generally considered to have any contour but is assigned a definite pitch level on the 5-level scale based on the tone of the preceding syllable. The neutral tone, according to most commonly accepted descriptions, will be 2 after the first tone, 3 after the second tone, 4 after the third tone, and 1 after the fourth tone. Dreher and Lee (1966: 371-372) have shown that the "neutral or zero tones are not simply points on the frequency scale, but very short, fully contoured tonemes." They are described as follows:

Post-1 tone:	41
Post-2 tone:	31
Post-3 tone:	23
Post-4 tone:	21

For pedagogical purposes, it may be sufficient to say that the neutral tone is low after tones one, two, and four and high after tone three.

The occurrence of the neutral tone may be determined in part by the surface structure of the utterance in which it occurs. Cheng (1973) includes particles, suffixes, localizers, reduplicated morphemes (other than adjectives, numerals, and classifiers), pronouns after verbs, directional verbs, and resultative endings which may carry the neutral tone. In addition, there is a number of lexical items, mostly bound forms, which are neutral in tone.

A third major type of tonal modification is the tendency for a sequence of tones to lose its contours in fast speech, with the exception

of those syllables which receive primary and secondary stress. These, according to Cheng (1973) and Kratochvil (1962) are usually the last and first syllables, respectively, of the utterance. Cheng (1973: 52) gives the following example:

	Lǎu	Lǐ	mǎi	hǎo	jǐu.	'Old Li buys good wine.'
(a)	ˊ	ˇ	ˇ	ˊ	ˇ	
(b)	ˊ	ˊ	ˇ	ˊ	ˇ	
(c)	ˊ	ˇ	ˊ	ˊ	ˇ	
(d)	ˊ	ˊ	ˊ	ˊ	ˇ	
(e)	ˊ	–	–	–	ˇ	

As the speed of articulation increases, the action of tone sandhi operates across progressively stronger syntactic boundaries until a sequence such as (e) occurs. The role of stress in this type of tonal modification is important because stressed syllables will not lose their tonal contours in fast speech unless they first become unstressed. In addition to the last and first syllables of the utterance retaining tonal contour in accelerated speech, certain syntactic items appear to be resistant to unstressing. Chang and White (1978) found that verbs and adjectives retain their tonal contours longer than other sentential elements as the speed of articulation increases suggesting that stress, in Mandarin, is related to the syntactic structure of an utterance.

2.3.2 Intonation in Mandarin

In addition to the lexical tone discussed above, Mandarin has sentence-level intonation in much the same way as English although the phonetic manifestations of these two systems are radically different. Chao (1968: 39) answers, metaphorically, the question of how an

intonation system interacts with a tone system by comparing "syllabic tone and sentence intonation with small ripples riding on large waves (though occasionally the ripples may be 'larger' than the waves)." In other words, the intonation, or large waves, carries the tone or ripples. The metaphor is partially supported by experimentation. Chang (1958) and Ho (1976, 1977) show that sentence intonation has a definite influence on tone contours but does not distort the contours. Depending upon the placement in the sentence of the various tones, different intonational contours will cause the tones to be either longer or shorter in duration and will exaggerate or reduce the contour of the tone. In addition, Chao (1968) states that emotion (which is how he defines intonation in Chinese) can widen, narrow, raise, or lower the pitch range of a speaker.

The pragmatic properties of intonation in Mandarin (or in any dialect of Chinese) are much less clear and certainly not widely agreed upon. Chao (1968) identifies thirteen types by the attitude expressed (complaining, disapproval, praise, etc.) which he says are found not only in Mandarin but in most other Chinese dialects as well; however, he does not consider it an exhaustive list.

2.4 Summary

In this chapter I have briefly described the intonation system of English and the tone and intonation systems of Mandarin. In English the tone-unit may be defined as the largest intonational unit, having a terminal glide and some junctural element as its boundary marker. The tone-unit may be made up of any number of syllables and must have at

least one element--a nuclear tone. Tones may be level, falling, rising, falling-rising or rising-falling, or any combination of these. Intonation is not lexically distinctive, but it is pragmatically distinctive, and inasmuch as semantics play a role in grammar, it may be grammatically distinctive. In Mandarin there are four lexically distinctive tones: a high level tone, a high rising tone, a low falling-rising tone, and a high falling tone. In addition, there are numerous phonetic realizations of these four phonemic tones. The low falling-rising tone may be realized as a low falling tone, a high rising tone, or in its full tonal contour. There is a fifth class of tone in Mandarin called the neutral tone which is much shorter than the full tones. Its occurrence may be specified in the surface structure, but it also occurs on a number of lexical items. In fast speech the tonal contours of all tones except the strongly stressed tones may be lost. In addition to this lexically distinctive tone system, Mandarin has a pragmatically significant intonation system. The overall effect of the intonation system upon the tone system can be likened to small ripples riding on large waves.

Both languages use pitch level, pitch contour, stress, and juncture in their systems although in significantly different ways. In the next chapter, the major differences between the two systems will be discussed.

CHAPTER 3

A CONTRASTIVE ANALYSIS

3.1 Introduction

In this section I shall examine the systems of Mandarin tone and English intonation in an attempt to account for some of the errors observed in English speakers learning Mandarin. The tonal system of Mandarin encompasses at least the phonetic, phonological and, in part, syntactic levels, while the intonational system of English includes phonetic, phonological, syntactic, and pragmatic levels. These systems may contrast on any of these levels. I shall begin this analysis with an account of some phonetic contrasts between Mandarin and English and then examine the phonological, syntactic, and pragmatic contrasts.

3.2 The Phonetic Contrasts of English Intonation and Mandarin Tone

The primary and most easily measurable correlate of tone and intonation, according to Ohala (1973), is the fundamental frequency of the vibrations of the vocal cords, abbreviated F_o. Perturbations of the F_o are commonly referred to as pitch, although Ladefoged (1975) states that the relationship of pitch level to F_o is not a direct relationship. In other words, as pitch rises, the F_o also rises but not in direct proportion. It is generally agreed, however, that F_o perturbations cause changes in pitch. F_o force may be determined by two

factors: the state of the vocal cords and the aerodynamic forces driving the chords.

3.2.1 The Pitch Ranges of Mandarin and English

It has been shown that the relative pitch range of all humans falls within a certain range of F_o readings, and that the various pitches used in any given language are distributed relatively evenly across this range. There are no languages which use all high pitches and no low pitches, although the upper and lower ranges of pitch used in normal conversation may vary slightly from language to language.

The relative pitch range of Chinese has been demonstrated to be wider than that of English. In an oscillograph study conducted at the University of Wisconsin between 1970-1972, it was determined that the pitch range of Chinese speakers was 1.5 times wider than the pitch range of English speakers (Chen 1974). Both word-level and sentence-level pitch were tested. The average pitch range of native Chinese speakers speaking Mandarin was 258% wider than the average pitch range of English speakers speaking English when uttering one of the test words, and 154% wider when uttering one of the test sentences. When the English speakers spoke Mandarin, their pitch range increased by 123% for words and by 62.7% for sentences (Chen 1974). Unfortunately, the data presented in the report do not include the upper and lower frequency readings for English and Mandarin so we are forced to conclude that the average pitch range for Mandarin speakers is 25% higher and 25% lower than the average pitch range for English speakers. The pedagogical implications are clear. The beginning level student of Mandarin must learn to widen his

normal pitch range in order to successfully pronounce the Mandarin 1st (high) tone and the 3rd (low falling-rising) tone.

3.2.2 The Contours of Mandarin Tone and English Tone

With what is known about the relative pitch levels and contours of Mandarin tone, and through extrapolation from Chen's (1974) data, we can compare the pitch levels and contours of Mandarin and English tones. The contours of both tonal systems are described in Chapter 2. Mandarin has a high level, a rising, a low falling-rising, and a falling tone; English has at least level, falling, rising, falling-rising, and rising-falling tones. Crystal (1969: 225) lists the frequency of occurrence in his data for the basic types of English tone:

falling	51.2%
rising	20.8%
falling-rising	8.5%
rising-falling	5.2%
level	4.9%
combinations	9.7%

An informal dictionary count shows that the frequency of occurrence of the phonemic Mandarin tones is:

falling	34%
rising	26%
level	24%
falling-rising	16%

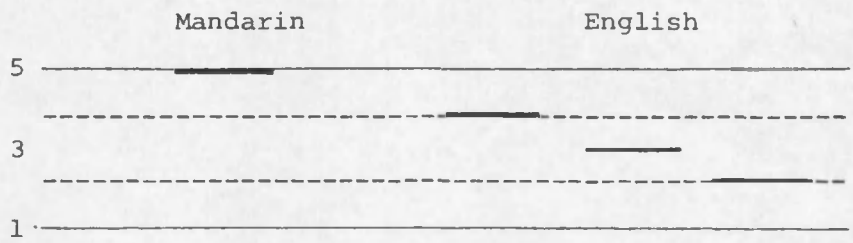
Naturally, a large sample of recorded data would have been a much better source for a tone frequency count. Nevertheless, it is interesting to note the relatively high frequency of occurrence of the falling and rising contours in both languages. The first significant difference

is the domain of the tones. In Mandarin the tone falls on one syllable; in English the tone may be spread across any number of syllables.

Following Chao (1948), a five-level pitch range will be used with 5 indicating the highest pitch. Interlinear transcription will be used in the following diagrams with the solid lines indicated the upper and lower levels of the relative Mandarin pitch range and the dotted lines indicating the upper and lower levels of the relative English pitch range.

The Mandarin level tone is generally accepted to be a 55 tone. Tests by Dreher and Lee (1966) have shown that is is actually a 54, but they stress that for pedagogical purposes the 55 description be retained. The level tone in English may begin at any pitch level. It does not usually occur as a nuclear (hence primary stressed) tone, but a high level tone gives secondary prominence to syllables. In both languages, it has been demonstrated that a series of level tones will gradually step down in pitch.

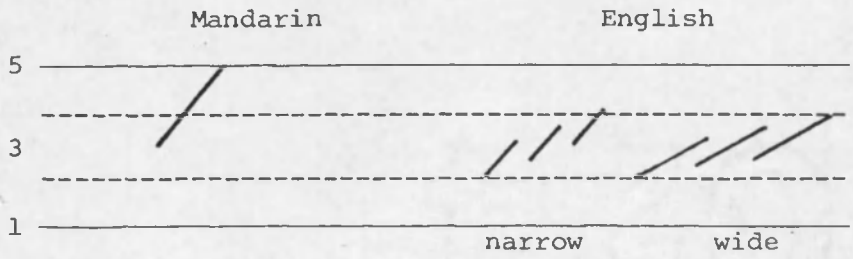
(1)



The rising tone in Mandarin is described as a 35 tone. It begins on a mid-level pitch and rises to a high-level pitch. In English, according to Lindström (1978), the rising tone begins on a low- or mid-level pitch and reaches a mid- or high-level pitch. It may be wide (longer in duration) or narrow. This tone is <u>always</u> nuclear; that is,

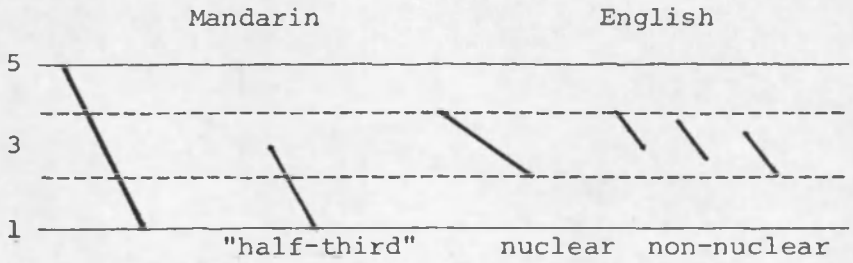
it only occurs on primary-stressed syllables and, therefore, indicates a word of pragmatic importance. This tone is commonly associated with a certain type of question in English, although it also indicates politeness or doubt. The pragmatics of the English tonal contours will be discussed more fully in Section 3.3.2.

(2)



According to the preceding statistics, the falling tone is the most commonly occurring tone in both languages. Mandarin falling tone begins at the high level and falls to the low level. The falling tone in English may begin at any pitch and end at any lower pitch. As a nuclear tone, according to Lindström (1978), it is usually wide; as a non-nuclear tone, it is narrow. The Mandarin "half-third" tone, a short falling tone, closely resembles the non-nuclear English falling tone.

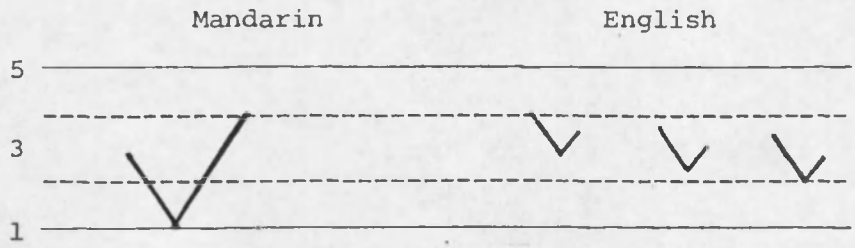
(3)



The falling-rising tone occurs less freqently than the three tones described above in both languages. In Chinese it begins on a lower pitch than that on which it ends. The reverse is true for the English falling-rising tone. It always begins on a higher pitch than

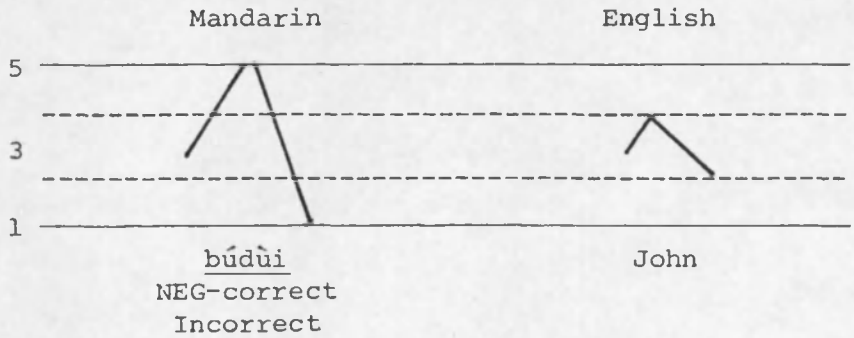
that on which it ends, and it may reach a mid- or low-level at its lowest point.

(4)



There is no monosyllable tone in Mandarin which may be compared with the rising-falling tone in English. This contour in English is less frequent than any other single tone in English. It may occur over one syllable, but it more frequently occurs over two or more. It may be compared with the combination of the Mandarin rising and falling tones when it occurs over two syllables. The polysyllabic <u>búdùi</u> 'incorrect' may be compared with the English rising-falling tone. The rising-falling tone in English begins on a low- or mid-level pitch, rises to a higher level and then falls to a low level.

(5)



This examination of individual Mandarin tones and comparison of them with English tones has revealed no major differences except the significantly wider Mandarin pitch range and domain of tonal contour. English has the same tonal contours as Mandarin and even some which

Mandarin does not have. Why, then, do English speakers experience such profound difficulty in acquiring Mandarin tones? While the difficulties observed in English speakers learning Mandarin occur, for the most part, in sentences or in combinations of words, not on isolated syllables, some problems have been observed in production of Mandarin tones on certain isolated syllables. It has been suggested (Light 1980) that the problem is in the consonant or vowel of the Mandarin syllable. Work in the field of tonogenesis suggests that phonetic constraints associated with certain phonological segments, usually consonants, produce F_0 perturbations that are universal and closely associated with certain pitch registers and contours. For example, voiceless initial consonants have been associated with a higher relative pitch than voiced counterparts in non-tonal languages, and association of voiced-voiceless distinction with upper and lower pitch registers in tonal languages is universally accounted for. Glotallic final consonants are associated with a rising tone in a number of genetically unrelated languages. While less work has been done on the influence of vowel on the development of tone, some effect of the vowel on the tone is to be expected. It is these constraints which may be the cause of the difficulty encountered by learners in pronouncing isolated syllables rather than any interference from an English tonal contour. The contrastive analysis of the phonetic tonal contours of English and Mandarin has failed to reveal any major articulatory differences between the isolated tonal contours of the two languages. The primary difference between the tones of English and Mandarin is the significantly wider domain of the English tone. Errors in the production of isolated tones do not occur consistently with one

single tone. That is, English speakers do not have problems pronouncing the Mandarin third tone but do have difficulty in pronouncing the Mandarin word sǐ 'die' with the third tone. Both the vowel (a high, front vowel) and the consonant (a voiceless consonant) in this syllable are associated with high tones although the lexical tone is low. These problems, while important, must be considered as problems which develop because of inherent difficulties in the target language rather than interference-caused errors. That is, the Mandarin tone violates some universal phonetic constraint in the syllable; and, because of this, the particular syllable-tone combination is difficult for speakers of most other languages, not just English, to pronounce.

3.2.3 Stress in English and Mandarin

An examination of the tonal contours of English and Mandarin has failed to reveal any differences that will account for the errors observed in English speakers learning Mandarin. Tonal contour, however, is only one element of the English intonational system. Although stress is perhaps the most important element of English intonation, it is not an essential element of the Mandarin tonal system.

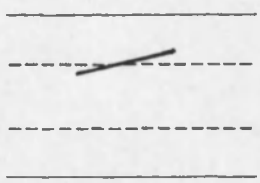
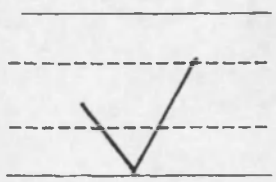
Stress in English is commonly defined as an increase in duration, amplitude, and pitch. While duration and amplitude are closely related to stress, studies by Fry (1955, 1958 both cited in Hyman 1973); Lehiste (1970 cited in Hyman 1973), and Lieberman (1957 cited in Crystal 1969) have shown that changes in the F_0 are primary cues for detecting stress. Syllables with high pitch levels, particularly high contoured tones, are perceived as stressed; the higher the syllable, the more likely the

perception of stress in English. Significant differences arise in the literature as to the importance of amplitude and duration. Fry's studies (1955, 1958 cited in Hyman 1973) indicate that duration is of greater importance in the perception of stress while Lieberman (1957 cited in Crystal 1969) concludes that amplitude is the important cue. If duration is the more important cue for detecting stress in English, then the length of the rising and falling-rising Mandarin tones would be perceived as stress by speakers of English. Experience has shown that this is not the case, but that the two shorter tones (level and falling), which begin at a high level, are most often perceived as stress by English speakers.

English stress is predictable (see Section 2.2.2); and, in addition to playing an essential role in the intonational contour of an English utterance, it affects the quality of English vowels. Unstressed English syllables usually undergo vowel reduction.

Stress in Chinese is not related to phonemic tones but does determine, in part, what the phonetic manifestations of them will be. Kratochvil (1969) proposes syllabic volume as the acoustic correlate of stress in Mandarin. He proposes that the fundamental frequency of a given syllable is not the primary determinant in the perception of stress, as it is in English, but that duration and amplitude play a more important role. Stressed tonic syllables in Mandarin are perceived as relatively longer and louder than unstressed tonic syllables. Pitch level, because of its phonemic nature in Chinese, is not an important determinant in the perception of stress. This is an important difference between English and Mandarin. The English speaker who is

conditioned to hear high pitch as stress will hear the two high Mandarin tones (first and fourth) which begin at a high pitch level, as stress. Moreover, the English speaker speaking Mandarin often produces these high level tones whenever the situation indicates the use of stress. For example, when unexpectedly called upon in class, the English speaking student may point to himself and exclaim:

(6)  instead of 

* wǒ? wǒ? me?

The tones of stressed Mandarin syllables, in addition to being longer and louder, generally show an exaggeration of the tone contour. A stressed third tone (low falling-rising) syllable, according to Kratochvil (1969), exhibits a <u>lower</u> F_o than normal because the contour is extended to a lower point. This is precisely the opposite of the effect that stress has in English. Cheng (1968) shows that the weakest stress in English acts as the Mandarin third tone in a Chinese sentence causing sandhi in the preceding syllables. The weakest syllables in English usually have the lowest F_o. The weaker the stress, the lower the tone. Therefore, the stressed third tone, which is lower than the unstressed third tone syllable, will be perceived as the weakest stress by an English speaker.

The association of low tone with weak stress causes another problem in the pronunciation of the vowel of a low tone syllable.

Because of the vowel reducing effect of weak stress on English syllables, the English speaker may pronounce low tone Mandarin syllables with a reduced vowel. This is particularly so when the English speaker expects the syllable or syllables to be unstressed. That is, the English equivalent would be unstressed in a similar English sentence.

3.2.4 Junctural Elements

Linguists working on the description of English prosodic features have identified a number of junctural elements. The three primary junctural elements are the types which occur between words, the types which occur between syntactic units, and the types which mark the tone-unit and occur between longer stretches of utterances. The first type of juncture is indicated in the phonetic system of English. The difference between night rate [niyt˗rat] and nitrate [niyt^{h}rat] is in the length of the vowel preceding the stop /t/, and the allophone of /t/, [t˗] or [t^{h}]. This type of juncture is not a major factor in errors by English speakers learning Mandarin because of the syllable structure of Mandarin. With the exception of [n] and [ŋ], there are no final consonants. The second type of juncture is slightly more important. It often coincides with the third and most important type. These syntactic junctures determine, in part, the domain of tone sandhi in Mandarin. As was described in Section 2.3.1, as the speed of articulation increases, the effect of sandhi operates across increasingly stronger syntactic junctures until all elements of the utterance except the first and last have been affected.

The third type of junctural element, the pause, is the most important. The pause usually delimits the tone-unit in English. In Mandarin the last formative before a pause retains its tonal contour as does the element following a pause. These pauses usually occur at the boundaries of syntactically defined units and are voiceless. Voiced pauses are sometimes included in a study of prosodic features, although they are more closely related to the phonological and syntactic systems of the language. Nevertheless, the interference from English voiced pauses [əm] or [əh] is a major problem in learning to speak Mandarin fluently. The Mandarin voiced pauses (pause particles) should be taught at the beginning level when students are often at a loss for words. Nothing sounds less like Chinese than a Mandarin sentence punctuated with numerous "um's" and "uh's."

Crystal (1969: 166) points out that of all intonational phenomena studied, pause is the most segmental because it works "in sequence rather than simultaneously with segmental phonology." Its function in marking the tone-units of English and their corresponding syntactic units is clear. In Chinese the pause marks grammatical units but, according to Chao (1968), it is important because pause or potential pause marks word boundaries. In English phonetic elements, such as those seen in the previous examples (night rate versus nitrate), or stress may mark word boundaries but pause seldom does. The difference between blackboard [bláǽk+bord] and black board [blæk+bórd] in English is not a pause between the two elements of the second but the allophone of /k/, [k̚] or [k^h] <u>and</u> the placement of stress. In Chinese the potential for a pause is an indicator of a word boundary. Chao (1968: 155)

states: ". . .if for any reason a speaker hesitates in the middle of a polysyllablic word, he does not continue from there, but repeats himself by starting from the beginning of the word, so as to say the whole polysyllabic syntactic word without interruption." In English, when a speaker hesitates in the middle of a polysyllabic word, even a compound word, he need not repeat the entire word because the other junctural and stress elements have already indicated it as such.

An English speaker may simply continue a Mandarin utterance from the point at which a hesitation occurred, whether or not it occurred in the middle of a polysyllabic word. Therefore, the humorous possibility of a student saying

(7) Méiyu+jī+huì+jiǎng+gúoyü.
NEG-have chicken able speak Mandarin.
I don't have a chicken which can speak Mandarin.

instead of

(8) Méiyu+jīhui+jiǎng+gúoyü.
NEG-have opportunity speak Mandarin
I don't have any opportunities to speak Mandarin.

is very real. The only difference between the two utterances is the potential for a pause between <u>jī</u> and <u>huì</u> in the first and not the second sentence.

3.2.5 Summary and Pedagogical Suggestions

The first major difference between Mandarin tone and English intonation discussed here is the significantly wider pitch range of Mandarin. The Mandarin high tones are higher than the English high tones, and the low tones are lower. The obvious solution to the

problems which result from this difference is to have English speaking students practice the pronunciation of syllables with the high and low tones, perhaps even exaggerating the extremes. A diagram which illustrates the relative English and Mandarin pitch ranges and has the Mandarin tones marked on it might provide visual stimulation.

The mechanisms of stress in the two languages are extremely different, and a large number of observed learner errors can be directly attributed to this. Stress in English is associated with pitch height; because of this, the English speaker will hear the Mandarin high tones as stress. Emphatic stress is expressed with a high falling tone in English. The shape and contour of this stressed tone is very close to the Mandarin falling tone. While this may superficially appear to be a case of positive transfer, a case that would make the teaching of the Mandarin falling tone easier, it is in fact a situation which is responsible for the mispronunciation of numerous descriptive adjectives or stative verbs in Mandarin. As with many of the other examples cited in this study, this may be a situation in which the teacher should simply point out to students the differences in the systems of the two languages. Unstressed syllables in English words have reduced vowels, but unstressed syllables in Mandarin retain the vowel quality. In addition, the unstressed syllable in English acts much like the third tone in Mandarin. Because of this, the third tone is perceived as unstressed or very weakly stressed, and the speaker of English who has not mastered the vowel system of Mandarin may be heard to pronounce third tone syllables with [ɨ] or [ə] instead of the full vowel. This association by English speakers of high pitch with stress and low pitch with weak or no

stress is so strong that an entire lesson on the stress systems of the two languages may be warranted.

Only one case in which juncture was associated with a transfer-related error was discussed. Word boundaries in English are marked, not by pauses but by phonological features and/or stress. If a polysyllabic English word is interrupted by a pause, the integrity of the word is not lost. In Mandarin it is the potential for a pause which distinguishes two monosyllabic words from one bisyllabic word. If the bisyllabic word is interrupted by a pause, the speaker must repeat the entire word in order to preserve its integrity. This simple point can be explained to students and practiced using minimal pairs (the potential pause would be the distinctive feature).

3.3 The Syntactic and Pragmatic Properties of English Intonation and Interference

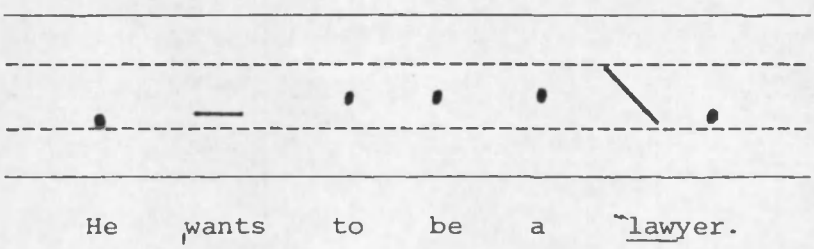
The function of English intonation is an extremely complex system. Intonation may change the utterance from a statement to a question, as in the example in Section 2.2, "John's leaving," or it may indicate some emotion or shade of meaning not present in the vocabulary of the utterance. These emotional contours are highly formalized and recognizable to all speakers of English as having a certain meaning. There are numerous contours and combinations of contours, each of which has a specific pragmatic function. The correlation of tonal contour and function is a complicated endeavor, and those who have attempted it are in no general agreement. Most of these linguists are looking for contrasts, that is, two otherwise identical utterances whose only difference is the intonation contour.

The two functions of intonation, the first indicating sentence type and the second adding emotion or meaning to the utterance, may operate simultaneously; however, they will be discussed separately. The first type includes basic declarative, exclamatory, and imperative sentences, as well as yes/no, Wh-, and tag questions; the second type includes the intonational contours which have pragmatic functions: surprise, request, thanks, enumeration, counting, and contrast. This list is, of course, not exhaustive but represents the basic, most commonly agreed upon contours and will serve to illustrate the types of errors English intonational contours may cause in English speakers attempting to learn Mandarin.

3.3.1 Sentence-type Intonation and Related Contours

The basic intonational contour in English is the simple, declarative sentence:

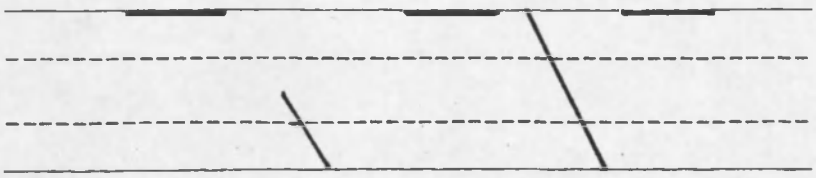
(9)



This contour does not change unless emphasis, surprise, or some other emotional element is added. This contour typically begins on a low, unstressed syllable, builds to the nuclear syllable, and then glides off. This pattern may account for the low-tone initial syllable and gliding final syllable heard when English speakers produce Mandarin

sentences. The basic intonation of a Mandarin sentence is simply no change in the normal pitch range and tone sequence:

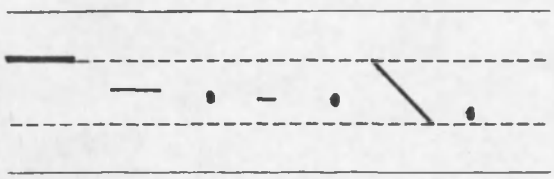
(10)



Tā xiǎng dāng lùshī.
he think become lawyer
He wants to be a lawyer.

The falling contour is also associated with Wh-questions in English:

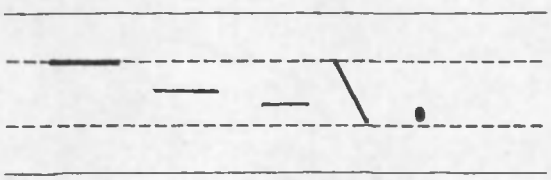
(11)



ˈWho wants to be a ˋlawyer?

The primary difference between this contour and the declarative contour is the high stressed syllable at the beginning of the utterance. This contour may account for the following type of error:

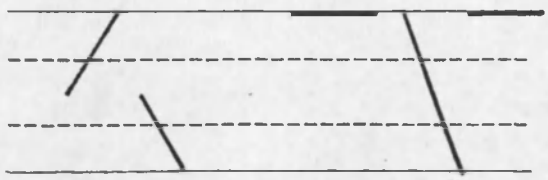
(12)



* Shéi xiǎng dāng lùshī?

instead of

(13)

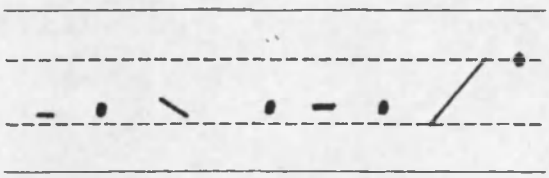


Shéi xiǎng dāng lùshī?
who think become lawyer
Who wants to be a lawyer?

The first syllable is stressed (correctly) but given the wrong contour. It is difficult for an English speaker to begin an utterance on a rising tone because so few English utterances begin this way. It is much easier for the English speaker to pronounce shéi 'who' at the end of an utterance, where it often occurs in Mandarin, because this corresponds with the rising tone of the English yes/no question.

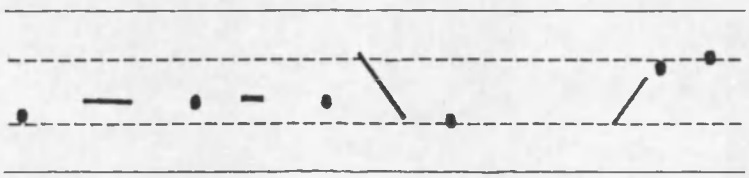
The high rising tone is associated with two types of questions in English, the yes/no question and the tag question.

(14)



ˌDoes he ˋwant to be a ´lawyer?

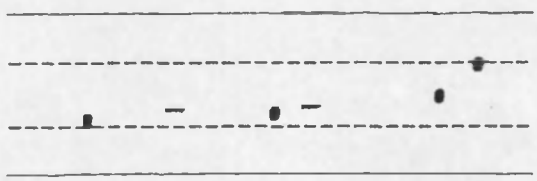
(15)



He ˌwants to be a ˋˋlawyer // ´doesn't he?

Although there is no grammatical equivalent to the yes/no question in Mandarin, there is a conceptual equivalent, the V NEG V question. English speakers frequently pronounce these questions with a rising intonation in approximation of the intonation in the English equivalent.

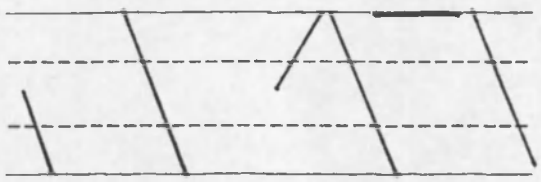
(16)



* Nǐ yào búyaò chīfàn?

instead of

(17)

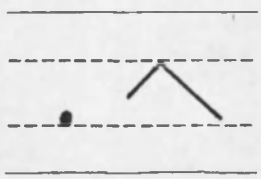


Nǐ yào búyaò chīfàn?
you want NEG-want eat-rice
Do you want to eat?

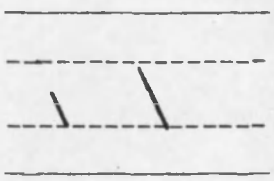
Mandarin has another type of question, the ma question-particle type. English speakers also pronounce this type of question with a rising intonation, although the interference may come not from the regular yes/no question but from questions which have statement word order and rising intonation. These questions, usually indicating surprise in English, are close grammatical equivalents to the Mandarin ma-type questions.

The falling tone in English is also associated with both exclamatory and imperative sentences. This association of the falling tone with command makes it difficult for the English speaker to pronounce

the standard valediction, zài jiàn, which has two falling tones. The English valediction is pronounced with simple falling tones and stress on the first syllable only when anger is intended.

(18) 

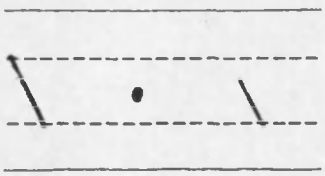
Good ^bye !!

(19) 

`Good ˜bye !!

The intonation contour of (19) is very similar to the tone pattern of the Chinese valediction.

Likewise, the association of falling contour with commands often causes the English speaker to pronounce Mandarin imperatives with falling tones.

(20) 

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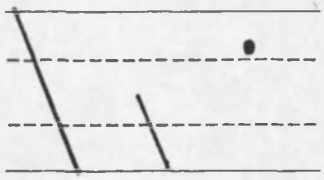


* Zhàn qǐ lai.

Zhàn qǐ lai.
stand-RESULT-come
Stand up!

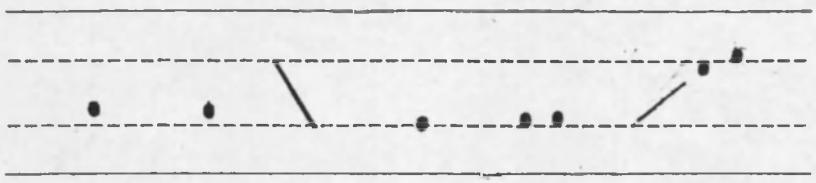
In Chinese dialects, impatience or tone of authority associated with these types of commands is expressed by falsetto (Chao 1968). Because of the correlation between high voice and femininity in American culture, it may be difficult to teach this manner of expressing impatience or authority to American males.

3.3.2 Pragmatic Intonational Contours and Interference

Although sentence-type intonational contours have been shown to cause a number of interference-related errors, interference from pragmatic or attitudinal contours is probably the more important source of tone pronunciation errors in English speakers. It is in this type of intonational contour that emphatic and contrastive stress come to play. Moreover, this type of intonation operates on a less conscious level than does the sentence-type of intonation. The less conscious a speaker is of an interference-causing pattern, the more difficult it is to correct. The number of such attitudinal intonation contours is not agreed upon and is probably limited only by the number of possible human emotions. Forms of direct address, counting and enumeration, reclamatory questions, questions inviting confirmation, requests, apology, contrast, and emphasis will be examined below. These categories were selected because they represent most of the notions which beginning Mandarin students are called upon to produce.

Direct address in English may have several intonational contours, the most common of which is the rising contour. This is perhaps because it is a contour associated with politeness and deference. It is used in courteous greetings, introductions, and statements and questions when the addressee is aware that he is being addressed (the falling contour is used to gain the attention of a previously unaware addressee).

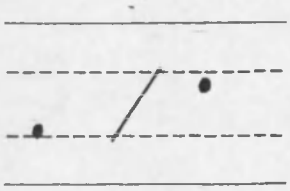
(21)



Pleased to `meet you// Dr. ´Anderson.

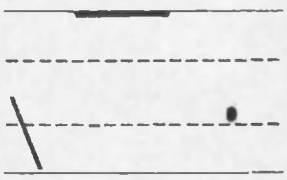
Most Mandarin forms of address include a polysyllabic title, the second syllable of which often carries the neutral tone, or a full name, which carries the full tonal contour. The English speaker's immediate inclination is to use the rising contour for all Mandarin forms of address, when they occur in a sentence.

(22)



*Lǐ Xiānsheng ....

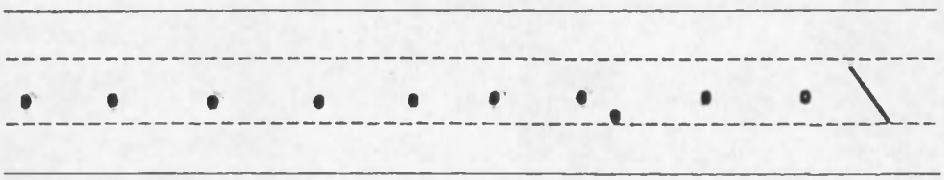
rather than



Lǐ Xiānsheng ....
Li mister
Mr. Li ....

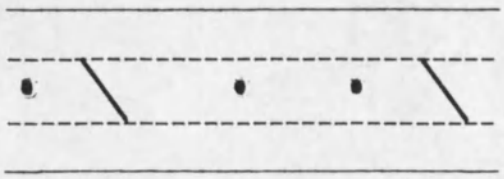
The intonational contour of counting in English may follow one of a number of very formalized patterns, depending upon the speed of articulation. All counting contours, however, end with a falling tone.

(23)



one two three four five six seven eight nine ten

(24)

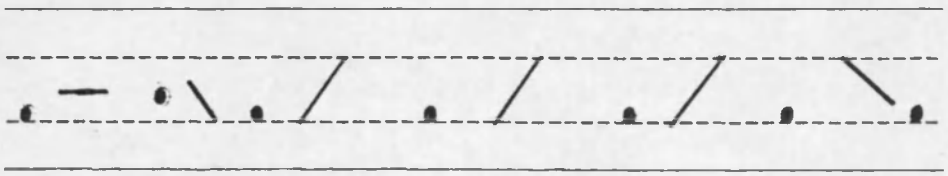


one two // three four five

The Mandarin numerals, of course, have lexical tone, and the numeral shí 'ten' carries the rising tone, which is difficult for English speakers to end on.

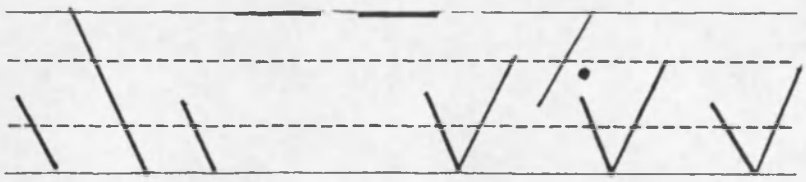
Sequences of items are pronounced as a series of rising tones until the last item, which is pronounced with a falling contour. The interference from this English intonational pattern is often observed when beginning level students are required to list items as part of Mandarin conversation practice. Compare the English and Mandarin:

(25)



I ˏwant to ˋbuy a ˏbook // a ˏpencil // a ˏpen // and ˋpaper.

(26)



Wǒ yào mǎi shū, qiānbǐ yúanzibǐ zhǐ.
I want buy book pencil ballpoint pen paper
I want to buy a book (books), a pencil (pencils), a ball-point pen (ballpoint pens), and paper.

(In fast conversation the falling-rising tone on the last syllable of yuánzibǐ would be sandhied.)

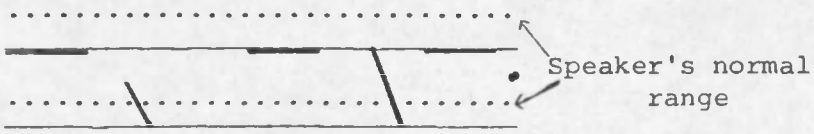
Reclamatory questions (questions which exclaim against some previous statement and usually express doubt) and questions inviting confirmation may be considered as having emphatic stress. A simple declarative statement (see Example 1, Section 3.3.1) can become a reclamatory question expressing surprise at the choice of profession.

(27)

He ˌwants to be a ˊlawyer ?

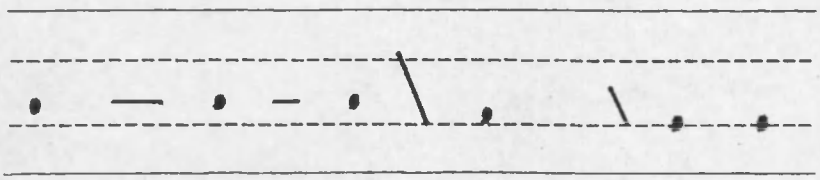
In most Chinese dialects this question type, according to Chao (1968) is spoken in a low, breathy manner and is accompanied by the final particle a 啊. The lexical tone contours are not changed.

(28)



Tā xiǎng dāng lǜshī a ?
he think become lawyer-PART
He wants to be a lawyer?

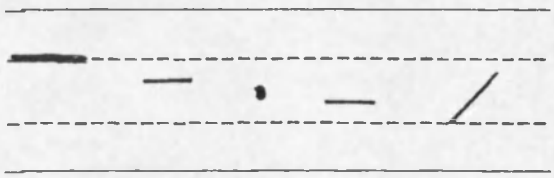
Tag questions inviting confirmation are associated with the falling tone as opposed to nonemphatic tag questions which are associated with the rising tone in English.

(29) 

He ˌwants to be a ˇlawyer // ˎdoesn't he ?

In this case, as in the case cited in Example 27, there is no grammatical equivalent in Mandarin, but there is a conceptual equivalent. The English speaker will, in approximation of his native intonational contour, pronounce a V NEG V Mandarin question with this kind of contour if the invitation for confirmation is intended.

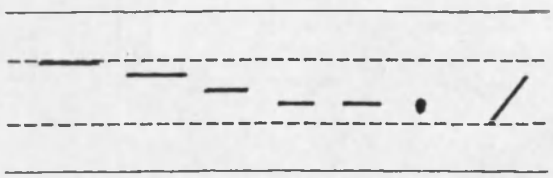
The notion of request in English is very complex, and requests reflect this. They may be subtle as "It's cold in here," meaning "Close the window," or as direct as "Close the window, please." Most beginning level students of Mandarin (or of any language) are not able to grasp the subtleties of the language and are therefore not requested to express them in the classroom. The teacher must be aware that these subtleties exist in the native language and that the student may attempt to transfer them into Mandarin. The primary tonal contour used with requests in English is described by Lindström (1978) as a high head, followed by a low rising nucleus.

(30) 

ˈPlease hand me that ˏbook.//

The English speaking student called upon to produce a Mandarin sentence which expresses a similar request may transfer the English contour onto the Mandarin sentence.

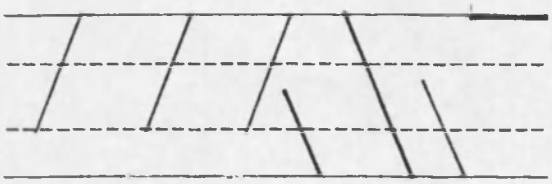
(31)



* Qǐng nǐ gěi wǒ nèiběn shū.

instead of

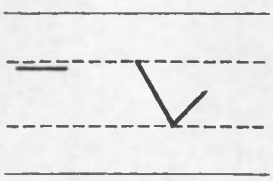
(32)



Qǐng nǐ gěi wǒ nèiběn shū.
please you give me that-M book
Please give me that book.

Apology is as complex as request in English and probably in most other languages as well. It is associated with the falling-rising contour in English.

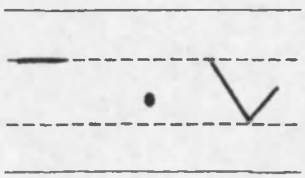
(33)



,I'm ˇsorry.

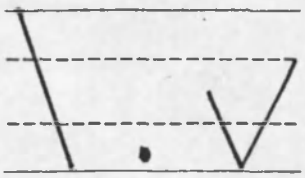
The intonation contours associated with these expressions in English occur perhaps because the pragmatics are very deeply established in the native speaker. Requesting and apologizing are not just <u>saying</u> things but <u>doing</u> things. That is, the act of apologizing is an <u>action</u> which is done with words. The <u>saying</u> of words makes the act of apology a reality. Alteration in the contour strikes at something much deeper than conscious logic can explain. The Mandarin teacher must be aware that forces much more complex than surface structure and pitch are acting when the English speaking student says:

(34)



* Dùi bu qǐ.

instead of

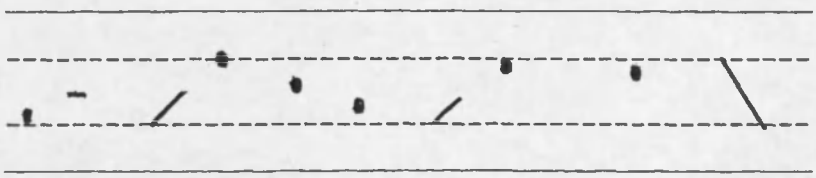


Dùi bu qǐ.
face NEG-RESULT
I'm sorry.

The English patterns for contrastive and emphatic stress cause a number of interference-related problems. Emphatic stress in English is associated with a high falling tone, not unlike the Mandarin fourth tone. When a contrast between two elements of an utterance is being

made, the first item is usually pronounced with a rising tone; the second, contrasted element is pronounced with a high, falling tone.

(35)

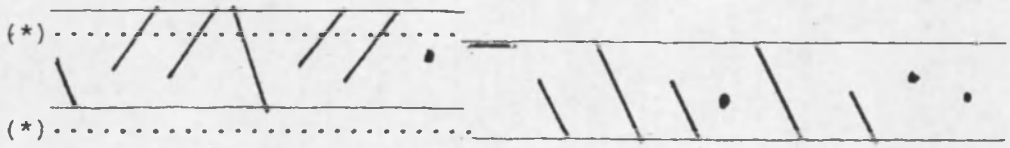


If we ´wanted to get married // we ˜could.

(From Lindström 1978: 212)

In Chinese this kind of contrast, according to Chao (1968: 41), is indicated by a slight raising of the entire pitch range of the first phrase.

(36)

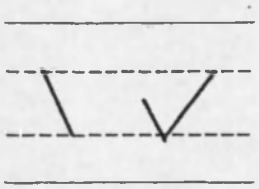


Nǐ hái bú kuài qǐ xíngli hūitǒu jìu gǎnbushàng huǒche le.
you still NEG fast arrange luggage, then only catch-NEG-RESULT train ASP
If you don't hurry and pack up, you won't be able to catch the train.
(*) Speaker's normal range

Emphatic stress, associated with a high-falling tone in English, causes problems for beginning Mandarin students perhaps because of its similarity to the Mandarin falling tone. This is particularly noticeable in the case of descriptive adjectives or stative verbs. If it happens that the Mandarin word has a falling tone, then the combination is a happy one. This is the case with the Mandarin dà, 'big, large.' It is seldom mispronounced by English speakers. Unfortunately, the host of adjectives or stative verbs which are not pronounced with the

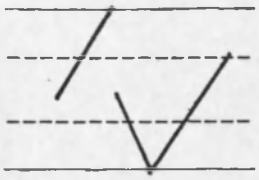
falling tone in Mandarin are often mispronounced by speakers of English. For example, the English speaker wishing to emphasize the Mandarin word <u>hěn</u> 'very' in <u>hěn</u> <u>hǎo</u> 'very good' may say:

(37)



* hěn hǎo

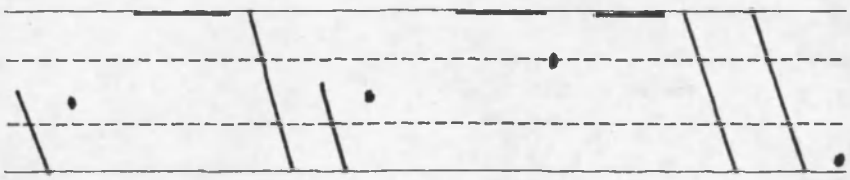
rather than



hěn hǎo !!!
very good
Very good!

The examples presented thus far are examples of the extreme case of transfer--Mandarin sentences with English intonation. While these types of errors occur, the more commonly heard error is the mispronunciation of the tone on the lexical item in the Mandarin sentence whose English equivalent would be stressed. The beginning learner may pronounce all of the syllables with the correct tone <u>except</u> the syllable(s) which would have peak prominence in an equivalent English sentence. For example, in a substitution drill on adjectives with the following model sentence:

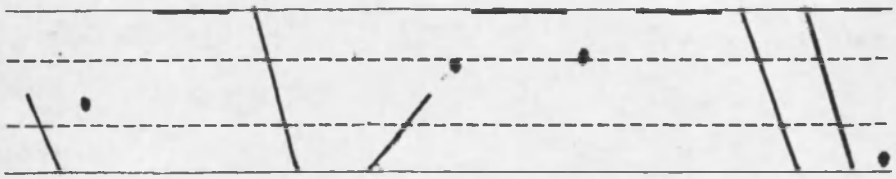
(38)



Wǒde shū shì xiǎode , tāde shū shì dàde.
I-POSS book be small-PART he-POSS book be large-PART
My book is small, his book is large.

The beginning level student, if he considers the contrast to be on the size of the books in question, may pronounce the model correctly because the adjective dà 'large' is in the falling tone, but when asked to substitute other adjectives, may begin to make errors such as:

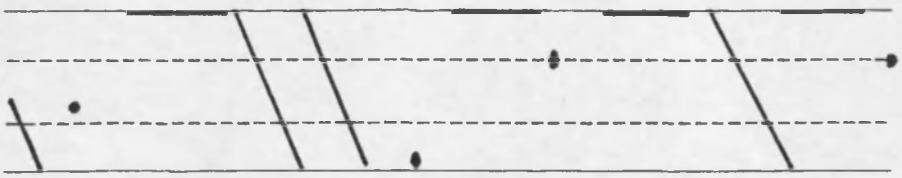
(39)



* Wǒde shū shì jìude, tāde shū shì xīnde

instead of

(40)



Wǒde shū shì jìude, Tāde shū shì xīnde
I-POSS book be old-PART he-POSS book be new-PART
My book is old, his book is new.

If the English speaker considers the contrast to be on the possessive pronoun, he may pronounce wǒ 'me' with a rising tone and tā 'he' with a falling tone.

3.3.3 Summary and Pedagogical Suggestions

Intonation which functions on a deeper level of consciousness in the speaker presents a much more serious transfer problem than does the more consciously used sentence-type intonation. The English speaker is much less aware of his use of intonation to express emotion and attitude than of his use of intonation to differentiate sentence

types. Therefore, he is less conscious of transferring these intonational contours onto Mandarin sentences. This presents a much more difficult problem for the Mandarin teacher. The cause of the difficulty is not only linguistic, but psychological and sociological as well. The teacher must be aware of the English intonational contours and of the pragmatic significance attached to them so that he can anticipate when a certain English contour may be transferred to a Mandarin sentence. This is very close to saying that the teacher must outguess the student. Not only must the teacher be familiar with English intonational contours and the pragmatic notions which they carry, he must be able to predict the conceptual equivalences between certain Mandarin and English sentences and the particular lexical item which would have peak prominence in the English sentence. If the teacher is going to teach the Mandarin V NEG V question, he cannot assume that because English has no syntactically similar structure there will be no interference. The conceptual equivalent may be the English tag question which has a rising contour on the duplicated verb or auxilliary.

3.4 Review of Textbook Approaches to the Teaching of Mandarin Tone

Almost all of the textbooks currently in use in this country to teach Mandarin are written specifically for English speakers. All notes and explanations are in English and English translations of vocabulary items are provided. Despite the linguistic homogeny of the intended users, almost no consideration is given to the problem of mother tongue interference. The paucity of material on the types of problems discussed in this investigation may be attributed, in part, to the brevity

of the sections on Mandarin tone. Few of the texts devote more than a brief introduction to the teaching of Mandarin tones.

DeFrancis' (1963) Beginning Chinese and Fenn's (1967) Speak Mandarin are probably the two most widely used texts for university level Mandarin classes in this country. Neither text devotes much more than an introductory description to the tones. DeFrancis introduces the tones in his Introduction with a chart and brief description. He discusses tone sandhi later in the Introduction. The few exercises which drill tones and tone sequences are scattered throughout the book. A maximum of ten pages of the 500-page volume deal with the presentation and drill of tone. Fenn also introduces the tones in the Introduction. No drills or exercises designed to aid aural tone discrimination or oral production are included in the text.

Chao's (1948) text, A Mandarin Primer, presents an almost staggering amount of linguistic material on tones and tone sandhi. It includes numerous drills for the discrimination and production of isolated tones and tones in combination. While the linguistic detail might be overwhelming for the beginning student, no teacher should be without a copy of the text for reference and drills.

The Defense Language Institute's (1979: 45-46) Standard Chinese, A Modular Approach, currently out in a field test edition, is notable for its attention to the teaching of pronunciation, including tones, and for its consideration of the problems of mother tongue interference. The text consists of core, optional, and resource modules, all of which are accompanied by tapes. The first of the resource modules presents pronunciation and includes a substantial amount of material on tones.

There is relatively little explanatory material but copious drills which are to be used with tapes. The exercises drill aural discrimination first and then oral production of isolated tones. When possible, the text uses proper nouns, instead of vocabulary items, to free the student from having to learn vocabulary while attempting to master the tones. Later exercises drill tones in combination. The text includes drills on tone and pronunciation to be accompanied by six tapes and approximately twenty-five pages of explanatory material, six pages of which deal with tones, and another four which discuss the intonational patterns of Mandarin and the problems of interference from English. This text admonishes the student to "be careful not to turn your stressed syllables into Falling Tone syllables." It further discusses some of the basic intonational devices of Mandarin and encourages the student to listen for them and use them, and to fight the "natural tendency as a speaker of English to end statements with a drop in pitch."

While this textbook goes no deeper than the superficial differences in the stress mechanisms and the two basic English intonational contours, it is outstanding in that it recognizes interference from English intonation as a problem in the acquisition of Mandarin tones. The emphasis on developing a solid foundation in pronunciation and tones during the early weeks of learning Mandarin is also important. Not all error in the production of Mandarin tone can be attributed to mother tongue interference or difficulties inherent in the language. Some of it must be attributed to lack of an adequate foundation in pronunciation and insufficient attention to the tones of new vocabulary. It has been

observed that students whose first weeks of Chinese language training were spent in intensive pronunciation practice retain this ability and exhibit superior pronunciation in more advanced levels of study than do students whose courses began with content material and little or no pronunciation practice.

CHAPTER 4

CONCLUSION

In the introductory chapter of this thesis, I present the hypothesis that many observed learner errors which cannot be attributed to difficulties inherent in the target language or to overanalogization of a rule, can be attributed to interference from the native language of the learner; and that a thorough contrastive analysis of the two languages with respect to the problematic area will reveal the sources of this interference. I propose that many observed errors of English speakers in the production of Mandarin tones can be accounted for through a comparison of the Mandarin tonal system with the competing English intonation system.

I have attempted to look at the similarities and differences of the two systems on a number of levels and to isolate those problematic areas at each level which are the cause of learner difficulty. In addition, I have attempted to provide pedagogical suggestions to the teacher of Mandarin to English speakers for the prevention or correction of these interference caused errors.

I have shown that the typological difference between the two systems is a significant cause of observed learner error. The interference from the intonational contours of English which are the most pragmatic, and therefore operate on a much deeper level of consciousness in the speaker, are the strongest sources of negative transfer. The

deeply ingrained intonational contours of request, apology, direct address, enumeration, surprise, etc. appear frequently in Mandarin sentences produced by English speakers. The result may be a sentence of Mandarin words without any tones whatsoever pronounced with English intonation. More frequently, however, the error occurs in a sentence which carries emotional implications similar to those of an English sentence, on the lexical items which would have peak prominence in the similar English sentence. This is especially the case when the Mandarin and English lexical items fill the same syntactic slot.

I have also shown that intonation associated with specific sentence types in English is often transferred onto Mandarin sentences which are similar, either syntactically or conceptually. Not all Mandarin sentence types have syntactic equivalents in English, but conceptual equivalents do exist. Thus, because English does not have the syntactic equivalent of the Mandarin V NEG V question, it does not mean that no transfer will occur. The English conceptual equivalent of the V NEG V question is the tag question, and with the tag question is a very strong rising intonational contour. The teacher of Mandarin must be aware of all possible equivalents and the intonation which is associated with them in order to diagnose and correct error in the learner.

I have shown that the significantly different systems of stress in Mandarin and English are responsible for both errors in the production of Mandarin tone and in the pronunciation of some Mandarin vowels. Stress in English is closely associated with pitch level and movement, the most strongly stressed syllables being the highest in most cases. The high, falling tone associated with strong emphasis in English

corresponds with the Mandarin high fall and causes difficulty in at least two observable manners. First, the learner wishing to emphasize a word will often pronounce the word with a high, falling contour regardless of the phonemic tone(s), and second, the learner will have difficulty pronouncing this tone where emphasis is not indicated. In addition, the English stress system is directly related to vowel quality; unstressed vowels are reduced. The English speaker may transfer this system onto the Mandarin syllables which he does not perceive as stressed (that is, the syllables with low tones or syllables whose English equivalent would be unstressed in a similar English sentence).

I have examined the phonetic level of the system of Mandarin tone and contrasted it with the system of English intonation in an attempt to isolate the source of the extreme difficulty English speakers have in the production of some tones. The relatively narrow English pitch range as opposed to the wide Mandarin pitch range accounts for the problem some speakers have in producing the Mandarin high and low tones correctly. The pitch level of the Mandarin first tone falls outside the normal pitch range of English speakers and therefore seems unnaturally high to English speakers. The cultural association of high voice with femininity in America contributes to the difficulty American males have in pronouncing this tone.

However, neither the difference in the relative pitch ranges of the two languages nor the phonetic realization of the tonal contours of both languages (English has even more tonal contours than Mandarin) has explained the difficulty learners have in pronouncing the correct tone on certain consonant-vowel combinations. This difficulty appears to be

more closely related to the consonant and the quality of the vowel than to any interference from English intonation. As such, it is not a transfer-related error but an error inherent in the target language.

I have examined the major textbooks used to teach Mandarin to English speakers and have found that the majority are woefully inadequate in their approach to the teaching of Mandarin tone and lacking in any reference to the problems discussed in this paper. I suggest that, prior to teaching each lesson, the Mandarin teacher examine the contents of the lesson and attempt to isolate the structures and vocabulary that English speaking students are likely to encounter difficulty producing, isolate the English intonational contours which will be transferred onto these structures and prepare exercises which will illustrate the problem to the student and help him overcome the difficulty. The teacher must be keenly aware of the possibilities for the types of error described in this study, listen for them, and when they do occur, be prepared to point out the source of difficulty to the student and to help in correcting it.

SELECTED BIBLIOGRAPHY

Alatis, James, ed. 1968. The Georgetown Monograph Series on Linguistics No. 21, Washington, D. C.: Georgetown University Press.

Allen, J. P. B. and S. Pit Corder, eds. 1974. The Edinburgh Course in Applied Linguistics Vol. 3, London: Oxford University Press.

Austin, J. L. 1962. How To Do Things with Words. Cambridge: Harvard University Press.

Bloomfield, L. 1933. Language. New York: Holt, Rinehart and Winston.

Bolinger, Dwight. 1949. "Intonation and Analysis." Word, 5:248-254.

_____. 1951. "Intonation--Levels versus Configurations." Word, 7:199-210.

_____. 1958. "A Theory of Pitch Accent in English." Word, 14:109-149.

_____. 1964. "Intonation as a Universal." Proceedings of the Ninth International Congress of Linguistics, Boston 1962. The Hague: Mouton.

Bolinger, Dwight, ed. 1972. Intonation. Harmondsworth.

Chan, Margorie K. M. 1977. "A Study of Tonogenesis in Chinese." Unpublished paper. University of British Columbia, Vancouver, B. C., Canada.

Chang, Nien-Chuang T. 1958. "Tones and Intonation in the Chengtu Dialect." (In Bolinger, ed. 1972. Intonation. Harmondsworth), 391-413.

Chang. Tom and Caryn White. 1978. "Sentence Stress in Peking Dialect of Modern Chinese." Unpublished paper. The University of Arizona, Tucson, Arizona.

Chao, Yuen Ren. 1930. "A system of tone-letters." Le maître phonetique, 45:24-27.

_____. 1948. A Mandarin Primer--An Intensive Course in Spoken Chinese. Cambridge: Harvard University Press.

Chao, Yuen Ren. 1956. "Tone, intonation, singsong, chanting, recitative, tonal composition and atonal composition in Chinese" in For Roman Jacobson (ed. M. Halle and others) The Hague: Mouton, 52-59

_____. 1968. A Grammar of Spoken Chinese. Berkeley: University of California Press.

Chen, Gwang-tsai. 1974. "Pitch Range of English and Chinese Speakers." Journal of Chinese Linguistics, 2.2:159-171.

Cheng, Chin-chuan. 1968. "English Stresses and Chinese Tones in Chinese Sentences." Phonetica, 18:77-88.

_____. 1973. A Synchronic Phonology of Mandarin Chinese. The Hague: Mouton.

Chomsky, N. and M. Halle. 1968. The Sound Patterns of English. New York: Harper and Row.

Crystal, David. 1969. Prosodic Systems and Intonation in English. Cambridge: Cambridge University Press.

_____. 1975. The English Tone of Voice. London: Edward Arnold.

Defense Language Institute. 1979. Standard Chinese--A Modular Approach. Monterey.

DeFrancis, John. 1963. Beginning Chinese. New Haven: Yale University Press.

DiPietro, Robert J. 1971. Language Structure in Contrast. Powley, Mass.: Newbury House.

Dreher, John J. and Pao-chen Lee. 1966. "Instrumental Investigation of Single and Paired Mandarin Tonemes." Monumenta Serica, 27:343-373.

Fenn, Henry C. 1967. Speak Mandarin. New Haven: Yale University Press.

Gibbon, Dafydd. 1976. Perspectives of Intonation Analysis. Munich: Lane.

Greenberg, J., ed. 1966. Universals of Language. Cambridge: M.I.T. Press.

Halle, M. and K. Stevens. 1971. "A Note on Laryngeal Features." Quarter Progress Report, MIT Research Lab, 101:198-213.

Halliday, M. A. 1963a. "The tones of English." Archivium Linguisticum, 15:1-28.

Halliday, M. A. 1963b. "Intonation in English Grammar." Transactions of the Philological Society, 143-169.

Halliday, M. A. K. and A. McIntosh, eds. 1966. Patterns of Language: Papers on General, Descriptive, and Applied Linguistics. London.

Haudricourt, A. G. 1954. De l'origine des tons en viêtnamien. Journal Asiatique, 242:68-82.

_____. 1961. Bipartition et tripartition des systèmes de tons dans quelques langues d'Extrême-Orient. Bulletin de la Societe de Linguistique de Paris, 56:163-180.

Hirst, D. J. 1976. "A Distinctive Feature Analysis of English Intonation." Linguistics, 168:27-42.

_____. 1977. Intonation Features a Syntactic Approach to English Intonation. Hague: Mouton.

Ho, Aiching Ting. 1976. "Mandarin Tones in Relation to Sentence Intonation and Grammatical Structure." Journal of Chinese Linguistics, 4.1:1-13.

_____. 1977. "Intonation Variation in a Mandarin Sentence for Three Expressions: Interrogative, Exclamatory and Declarative." Phonetica 64:446-457.

Hombert, J. M., W. E. Ewan, and J. Ohala. 1975. Tonogenesis: Theories and Queries. 8th Annual International Conference on Sino-Tibetan Languages and Linguistics.

_____. 1979. "Phonetic Explanations for the Development of Tones." Language, 55.1:37-58.

Huang, Raymond. 1969. Mandarin Pronunciation. Hong Kong: H. K. University Press.

Hyman, Larry, ed. 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1.

Hyman, Larry and Russel G. Schuh. 1974. "Universals of Tone Rules: Evidence from West Africa." Linguistic Inquiry, 1:85-115.

James, Carl. 1971. "The Execution of Contrastive Linguistics." (In Nickel, ed., 1971. Papers in Contrastive Linguistics. Cambridge University Press), 53-68.

Kratochvil, Paul. 1962. "The Role of Stress in the Syntactical Analysis of Modern Peking Dialect." Activities of the Linguistics Group in the Oriental Institute, Prague.

Kratochvil, Paul. 1964. "Disyllabic Stress Patterns in Peking Dialect." Archiv Orientalni, 32:383-405.

_____. 1969. "Syllabic Volume as Acoustic Correlate of Perceptual Prominence in Peking Dialect." Unicorn, 5:1-17.

Ladefoged, Peter. 1975. A Course in Phonetics. New York: Harcourt, Brace and Jovanovich.

Lado, Robert. 1957. Language Across Culture. Ann Arbor: University of Michigan Press.

Lea, Wayne. 1973. "Segmental and Suprasegmental Influence on Fundamental Frequency Contours." (In Larry Hyman, ed., 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1).

Leben, William R. 1973. "The Role of Tone in Segmental Phonology. (In Larry Hyman, ed., 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1).

Light, Timothy. 1978. "Tonogenesis: Analysis and Implications." Unpublished paper. The University of Arizona, Tucson, Arizona.

_____. 1980. Personal communication. Tucson, Arizona.

Lindström, Olof. 1978. Aspects of English Intonation. Goteborg, Sweden.

Maran, La Raw. 1973. "On Becoming A Tone Language." (In Larry Hyman, ed., 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1).

Matisoff, James A. 1970. "Glottal Dissimilation and the Lahu Rising Tone: A Tonogenetic Case Study." JAOS, 90.1:13-44.

_____. 1973. "Tonogenesis in South East Asia. (In Larry Hyman, ed., 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1).

Mazaudon, Martine. 1976. "Tibeto-Burman Tonogenetics." Linguistics of the Tibeto-Burman Area, 3.2.

Napoli, Donna Jo. 1978. Elements of Tone, Stress and Intonation. Washington, D. C.: Georgetown University Press.

Nickel, Gerhardt. 1971. Papers in Contrastive Linguistics. Cambridge University Press.

Ohala, John. 1973. "The Physiology of Tone." (In Larry Hyman, ed., 1973. Consonant Types and Tones. Southern California Occasional Papers in Linguistics, No. 1).

Pierce, Joe E. 1966. "The Supra-Segmental Phonemes of English." Linguistics, 168:27-42.

Pike, Kenneth L. 1947. The Intonation of American English. Ann Arbor: University of Michigan Press.

_____. 1948. Tone Languages. University of Michigan Publications on Linguistics, Vol. IV.

Richards, Jack C. 1974. Error Analysis. London: Longman Group, Ltd.

Sciarone, A. G. 1970. "Contrastive Analysis--Possibilities and Limitations." International Review of Applied Linguistics, 8:115-131.

Shen, Yao. 1963. "Some Pitch Pattern Correlates between Mandarin and English." Studies in Linguistics, 17:77-84.

Shen, Yao, Jessica Chao, and Giles Peterson. 1961. "Some Spectographic Light on Mandarin Tone 2 and Tone 3." The Study of Sounds. Tokyo: The Phonetic Society of Japan.

Thurgood, Graham. 1975. "Consonant Types and Tones." 8th Annual International Conference on Sino-Tibetan Languages and Linguistics, Berkeley, California.

Wang, William S-Y. 1967. "Phonological Features of Tone." International Journal of American Linguistics, 32.2:93-105.

Wang, William S-Y and Kung-po Li. 1967. "Tone 3 in Pekingese." Journal of Speech and Hearing Research, 10.3:629-636.

Wardhaugh, Ronald. 1967. "Three Approaches to Contrastive Analysis." Canadian Journal of Linguistics, 13:3-14.

_____. 1970. "The Contrastive Analysis Hypothesis." TESOL Quarterly, 4:123-130.

Wilkins, D. A. 1972. Linguistics in Language Teaching. London: Edward Arnold.

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