Chapter 2 Literature Review

2.0. Introduction

This chapter is divided into six sections. The first section examines acoustic manifestations of pitch, and the perception of pitch and the variables affecting pitch. This is followed by a discussion of Cantonese intonation contours. The third section focuses on intonation and illocutionary force. The next section discusses the relationship between intonation and Sentence-final Particles (SFPs), and relationship between intonation and sentence-final pitch.This is followed by a review of intonation patterns in Cantonese. Finally, Cantonese interrogatives will be discussed.

2.1. The Acoustic Manifestation of Pitch

Intonation is the ensemble of pitch variation in the course of an utterance (‘t Hart, Collier & Cohen 2003). Pitch can be found in every utterance, word and syllable when they are being spoken on a sentential level as well as on an isolation form (Pike 1972:20). Whenever a voiced sound is produced, the vocal cords vibrate at a certain rate, which correspond closely to the pitch perceived: the higher the rate of vibration the higher is the perceived pitch. As one of the three most consistently used prosodic features (Cruttenden 1997:2), pitch is found in all languages in the world.

Sounds resulting from the vibrations of vocal chords will have pitch and can be illustrated in a range of displays, for example, waveform. Transduced into electrical signals through a microphone and displayed through time, patterns of peaks and troughs sometimes with pure vowels quite regular, can be observed. The inverse of the value between two

recurrent peaks or other recognisable repeated points fundamental frequency (F0) (‘t Hart, Collier & Cohen 2003:17). In speech, ‘F0 refers to the first harmonic of the voice. F0 is the reciprocal of the fundamental period. Ideally, F0 is used to refer to a physical measure of the lowest periodic component of vocal fold vibration. Pitch should be used to indicate the perceptual phenomenon in which stimuli can be rated along a continuum of low to high’ (Kent & Read 1992:230).

2.1.1. Perception of Pitch

When pitch is used as a perceptual term, it refers to the listeners’ judgements as to whether a sound is high or low, whether one sound is higher or lower than another or by how much and whether the voice is going up or down (Cruttenden 1997:4). Authorities seem to differ on at what point a pitch can be perceived. ‘t Hart, Collier & Cohen (2003:26) suggest that the F0 of a perceptual pitch should not be lower than 40 hertz, whilst Borden & Harris (1980:38) point out that, in an utterance the important speech signals are within 100-5000 hertz. The human ear, however, is able to detect vibrations in frequency as low as 20 hertz and as high as 20,000 hertz. In addition, Borden & Harris (1980:38) report that we may not hear extremely low frequencies as sound, but we can often feel them. It should be noted that, thresholds suggested above are for perception of single sounds. However, in tone languages, for example, Cantonese, every syllable inherits a tone. The perception of two consecutive tones is found to be different from when a tone is heard in isolation. A person who may not be able to identify the frequency of a single tone accurately, when confronted with two successive tones, may very well be able to discriminate between a tone of 1000 hertz and one of 1005 hertz (‘t Hart, Collier& Cohen 2003:27). This is because auditory sense becomes much more sensitive in discriminating frequency differences in F0

when a stimuli is presented. Thus, thresholds of pitch perception intone languages can be different perception of a single sound.

Francis and Ciocca (2003:1611-18) conducted an experiment, to examine the sensitivity of Cantonese native speakers to small suprathreshold frequency differences in synthesized Cantonese syllables, ranging in F0 along with a lexical tone continuum with two successive syllables differing in F0 by approximately four hertz. Stimuli for this experiment consisted of a continuum of ten 300-ms syllables synthesized with a formant synthesizer known as SenSyn. All stimuli had level F0 contours and differed in frequency in perceptually equal steps approximately from 4.4 - 4.5 hertz. Participants were required to complete two tasks: a discrimination and an identification task. On each trial a pair of stimuli was presented, with a total of 28 pairs. After the presentation of the stimuli, the participants were instructed to click on one of the two buttons ‘same’ or ‘different’ to indicate whether the syllables were the same or different. The result of the experiment showed that, with the F0 difference of only four hertz, the participants success ranged between 70-74% of the correct answers.

Klatt (1973, cited in Vance 1976:373) also conducted a similar experiment on tone recognition threshold on Mandarin tones. Klatt (1973) found that differences in the shape of the F0 contours were sufficient to distinguish the contrastive tones especially when words were spoken in isolation. When the differences in shape between two tones were quite subtle, recognition was possible even when the range of F0 was severely restricted. A group of synthesized Mandarin syllables was tested after being compressed into a range of four hertz, and the recognition level was reported as being 90% of the time. Whilst the human ear can only normally perceive pitch within the range 20-20,000 hertz it

has been shown that this range can be extended in Cantonese by adding certain stimuli to certain syllables.

A stimuli, however, is just one of the variables that affecting the perception of pitch. An utterance is not merely an articulation of a successive speech sound as the speaker controls several other vocal features such as loudness, pitch and voice quality concurrently. The latter variations do not shape the phonetic identity of segmental speech sounds, but constitute a truly suprasegmental or prosodic layer in the sound pattern (‘t Hart, Collier & Cohen 2003:1). The three most consistently used prosodic features are: pitch, length and loudness (Cruttenden 1997:2). The F0 produced is based on the rate of vibration of the vocal cords which in turn is determined by their elasticity, tension and the amount of pressure below the glottis. So, tension and air pressure are, to a large extent under the speaker’s control (‘t Hart, Collier & Cohen 2003:12). These physiological factors affecting the F0 contours should be considered together with internal features of the language, for example, tone change and syntax.

2.1.2. Variables affecting the F0 Contours

Two main factors are said to affect F0 contours, the first, is where the speakers themselves by controlling the articulatory organs, for example, larynx, deliberately change the pitch of an utterance according to their own intentions. The second refers to variables that relate to the language itself, for example, syntax, which involves syntactical or word order change, for example, Cantonese Right Dislocation. Tone order can also change the pitch contour as in the example of Tone Sandhi. Tone in these circumstances plays a crucial role causing changes of pitch contour. This is a process that is not likely to be controlled by the speaker’s intentions but is more due to the elements of the language itself.

2.1.2.1. Variables relating to the speaker

2.1.2.1.1. Larynx

The larynx is the main organ for voice production used by human. Ohala (1977: 310-2) stresses the central role of the larynx in affecting pitch. The larynx serves as the primary mechanism for lowering or raising pitch. A speaker can affect the vertical tension of the vocal cords by raising or lowering the larynx, hence affecting the pitch. Ohala suggests the position of the tongue interacts with the larynx. For example, the way of the tongue pulls on the larynx during the high vowel can affect the F0 produced. It is the tongue's ability to affect the state of the soft tissues inside the larynx, which is the core mechanism affecting the pitch and not the position of the larynx per se.

There are two types of syllables in Cantonese: Entering Tones Syllables and Non-Entering Tone Syllables. The former are syllables attached with a voiceless stop /p/, /t/ or /k/ consonant at the end of the syllable. They are released relatively shorter compared to Non-Entering Tone Syllables which is also known as an open syllable with a vowel end, for example "pa". Pronunciation with a voiceless stop and vowel is certainly different in terms of position of the tongue and lips. Thus, it can produce different height of pitch as soft tissues inside the larynx are affected differently.

2.1.2.1.2. Air Stream

The air stream is one of the key components affecting sound quality. For example, breathy voice can be produced as a result of lessened glottal resistance and with a very wide range of air-flow (Laver 1980:132). In many tone languages, syllables with low or falling tones are phonetically characterized by a creak or a creaky voice (Laver 1980:126). Grenié (2004) conducted an experimental study to examine the relation of creaky voice and syllables in Mandarin. For example, different phonation is used to pronounce different kind

of words with different voice qualities according to the position in the sentence where creaky voice words or syllables occur. The findings indicated that, creaky voice phonation always appears for very low F0 values, that is to say at the end of sentences and paragraphs on the final and penultimate syllable. The monosyllabic words that are produced with creaky voice phonation are words without importance for message comprehension. Most often they are grammatical particles at neutral tone placed at the end of utterances (Grenié 2004:6-7). In Cantonese SFPs, for example, “aa4” are usually located at the sentence-final position, with a very low F0 value SFP can affect the F0 contour because creaky voice phonation is not likely to get detected in a pitch graph, which makes a sentence-final intonation look invisible on a pitch graph.

2.1.2.2. Variables relating to the language

2.1.2.2.1. Syntax

Different syntactic types, in a way, are associated with a certain intonation patterns though nothing is rigidly set, as certain illocutionary acts may be more likely to be performed by using certain intonation patterns (Katamba 1997:243). According to Cruttenden (1997:113):

> In sentence-final intonation-groups, there are often variations in meaning which depends on whether the tone is combined with a declarative sentence or a Yes/No Interrogative or question word interrogative. For example, the use of low-rise nuclear tone is frequently patronizing with declarative sentences but less obvious so with Yes/No Interrogative, for which it seems more as a neutral tone.

In Cantonese, a rise is usually used in question and a fall for confirmation (Mai 1998:272). The final rise makes the Yes/No Interrogative identifiable. This shows the desire of the speaker to put the rise into focus, and is known as nucleus placement. Besides that, the speaker can also put the nucleus syllable into a desired part of the sentence which involves word order alteration, also known as Morphosyntactic (Cruttenden 1997:147), for

example, the position of the subject in a sentence can be changed.

In Cantonese, the change of the subject position means alteration from subject-verb-object (S-V-O) syntactic form to V-O-S, which is also known as Right Dislocation. Cantonese makes use of a syntactic process resulting in identificational focus marking, and Right Dislocation is one such process (Law 2003:243). For example, "S1-V2-O3", "S"=subject syllable of a sentence; "V"=verb; "O"=object and "1-3" are their lexical tones respectively. The new syntactic structure after Right Dislocation will be "V2-O3-S1". As can be seen in the new syntactic structure, "S" is shifted from the beginning of the sentence to the end after the process of Right Dislocation. As every Cantonese syllable has its lexical tone, this shift of "S" has also involved a shift of the lexical tone to the end of the sentence. Clearly, the sentence-final tone contour has now been shifted from O to S's. The Right Dislocated phrase is typically associated with a resumptive pronoun or clitic in the main clause. An intonational break is obligatorily required which is done by SFPs in a sentence-medial position before the Right-dislocated phrase which often has a low and level pitch intonation (Law 2003:244). Right Dislocation can be exploited freely in all types of questions in Cantonese (Law 2003:269). Besides the sentential level, tone changes can also happen in the position of two tones which is also known as Tone Sandhi.

2.1.2.2.2. Tone Sandhi

Tone Sandhi can be defined as the change of tone due to the influence of one tone on another (Ladefoged 2006:252). This phenomenon shows a tendency for the pitch of a syllable at one level to be assimilated to the pitch of a syllable at another level (Brown, Currie & Kenworthy 1980:37). In Mandarin, the rule of tone sandhi is as follow: if two /214/ tone syllables occur in juxtaposition, the preceding syllable is changed to a /35/ tone. Cantonese tone sandhi, however, can and does occur but it is less subject to clear rules. It is

not even clear why it occurs at all (Yu 2007:191). Where it does occur, it can affect to the final F0 contour, for example, “jan4” – human. Its original lexical tone 4 (/21/) is a low-falling tone. When it comes to “man”- “naam4 jan4”, two tone 4s juxtaposed to each other, tone sandhi changes automatically to the latter from “jan4” to “jan5” (/13/) which is a low-rising tone. As can be seen now, “jan4”→ “jan5” involves a change of tone from a low-falling to a low-rising.

2.1.2.2.3. Phonological Reduction

Cantonese Entering Tone Syllables ending with Unreleased Stops /p, t, k/ (Gu, Fujisaki & Hirose 2004:227); for example (refer to 79-80), “saat” in “saat3 aa4”- “To kill SFP”. / t̚ / is placed at the coda position of “saat” and being an Unreleased Stop between of two vowels, / t̚ / is in a disadvantage position in terms of voice quality. Its voice is predominated by the “a:” vowels before and after it. In casual Cantonese speech a phonetic deletion phenomenon can occur through Syllable Merging, for example “kei **t**ɔ kɔ”→ [keɔ.kɔ] -“How many tokens?” (Ong 2007:56). The deletion of stops which appears at the syllable final is also possible due to the cluster simplification in order to achieve gestural economy (Raymond, Dautricourt & Hume 2006:55).

Besides consonants, a vowel can also be reduced in the process of articulation. According to Van Son and Pols (1995:83) ‘vowel reduction is a universal phenomenon that reduces the distinction of vowels in informal speech and unstressed syllables’; for example (refer to 77-78), “mei6 aa4” - “Not yet SFP”. In “mei aa”, /i / is an unstressed vowel, according to a phonological rule of vowel reduction, which states that all vowels, ‘when not stressed in a syllable, word, or phrase, are reduced to the neutral, mid-central vowel or schwa’ (Hanover 2005: para 5). It is not uncommon for a vowel of a Cantonese syllable to

be reduced in casual speech, for example "se**i** kɔ jɐn"→[seɔ.jɐn] "Four persons" (Ong 2007:94).

2.2. Cantonese Intonation Contours

Kwok and Luke (1986:32-40) carried out a preliminary experimental study to examine the basic intonation patterns of Hong Kong Cantonese. Six subjects (three males and three females) were asked to read out pairs of sentences, where every two sentences in a pair were exactly the same in terms of structure and syllables. Subjects had to read out the sentences without using any SFP and without the assistance of paraliguistics, such as facial gesture. They were to read in a neutral way depending on the different contexts given. In correlations of intonation and grammatical structures, Kwok and Luke (1986) outlined three types of Cantonese interrogatives: Declarative, Interrogatives and Commanding and three basic Cantonese intonation contours: Rising (L-H%), Falling (H-L%) and Rise-Fall (L-H-L%) consist of two patterns: one with a relatively sharper peak than another as follows:

-Declarative and Rising declarative contour

-Interrogative and Rising interrogative contour

-Commanding and Falling commanding contour

-Rising command contour

-Declarative with Rise-Fall contour

-Declarative with shaper peak contour

Their study was mainly focused on finding out the basic F0 contours of Hong Kong Cantonese and both declaratives and interrogatives were studied. Kwok and Luke's

(1986) study generally revealed that, declaratives ended with a final fall but a final rise not only turned a declarative into a Yes/No interrogative, it could change one interrogative type to another, for example, turn a Wh-Interrogative into an echo interrogative (Kwok & Luke 1986:34). Lastly, a declarative with a rise-fall final intonation or rhetorical interrogative. This type of interrogative has a tone spreading effect at the sentence-final position.

In another study of Cantonese intonation conducted by Mai (1998:269-279) the focus was on the structure of the sentences on Cantonese spoken in Guangzhou. Mai (1998) divided Cantonese intonation into two categories, that is, intonation on a sentential level and intonation on a sentence-final position. Mai (1998) categorized Cantonese sentence-final intonations into two groups: with and without SFP. Three types of sentence-final intonations were determined under the group without SFP: Rising, Falling and Zero final intonation. In a Zero final intonation a minus sign is used preceeding the word “rising” and “falling”: –rising & –falling (Mai 1998:269-279). When an utterance is claimed to be Zero final intonation, the sentence-final syllable is pronounced according to its original tone level. In other words, there is no intonation effects on sentence-final lexical tone in an utterance. For example, “sing1 kei4 saam1”-Wednesday, when the “saam1” is pronounced as tone 1(/55/, high-level tone), which can be a statement, its sentence-final intonation is considered to be a Zero final intonation, because the F0 contour of the original tone level (/55/) is not affected at all by intonation. However, if the “saam1” tone is raised even drastically, it can now be an interrogative and the tone level of the raised “saam1” must beyond of /55/. It was found that Rising and Falling Final intonation raises and lowers the sentence-final syllable tones drastically. The sentence-final intonation group together with SFP shows five types of sentence-final intonations: Rising, Falling, Low-level, High-level and Zero final intonation.

2.3. Intonation and Illocutionary Force

As previously mentioned, utterances use intonation to express emotive meanings, such as anger, irony. It is almost certain that, the patterns of intonation have a close relationship with the illocutionary force of utterances (Brown, Currie & Kenworthy 1985:30). When uttering a declarative statement in Cantonese, a Falling Final Intonation pattern is chosen, while for making an inquiry a speaker uses a Rising Final Intonation (Ma, Ciocca & Whitehill 2004:134). However, different choices of intonation are chosen not only based on different illocutionary acts, even a same illocutionary act if to be conducted by different intentions of a speaker can lead her to make different choices of intonation patterns. Kohler (2003:2) relates the change of intonation choices to the pragmatic and attitudinal change in the speaker. Kohler (2003) explains, if a speaker means to ask, if for specific information, a Falling Final Intonation Wh-Interrogative is likely to be chosen, whilst if for a polarized decision between a “Yes” and ”No”, then a Rising Final Intonation Yes/No Interrogative is likely to be the choice. However, if the speaker holds some expected answers (other than “Yes” and “No”) when a Yes/No Interrogative is uttered, the final intonation of that Yes/No Interrogative can be changed too from a Rising Final Intonation to a Falling Final Intonation (Kohler 2003:3). Thus, it is possible Rising and Falling Final Intonations coexist in both Yes/No and Wh Interrogatives (Kohler 2003:3-4).

At the same time, different choice of intonation is also the reflection of the emotive state or attitudes of the speaker when a same utterance is voiced. For example, Ladd (1998:114) relates a high pitch to active emotions, for example, anger and surprise; whilst, a low pitch is attributed to boredom and sadness. It should be noted though that, according to Katamba (1997), intonation is only one of the factors that affecting the attitudinal judgements. There are several important variables considered to affect attitudinal

judgements too: voice quality, paralinguistics, for example, facial expression, the context of an utterance and the grammatical and logical relationships between the words in an utterance (Katamba 1997:246-7). Especially important is thought to be voice quality, and researchers have become increasingly aware of its importance in influencing attitudinal judgements (Katamba 1997:247). Brown, Currie & Kenworthy (1985:22) suggest that, it is difficult to distinguish an insult from a friendly tease, if only the intonation is manipulated but the voice quality is held constant. It is, however, possible to make a very clear distinction between an insult and a friendly tease by holding the intonation constant and manipulating the voice quality.

Katamba (1997) further suggests that, voice contains indexical features that convey information of the speaker. Characteristics such as a speaker's sex, age, regional origins or membership of a social class are considered features that are relatively permanent and which can often be inferred from voice quality. Whilst laryngitis, a cold or being drunk are features considered more transient (Katamba 1997:247). The indexical features help narrow down the parameters for possible variables that affecting the F0 contours. For example, it is known that in general males have the lowest voice in hertz compared to females and children, the average F0 for men is around 120 hertz, while for women it is 225 hertz and for children is 265 hertz (Cruttenden 1997:4). One of the features of the creaky voice is that being in a very low frequency it can barely be detected in a pitch graph. By in view of this characteristic of the voice feature, one of the possible variables to cause the invisible F0 (pitch can not be detected on a pitch graph) is more likely to apply to the male voice rather than female voice.

Pitch range in an utterance can further affect the interrogative intonation, so that a larger pitch ranges indicate incredulity whilst a smaller pitch ranges indicate uncertainty (Liu & Xu 2005:72). As there is no utterance without intonation (Pike 1972:20), and

emotion has a close correlation to intonation, the close correspondence between emotive meanings and grammatical functions of intonation makes their separation impossible (Bolinger 1978:233).

2.4. Intonation and Sentence-final Particles

Cantonese uses different intonation patterns to perform different illocutionary acts in utterances. In addition, it uses Sentence-final Particles (SFPs) with different tone levels to achieve different grammatical functions. Chan (1999:87) mentions as SFPs carry emotive meanings, most of them help in reflecting the attitude or emotion of the speaker and some are used to achieve certain grammatical functions, for example “吗 maa5”, can turn a statement into an interrogative, such as in “要 jiu3”-“Want”, as in a statement, when it comes to “jiu3 maa5”-(you) want, as a question. Yip (2002:1) claims that almost every Cantonese utterance ends with a particle, they play a very important role in Cantonese expressions. Mai (1998:270) agrees with Chao’s (1933, cited in Mai, 1998) opinion about the relation of Cantonese intonation and lexical tone as being successive addition, which means that, intonation is a realization of pitch after a lexical tone. The effects of intonation on lexical tones are that a Rising Final intonation may raise the rising tone to an even higher level, or to level a falling tone. Vance (1976:369) explains that the use of the SFPs is for syntactic purposes. An utterance that ends with an SFP, the influence of intonation on that utterance is less compared to the influence of intonation on an utterance in non tone languages, for example, English. This is evident that the lexical tones of the syllables (except the SFP) are less likely to be modified, as particles can absorb intonation and free

lexical tones on substantive morphemes, for example, nouns, from the effects on intonation. Thus the absorbed effects of the intonation will then be realized through the SPF. As long as SFPs carry grammatical or affective information, intonation can be relieved of these functions (Vance 1976:370). Vance's emphasizes that the functions of SFPs are not merely phonological. Even if SFPs do not carry the above mentioned functions, at least theoretically, the function of conveying affective meanings, the emotional state is still dependent on intonation or other prosodic features, for example loudness. This contrasts with the grammatical functions of SFP claimed by Chan (1999:87) above.

Over the years, research has been carried out on Cantonese intonation especially on the differences between the declarative and the interrogative sentence. The influence of intonation over tone and the sentence-final pitch contour in utterances tends to be the focus of these studies. Ma, Ciocca & Whitehill (2004:135) claim that, both tone level and tone contour in Cantonese are modified by intonation. According to them the tone contour of the final syllable of question is modified by sentence intonation to rising contour regardless of the original contour. This claim is supported by Chang's (1958:84) early study on the Chengtu dialect, where it is suggested that intonation in Chengtu dialect is superimposed on the sentence as a whole. Moreover, it modifies the individual tones. There is a little research on tonal effects on intonation patterns of different interrogatives.

Although the superimposition of intonation over tones has been shown through experimental studies, it does not necessarily mean that, lexical tones do not have their influential domains over sentence-final contours. As Mai clearly states in his study, the Zero Final intonation does not affect the pitch of the final syllable (Mai 1998:273). Mai argues that, when an utterance ends with a SFP, it is natural that the sentence-final intonation falls on the SFP (Mai 1998:274). This claim points out a possible circumstance of which, under the Zero Final Intonation, the sentence-final pitch of the utterance is likely

to receive a stronger or even a total influence from the sentence-final lexical tone. In other words, the less influence there is from the intonation the stronger the influence of the lexical tone on the sentence-final intonation pattern.

In fact, Mai (2000:171) conducted an experiment to examine the effects of sentence-final rising intonation on sentence-final lexical tones. He chose 22 pairs (two pairs with three sentences) of sentences. The sentences in each pair were exactly the same except the sentence-final syllable had a different tone level, Mai's research was based on seven lexical tones, as it was a research based on the Cantonese spoken in Guangzhou. Participants were asked to read out those sentences using their natural way of expressing an interrogative. The readings were recorded and then listened to by different people looking for recognition of the tone differences of every pair. The conclusion of the study was four out of seven lexical tones could be recognized by the listeners after being superimposed on the Rising Final Intonation, with a successful recognition rate of almost 60%. The findings revealed the limitation of intonation influences over lexical tone. For example, intonation does not usually change the existing tone level, but further risens or lowers the tone level. On the other hand, a tone has its influential domain over the tone contour, for example, to sustain the tone level. Mai's claim is supported by a study conducted by Lee (2004:110), who examines the effect of intonation on the lexical tones in Cantonese declaratives and interrogatives. Respondents were asked to read out words at the sentence-final position from 18 test sentences which consisted of declaratives and interrogatives. This was done in order to allow a comparison between the differences of both sentences. Lee (2004) found that, all interrogatives had Rising Final Intonation as expected. In Cantonese interrogatives: the rising F0 contour is imposed on the sentence-final word in the case of a question word or a particle does not occur. This means that, should a particle occur at the sentence-final position of an interrogative, the tone contour of that particle can, to some extent, somehow

be partially or fully realized. Lee (2004) does not rule out the possibility that lexical tones could superimpose on the sentence-final pattern according to the tone contour of the SFPs.

SFPs are often said to be similar to intonation in non-tonal languages (Law 1990:375). The importance of the SFPs in tonal languages, however, is subject to divergent opinions. Xu (1993:123) suggests that the SFPs should be excluded as part of the intonation in Mandarin for phonological consideration. In Mandarin, SFPs at the sentence-final position are conventionally uttered with a light volume, which, Xu (1993) defines as Qing Yin (轻音) Syllables. Features presented by a light volume syllable are a weak contraction of the vocalis muscle, very low rates of vibration of the vocal cords and a weak air-flow. Infact, voice quality in Mandarin had been categorized by Chao (1957;1968) divides normal speaking voice in Mandarin into a five level classification, of which the lowest is marked by “1” whilst “5” is the highest and zero refers to toneless, and SFPs are example of these (cited in Jiang 2005:2). Normally, because of their light volume SFPs are not sufficiently strong to be clearly reflected on F0 contours and Xu (1993) suggests that light volume SFPs should therefore be excluded from part of intonation in acoustic studies (Xu 1993:151).

According to Xu (1993), beside SFPs, light volume syllables, for example, the word “头”(tou35), compare between 1.“石(shi35) 头(tou35)- stones” and 2.“车(che55) 头(tou35)-front side of the car”. The latter “头” is pronounced with a relatively heavier voice compared to the former one. The heavy volume, as opposite to light volume, “头” has a longer vowel sound and louder. The non SFP light volume syllables that occur at the sentence-final position should be excluded as part of the intonation, because the light volume can mislead the hearer’s auditory perception on different height levels of tone. He also finds the light volume can further weaken the vowel’s quality. As a result of the light

volume, creaky sounds can be produced (Xu 1993:123-4). Obviously, Xu (1993) treats SFPs in utterances merely as a phonetic unit, of which, only the voice quality is taken into consideration. Thus, he suggests that studies of Mandarin intonation should mainly focus on syllables with a stable tone level (Xu 1993:151).

Unlike Mandarin, in 'Cantonese each syllable bears a lexical tone and the phrase-final syllable also often bears a boundary tone, each syllable is specified for one of the six tones in the language, and that includes pragmatic particles' (Wong, Chan, & Beckman 2005:8), for example, Wh-indicator, "ne1". In contrast to light volume syllables or toneless SFPs in Mandarin, Cantonese SFPs bear specific tones.

Liu and Xu (2005:75) conducted an experiment investigating the acoustic manifestation of question intonations in Mandarin. Subjects were required to read six sentences, among which one was a statement and the other five different types of questions (Yes/No Question, Wh-Question, Particle Question, Rhetorical Question and Confirmation Question) to examine different sentence-final intonation between statement and question. Syllables in all these sentences were designed only with High-tone (/55/) except for two, a Particle-Question and a Rhetorical Question which ended with sentence-final particles "ma", which in Mandarin are usually toneless. One of the findings was that, in addition to the use of the particle and Wh-word, pitch rising occurs in questions. Clearly, this experiment proves that, even when a voice is barely audible, SFPs in Mandarin do reflect pitch contours as they are toneless in themselves. The experiment revealed the fact that even though the volume is low, SFPs can contribute F0 contours for acoustic study too. In Cantonese, however, as previously mentioned a tone can be recognized in an extremely restricted threshold when a stimuli is provided, even less than 10 hertz which can be considered a light volume feature (Klatt 1993, cited in Vance 1976:373). Despite being such a restricted threshold, it has been shown through experiments, to there being no

problem of showing a specific F0 contour. An experiment was carried out by O'Rourke (2006) to examine the relationship of peak heights in order to determine how the features of downstep, upstep and declination operate between two variations of Spanish in Peru. O'Rourke chose a threshold of seven hertz and above as a criteria for measuring the height difference. Based on the findings, the three features of peak height difference with the criteria of seven hertz and above were formed, moreover, the result showed that although the peaks with a rise of less than seven hertz still represent certain tonal patterns (O'Rourke 2006:65).

2.5. Intonation and Sentence-final Pitch

The experiment carried out by Liu and Xu (2005:73), showed a pattern of the sentences with all sentence-final syllables being in a same tone (/55/) except for the Particle Questions. Their objectives, besides investigating different acoustic manifestations of statements and questions were to investigate whether or not the divergence of pitch contour of statements and interrogatives only occured at the sentence-final position. The results indicated that, sentence-final position is not the only location where the divergence of pitch contour occured. It is, however, the part where the greatest divergence occurs between statements and questions as well as among different types of questions (Liu & Xu 2005:76). Apart from this, the result showed different pitch rising reached by different Mandarin interrogatives, it showed that, pitch rising of Yes/No and Rhetorical Interrogatives are higher than Confirmation and Wh-Interrogatives (Liu & Xu 2005:75). The greatest divergent part according to Pierrehumbert's (1980) definition of an intonation pattern, relates to the boundary tone. Pierrehumbert defines intonation as a tone tier that composed by a string of pitch tones and edge tones (Ladd 1998:50) as shown in Figure 2.1.

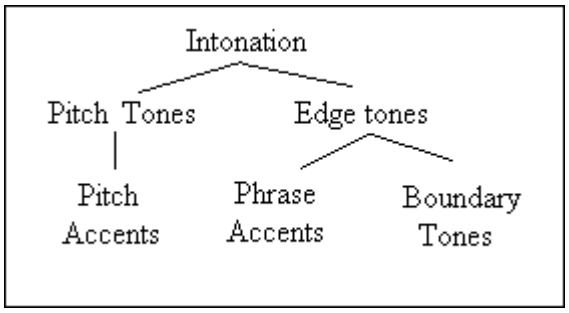

Figure 2.1.
Tone Tier of Pierrehumbert 1980

The basic tone levels for pitch accent are High (H) or Low (L), while the edge tones consist of phrase accents and boundary tones. A phrase accent occurs between the last pitch accent and the boundary tones; whilst a boundary tone is a single tone with either H or L tone, associated with the end of an intonation, which are indicated by H% or L% (Ladd 1998:80). The importance of the boundary tone is that, it contributes information about the intonational phrase as a whole (Ladd 1998:101).

According to Wong, Chan & Beckman (2005:1), Cantonese SFPs are performed as boundary tones that can be added after the final lexical tone in order to mark the ends of intonational phrases. The other importance of Cantonese SFPs is that they carry emotive meanings. On the one hand, a SFP or any syllable that acts as a boundary tone, can be uttered longer, technically, beyond the normal length of the syllable. This extended part of the boundary tone can be caused by the emotion of the speaker, the air-stream mechanism and constraint of the organs of speech. The effect of the emotions can be found throughout the whole syllable or even after it. This phenomenon is described by Pierrehumbert (1980, cited in Ladd 1998:89) as Tone-Spreading, which is an extended span of pitch. This extended span of pitch is also an indication of obvious physiological changes in the speaker, who is moved by strong emotion, for example anger (Brown, Currie & Kenworthy 1985:23). On the other hand, tone spreading is thought being related to air-stream

mechanism that used in speech production. Different motion and direction of the air produce different sounds (Katamba 1997:3). For example, the stronger air flow passes through the vocal cords and creates a strong vibration and the louder the voice that is produced. A strong voice quality is able to extend the length of a voiced sound (Xu 1993:124). SFPs that end with a vowel, for example, aa4, me1 and ne1, more often show the effect of tone-spreading, compared to those that end with a stop, for example, zek1. Thus, presumably, the effect of Tone-spreading on boundary tones appears to be rather common phenomenon in Cantonese interrogatives. Chan (1998:103) also claimed that syllable-lengthening is a common natural phenomenon in Cantonese. Chan also states that Cantonese syllables end with a vowel, for example, V, CV, CCV, are spoken 'in average 300 milliseconds, while SFPs can have duration of up to one full second. When two or three SFPs are concatenated at the end of an utterance, they can easily exceed one second'.

The extended part reveals a new dimension to the notation of the boundary tone and casts doubt on the common formulation mentioned by Ladd (1998), which considers that, 'a tone is a feature of a syllable, whilst pitch accent is a feature of a word and an intonation of phrase or sentence' (Ladd 1998:31). This formulation favors the notation of Pierrehumbert (1980), which boundary tones are indicated by a single H or L tone. Ladd (1998), however, refutes this claim and he justifies it by citing the empirical evidence about the feature interactions between words and sentences of Swedish which shows that 'pitch features whose function is clearly 'intonational' can nevertheless be quite precisely localized in the utterance' (Ladd 1998:31). This means that, it is possible to find intonation in the boundary tones besides 'tones', which is located at the sentence-final position only, for example the notation of the boundary tone is a H% or L%, but now, it is possible to be H*+L% (Ladd 1998:79).

Possible combinations of intonation contours according to Autosegmental-metrical Theory that is based on the notations of Pierrehumbert (1980) shows that all pitch accents consist of a single H or L tone or a combination of two single tones which is also known as a bitonal pitch accent, for example L*+H (Ladd 1998:79-80). Edge tones are indicated by a H or L tone. An intonation, in other words, is the combination of a single tone and bitonal pitch accents, for example, L*+HL%, or two sets of bitonal pitch accents, for example, L*+HHL%. Together, these combinations can work up around 22 possible intonation contours (Ladd 1998:82). In other words, possible boundary tone contours do not consist only by a H or L tone. There are theoretically 22 more possible contours.

These 22 possibilities cover the utmost comprehensive contours of intonation levels possible. In reality, not all of these contours will be commonly seen. A few such as LH and HL are relatively common, as LH reflects a Rising Final Intonation while HL reflects a Falling Final Intonation. The choice of an F0 contour has a tight correspondence with the syntactic form of an utterance or sentence it relates to (Kohler 2003:1). For example, Cantonese, in general, a rise is usually used in a question and a fall for confirmation (Mai 1998:272). It is important to have an interrogative sentence-final intonation to discern the interrogative form it is related to. In order that the interrogative will give a more substantial meaning to the sentence-final intonation compared to just a pure melodic intonation. That is to say the meaning of the interrogative will enhance the meaning of the sentence-final intonation beyond what the sounds alone can convey. For example, in "Go" with a rising final intonation, the rising sound is given a meaning of ‘questioning’, whilst, with a falling final intonation, the falling sound gives a meaning of ‘commanding’. The following section shows types of interrogatives referred by Tsang (1999:5-6).

2.6. Interrogatives in Cantonese

Accoding to Tsang (1999:5-6), there are four types of interrogatives in Cantonese:

a. Yes/No Interrogative

b. Wh-Interrogative

c. Disjunctive Interrogative

d. A-not-A Interrogative

Tsang defines a Yes/No Interrogative as a declarative which is attached with a SFP. A Wh-Interrogative can be indicated by some sort of SFP keyword, for example, “je5”-“What”. A Disjunctive Interrogative is also a type of interrogative that can be indicated by a keyword, such as “ding6”-“Or”. An A-not-A Interrogative is a type of interrogative which has a counterpart where “A” in “A-not-A” is duplicated normally from a verb or an adjective, and where “not” acts as a negator, “m4”. The left-hand “A” is regarded as the affirmative choice, whilst the right-hand “A” is attached after the negator and is regarded as the negative choice.

2.6.1. Yes/No Interrogatives

A Yes/No Interrogative is defined as a statement or a declarative sentence with an attachment of a SFP such as me1, aa4, which normally serves as a Question Particle such as “me1”.The SFP is the main overt of this type of interrogative. In Example 2.1., “m4 seon3” is a statement, meaning “do not believe”. The presence of the Question Marker SFP “aa4”, however, changes this utterance from a statement into a Yes/No Interrogative.

Example 2.1.

m4	seon3	aa4?	- Do (you) not believe?
Negator	*Believe*	*SFP*	

2.6.2. Wh-Interrogatives

A Wh-Interrogative is indicated by the Wh- key word(s) such as “mat1 je5”. The Wh-element in this type of interrogative is described in-situ (in its natural or original position). A Wh-key word stays in the complement position in an utterance. In Example 2.2., as can be seen that “mat1 je5” are the Wh-key words. They function as functional morphemes, in the same way as the interrogative why, what, who, when, where, how in English, but they are located at the final position of the utterance.

Example 2.2.

keoi5 siu3 **mat1 je5-** What is he laughing at? *he laugh what thing*

2.6.3. Disjunctive Interrogatives

‘Disjunctive questions present two alternatives, equivalent to presenting a set and its complement for the respondent to choose from, Yes/No questions are simply a proposition with the addition of an interrogative signal’ (Li & Thompson 1979, cited in McGinnis 1990:16-51). This type of interrogative is similar to A-not-A Interrogatives. Both types of interrogatives offer choices to the listener. An A-not-A Interrogative has a counterpart that also serves as an indicator of which its affirmative comes before the negative. A Disjunctive Interrogative, however, can be distinguished by the key word “ding6” (“or” in English) is distinguished by a connective ding6 or linking two or more alternatives. The alternatives can be in two forms: the whole predicate or the whole main clause.” (Tsang 1999:6). In Example 2.3 “ding6” is located in between two alternatives, “singing” and “dancing”. The two alternatives do not necessarily have to be the opposite of each other.

Example 2.3

keoi5 coeng3 go1 <u>ding6</u> tiu3 mou5 –Does/did/Will he sing or dance? *he sing song or jump dance*

2.6.4. A-not-A Interrogatives

An A-not-A Interrogative is formed by duplicated "A", "A" being a verb or an adjective. The "A" coming after is preceded by a Cantonese nagator "m4" (a negative word in English meaning "no" or "not"). It is also called the "Neutral Interrogative" when reference is made to the neutral attitude of the speaker to the interrogative (Yue-Hashimoto 1993:41, cited in Tsang 1999:6). This type of interrogative can also be defined as a Choice-Type Interrogative which presents two choices in an interrogative: an affirmative and a negative statement. The affirmative statement is regarded as the equivalent of "Yes" in English and the negative statement as the equivalent of "No". The other choice is a negative statement which can be regarded as "No" in English (Cantonese Lessons 2002-6: para 1). The listener is asked to make a choice between the affirmative and the negative. Besides the free morphemes like verbs, coverbs and adjectives used in "A" in A-not-A Interrogatives, bound morphemes such as, modals and prepositions are also commonly used in A-not-A Interrogatives. (Matthews & Yip 1994, cited in Law 2001:295). In Example 2.4., "heoi3 m4 heoi3" indicates an alternative to the hearer, whether "to go" or "not to go".

Example 2.4

keoi5 (heoi3 m4 heoi3)- Is he going? *he go Negator go*

Other than the above four types of interrogatives, there are some other common Cantonese interrogatives such as explained in the following sections.

2.6.5. Rhetorical Interrogatives

Burton (1997-2001: para 1) defines Rhetorical Interrogatives 'as any question asked for a purpose other than to obtain the information the question asks'. It is an illocutionary act that has the direct illocutionary force of a question (Summer Institute of Linguistics 2004: para 1). Burton (1997-2001: para 2) explains an ethical dimension of Rhetorical Interrogatives is to endear the speaker to the audience. While Chan (1998:125) claims that Rhetorical Interrogatives contain some element of sarcasm or exasperation, and Bailey (1999:11) states that a Rhetorical Interrogative can be signaled by a final falling cadence.

2.6.6. Elliptical Interrogatives

An Elliptical Interrogative is a single word interrogative. A description of this type of interrogative according to Katamba (1997:244), is that it has a level head (which is optionally omitted) and a high rising nucleus, which means it has a high rise intonation. The Elliptical Interrogative can be further examined by considering the utterance: "Coming?". "Coming?" can be an elliptical part for "*Are you* coming?" or any possibility that fits in the subject and verb parts depending on the situation and context. As can be seen in Figure 2.2, the pitch in the first syllables /k/, /ʌ/ is level and then rises at the Onset of the second syllable - /m/, /ɪ/, /ŋ/ and continues rising to the end of the word.

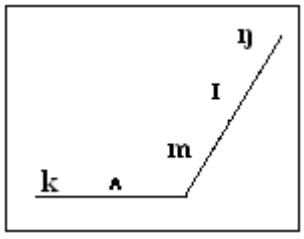

Figure 2.2
Intonation Pattern of "Coming?"

2.6.7. Tag Interrogatives

According to Chan (1998:125) Tag interrogatives have an element of impatience. She proposes that a tag, for example, zek1, can function as a sign of information seeking too, but a speaker will only usually use this to those she knows well. There are two types of question tags in Cantonese: the single word tag, and the Cluster-word tag which consisting of two or more SFP(s).

2.7. Summary

This chapter presented the concepts of acoustics and perceptive pitch manifestation. It then identified the variables affecting F0 contours relevant to both the language and the speakers. The relationships between intonation and illocutionary force, sentence-final pitch and SFPs were then reviewed. Intonation in Cantonese was empirically shown to have an influence on sentence-final intonation patterns. Finally, different types of Cantonese interrogatives were discussed. The utterances indicate that the effect of Cantonese lexical tone on sentence-final intonation patterns is still being examined. Hence, this study attempts to fill this research gap by examining sentence-final intonation in Cantonese Interrogatives.