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An Acoustic Phonetic Study of the Intonation of Sentence-Final Particles in Hong Kong Cantonese

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Abstract

This paper attempts to illustrate the interaction of sentence-final particles and intonation in Hong Kong Cantonese using acoustic phonetic analysis. The system of sentence-final particles is very rich in Cantonese, and these particles serve similar functions as intonation in intonation languages. How intonation and sentence-final particles work in the language, and how the pitch levels and contours on the sentence-final particles compare to the lexical tones in the language are discussed.

Keywords: Hong Kong Cantonese, Pitch, Tone, Intonation, Sentence-final particles, Phonetics

1. Introduction

Cantonese, like other Chinese dialects, is a tonal language in which each syllable is associated with a lexical tone. The system of lexical tones uses pitch height and pitch contour to distinguish between lexical meanings. Yet variations of pitch are also used as intonation in the language to convey meanings related to speaker attitudes and emotions and grammar, like the case in an intonation language such as English. The interaction of tone and intonation in a Chinese language is interesting from the phonetic point of view as both are manifestations of pitch, and it has long attracted linguists' attention (e.g., Chao 1933). In addition to intonation, Cantonese has a class of words called sentence-final particles, mostly one syllable long, which serve the functions of intonation, conveying the speaker's attitude and emotions, and expressing the moods of sentences (Luke 1990). As a result, the relationship between tone and intonation in this word class is worth studying.

2. Lexical tones & sentence-final particles

2.1 Lexical tones

The variety of Cantonese discussed in this paper is the one used in Hong Kong, which will be referred to as Hong Kong Cantonese. There are six contrastive lexical tones in Hong Kong Cantonese (Bauer and Benedict 1997; Zee 1999), which are Tone 1: High-Level, Tone 2: High-Rising, Tone 3: Mid-Level, Tone 4: Low-Level/Falling, Tone 5: Low-Rising, and Tone 6: Low-mid Level. The contours of these tones are shown in Figure 1; the syllable used is [ji], which happens to be meaningful with all the six tones: Tone 1: "clothes", Tone 2: "to rely on", Tone 3: "meaning", Tone 4: "to suspect", Tone 5: "ear", Tone 6: "two". The six syllables were recorded by a male native speaker of Hong Kong Cantonese; the pitch tracings are the output of the speech analysis software WASP (Huckvale 2007).

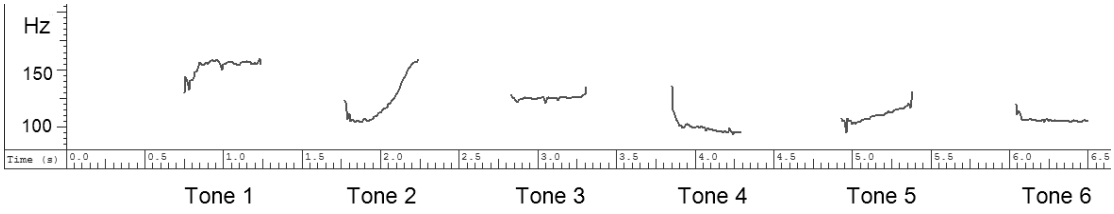


Figure 1. the six contrastive tones of Hong Kong Cantonese

In the following discussion, the syllables and tones are transcribed using the International Phonetic Alphabet as illustrated in Zee (1999). The symbols of Tones 1 to 6 are respectively ˥, ˧˥, ˧, ˨˩ and ˩˧.

2.2 Cantonese Sentence-final particles

The word class "sentence-final particles", abbreviated as SFPs hereafter, is also known by other names including "utterance-final particles", "utterance particles", "modal particles" and "final particles". These particles are a group of syllables which appear in sentence-final positions and are used to convey "emotive and/or epistemic nuances within a

particular discourse context" (Li 2006). SFPs are a prominent characteristic of the Chinese dialects.

Cantonese has a much higher number of SFPs than Modern Standard Chinese (Putonghua) does. Most researchers (e.g., Cheung 1972, Kwok 1984, Luke 1990, Leung 1992, Matthews & Yip 1994, Fang 2003) consider Cantonese SFPs as mainly conveying the speaker's emotions and attitudes. The Cantonese SFPs can be classified as monosyllables and particle clusters consisting of two or three syllables. The reported number of sentence-final particles in Cantonese varies from studies to studies, ranging from around thirty (Kwok 1984) to over seventy (Ball 1924) basic monosyllabic forms, and as many as forty-five particle-clusters (Leung 1992).

To give an example of how Cantonese SFPs work, the monosyllabic SFP 咩 [μE˧] is used as an illustration. This SFP is usually used to convert a statement into a question of disbelief or surprise, as a "query to the truth of something" (Kwok 1984: 88). When the SFP [μE˧] is suffixed to the declarative sentence 你好熱 [νει˩˧ ηου˥ φιτ˥˩] which means "You are feeling very hot", the resulting utterance 你好熱咩 [νει˩˧ ηου˥ φιτ˥˩ μE˧] is a question, and the speaker is conveying his surprise or disbelief that the listener is feeling very hot, similar to saying "Oh, are you really feeling very hot?"

The main functions of intonation are expressing attitude and emotion. The general findings of intonation in other languages may also be applicable to Cantonese. For example, excitement can be signalled by raising the pitch of the voice; emphasis can be conveyed by lengthening the syllables, stressing the syllable or pitch changes. But the use of SFPs in addition to the sentence intonation is characteristic of the Cantonese system.

The four basic moods of Cantonese utterances are declarative, interrogative, imperative and exclamative. Fang (2003: 25-30) points out that there are three kinds of relationship between SFPs and the moods of the utterance: (1) an SFP is suffixed to a sentence and does not change the mood of the utterance; (2) an SFP is suffixed to a sentence but changes the mood; (3) in some utterances, an SFP must appear together with intonation in the sentence to make a grammatical sentence, and the SFP determines the sentence mood. She also maintains that the information conveyed by SFPs must be shown by the linguistic context and the interaction between the semantic content and suprasegmental features. Her view on the interaction between tone of SFPs and intonation in Cantonese is that Cantonese particles have lexical tones, and their tones assimilate with the intonation.

Law (1990) holds a different view towards the claim that all SFPs have inherent tones. She discusses several SFPs including [λα], [E], [α] and [λO] and believes that these SFPs do not have inherent lexical tones, and that in different contexts they will become different phonetic forms, having particular pitch features, which share similar meanings but have different degrees of strength, that is to say, how strongly the speaker believes in the truth of the assertion of the statement that he is making.

3. Research focus and test materials

3.1 Research focus

Relating to the phonetics and semantics of Cantonese SFPs and Cantonese intonation, the following are important themes for investigation:

(1) If SFPs are said to have lexical tones, like other syllables in Cantonese, then is it the tone of the SFPs that determines the mood of the utterance? Or is it that, as Li (2006) suggests, each phoneme in an SFP has meaning and the summation of these phonemes determines the mood of the utterance which contains the SFP?

Most studies on Cantonese SFPs refer to them as syllables with particular tones, but it is interesting to note that if we refer to SFP as having lexical tones, among the six lexical tones, one tone is missing: we do not find a Cantonese SFP which is with the Low-Level contour, that is Tone 6. In Fang (2003: 35), among the 39 frequently used monosyllabic SFPs listed, 8 are with Tone 1, 6 with Tone 2, 15 with Tone 3, 8 with Tone 4 and 2 with Tone 5. It is intriguing why, given the large number of monosyllabic Cantonese SFPs, no Low-Level contour is found.

Nevertheless, in the present paper, the tone numbers are used to refer to the pitch level and contour of the SFPs for the ease of presentation and discussion. In Section 4, some pitch tracings will be presented to discuss the "tones" of the SFPs.

(2) If we refer to the SFPs as having inherent lexical tones, how do the tones of these particles compare to the lexical tones of other word-classes acoustically?

(3) When an utterance has an SFP suffixed to it, will the intonation of the utterance body be affected or changed?

3.2 Test materials

Two sets of test sentences were used, and a female Hong Kong Cantonese speaker was invited to record the test sentences for acoustic phonetic analyses.

3.2.1 Set 1

The first set consists of six pairs of sentences and illustrates how a rising intonation in a question affects the final syllable. In each pair, the same carrier sentence 佢寫嗰個字係____"The character he wrote was ___" was used, with

the test syllable [φι] appearing at the end of the sentence; the first sentence of the pair was a declarative sentence and the second was an interrogative sentence formed from the declarative sentence using a rising intonation. The six pairs of sentences differed in the tone of the test syllable, that is, all the six contrastive tones were tested. The first test sentence, containing the test syllable [φι] in Tone 1 (meaning "clothing"), is provided below:

佢	寫	嗰	個	字	係	衣
[κ8ψ˩	σE˧	κO˧	κO˩	τσι˥˧	ηϭι˥˧	φι˧˥]
he	write	that	classifier	character	was	clothing

"The character he wrote was 'clothing'."

The second test sentence was an intonation question formed from the above sentence: "The character he wrote was 'clothing'?" The remaining test syllables in this set of test sentences were 倚 [φι˧] "to rely on", 意 [φι˩] "meaning", 疑 [ji˧] "to suspect", 耳 [ji˩˧] "ear" and 二 [ji˥˧] "two".

3.2.2 Set 2

The second set of test sentences consists of five pairs of sentences, devised to illustrate the characteristics of utterance-body intonation, and the features of the intonation of SFPs with different "tones". In each pair, both sentences consisted of syllables with the same lexical tones; the first sentence was a declarative sentence without an SFP, and the other sentence was formed by suffixing an SFP of the same "tone" to the declarative sentence. For example, in the first pair, the declarative sentence consisted of all Tone 1 syllables, shown below,

晶晶	聽　朝	返	東　京
[τσIN˧˥τσIN˧˥	τ　IN˧˥ τσιυ˧˥	φαν˧˥	τYN˧˥ κIN˧˥]
Jing-jing (name of a girl)	tomorrow	go back	Tokyo

"Jing-jing is going back to Tokyo tomorrow".

and the second sentence was formed by suffixing the "Tone 1" SFP 咩 [μE˧˥], to the first sentence: 晶晶聽朝返東京咩? [τσIN˧˥ τσIN˧˥ τ　IN˧˥ τσιυ˧˥ φαν˧˥ τYN˧˥ κIN˧˥ μE˧˥] "Jing-jing is returning to Tokyo tomorrow morning?".

In the second pair of sentences, the declarative sentence consisted of all syllables with Tone 2, and the SFP chosen had "Tone" 2. Similarly, the third, fourth and fifth pairs of sentences were made up of all syllables having Tone 3, Tone 4 and Tone 5 respectively.

The five SFPs chosen were [μE˧˥], [κE˧], [α˩], [α˧] and [ωO˩˧], and they are in "Tones" 1, 2, 3, 4 and 5 respectively. The meanings of these SFPs are discussed below.

3.3 Meanings of the five SFPs

(1) [μE˧˥]

[μE˧˥] is suffixed to a declarative sentence to turn it into a question. The question contains a hint of surprise or doubt. The test sentence without this SFP is a statement: 晶晶聽朝返東京 [τσIN˧˥ τσIN˧˥ τ　IN˧˥ τσιυ˧˥ φαν˧˥ τYN˧˥ κIN˧˥ μE˧˥] "Jing-jing (a girl's name) is returning to Tokyo tomorrow morning." The test sentence with this SFP is a question, which may be asked when the speaker is surprised to learn that Jing-jing is leaving the next morning; maybe in the speaker's mind, Jing-jing is not leaving at all, or is leaving at a different time, or going to a different place, and this question may be followed by utterances such as "Are you sure?" or "I thought she's leaving next week."

(2) [κE˧]

The particle [κE˧] in the test sentence is a statement particle. Such a statement particle may be used by a speaker to plead for himself or the third person referred to in his utterance (Leung 1992: 97-98). The test sentence without this particle is a statement: 小寶揀睇水彩畫 [σιυ˧που˧καν˧τ　ϭι˧σ8ψ˧τσ　Oι˧ωα˧] "Siu-bo (a boy's name) chooses to watch water-colour painting". One context where the [κE˧]-suffixed sentence may appear is the circumstance where the speaker assures the listener that Siu-bo is choosing to go to the gallery and not somewhere else and that the listener needs not worry about him.

(3) [α˩]

The particle [α˩] may appear in neutral questions or in affirmative statements. In the present study, its use was in an affirmative statement, where it functions to soften the tone of the statement, making it sound less abrupt. The test sentence without this SFP is a statement: 宋泰再欠債 [σYN˩ τ　αι˩ τσOι˩ ηιμ˩ τσαι˩] "Sung Tai is again in debt." The [α˩]-suffixed test sentence is a declarative sentence used by the speaker to tell the listener the fact in a gentle manner.

(4) [α˧]

The particle [α˧] is suffixed to a statement and turns it into a question. The question having this particle is not a neutral

question like the yes-no question but "expresses a measure of doubt" (Kwok 1984: 86). Such a question may be put forward in order to get a confirmation from the listener, or in a context where the speaker did not hear clearly what the hearer had just said, or as an echo question. The test sentence without this SFP is 人群仍然和平遊行 [φ6ν˥ κ˧ 6ν˥ φIN˥ φιν˥ ωO˥ π˧ IN˥ φ6υ˥ η6N˥] "The crowd are still marching peacefully." And so in the [α˥]-suffixed sentence, the speaker could be asking for confirmation from the listener whether the march is still peaceful.

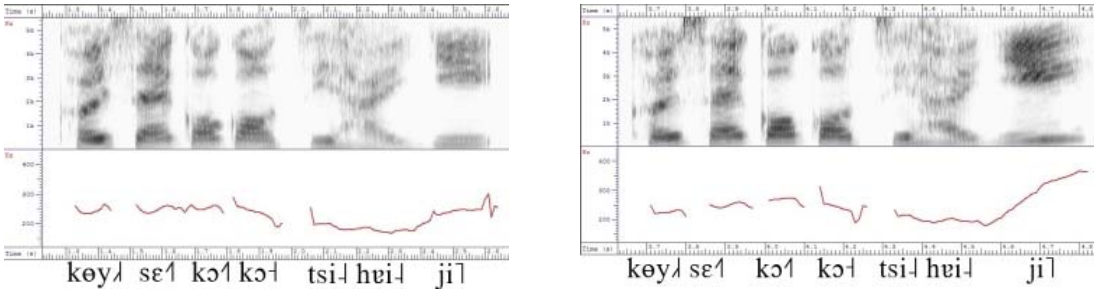
(5) [ωO˩]

The particle [ωO˩] is a hearsay particle (Matthews 1998), that is, it is used by the speaker to indicate that the statement is something he has heard and is not necessarily what the speaker believes in. This particle can be used alone as a reported speech marker, or together with expressions such as "he said" which explicitly state the source of the hearsay. The test sentence without the particle is a statement: 佢晚晚買蟹 [κ 8ψ˩ μαν˩ μαν˩ μαι˩ ηαι˩] "He buys crabs every night." The [ωO˩]-suffixed test sentence is equivalent to saying "I heard people say that he buys crabs every night." The use of this particle puts the responsibility of the validity of the statement on someone else.

4. Results

4.1 Comparing statements and intonation questions

Figure 2 below shows the spectrogram (above) and pitch tracings (below) of the statement "The character that he wrote was 'clothing'." and its intonation question. The test syllable is the Tone 1 [ji ˥]; the syllables in these two sentences are [κ8ψ˩ σE˥ κO˥ κO˩ τσι˨ η6ι˨ φι ˥] (Section 3.2).



statement intonation question

Figure 2. Pitch tracings of a statement and its intonation question

The general observation from the above pitch tracings is that the intonation patterns of the statement and the intonation question are similar except the final syllable, which is the test syllable. For the interrogative sentence, a rising intonation on the final syllable is observed, and the rise in pitch is very high, with the final pitch reaching to a level much higher than the pitch for Tone 1.

For the six pairs of statements and intonation questions, the following are the pitch contours and the measurements of the fundamental frequency (Fx) of the final syllables:

statements	intonation questions
Tone 1: level; about 247 Hz	Tone 1: 193 Hz rising to 367 Hz
Tone 2: rising; 156 Hz to 208 Hz	Tone 2: 168 Hz rising to 360 Hz
Tone 3: level; about 199 Hz	Tone 3: 209 Hz rising to 324 Hz
Tone 4: falling; 170 Hz to 149 Hz	Tone 4: falling from 170 Hz to 159 Hz, then rising to 335 Hz
Tone 5: rising; 165 Hz to 185 Hz	Tone 5: 175 Hz rising to 368 Hz
Tone 6: level; about 174 Hz	Tone 6: 200 Hz rising to 338 Hz

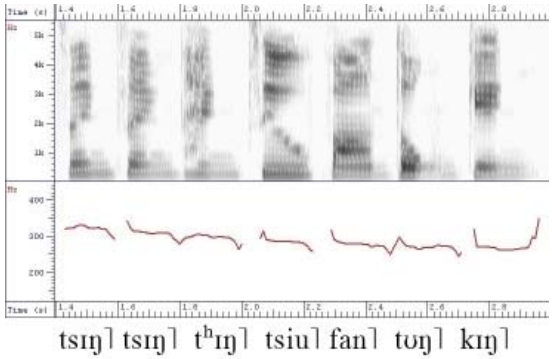
For the final syllables with Tones 1, 3, 6, it can be said that the intonation is superimposed on the lexical tone, and the rise starts right at the beginning of the tone and the pitch contour shows a sharp rise in pitch. The pitch height is much higher than the normal lexical tone 1, about 48.6% increase in Hz for Tone 1. For Tones 3 and 6, the final pitch values are comparable to that for Tone 1, rising to above 300 Hz.

For the final syllables with Tones 2 and 5, which have rising contours, the rising intonation also raises the final target Fx of the tone but does not affect the starting pitch. The ending pitch values for questions ending with Tones 2 and 5 are comparable to that for Tone 1, ending above 300 Hz.

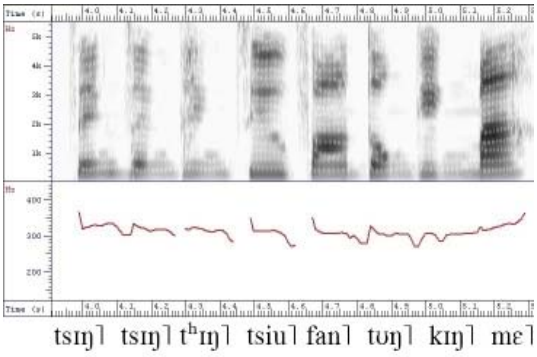
For the final syllables with Tone 4, where the citation tone is falling, it can be observed that the rising intonation of question is added at the end of the falling pitch, and so there is "successive addition" of intonation to the lexical tone.

4.2 Comparing the intonation of sentences with and without SFPs

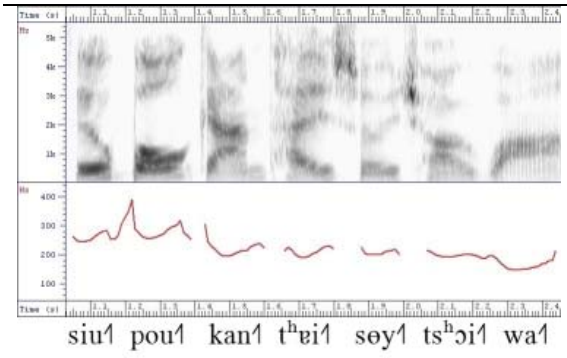
Figure 3 below shows the pitch tracings of the five pairs of sentences of Set 2 test materials (Section 3.2):



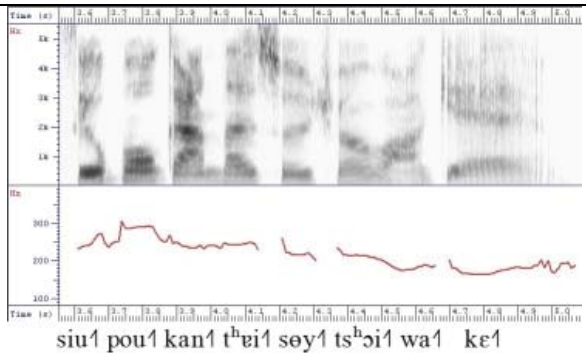
Tone 1 syllables, no SFP



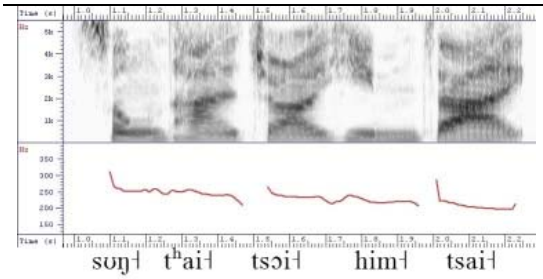
Tone 1 syllables, SFP [μE ʃ]



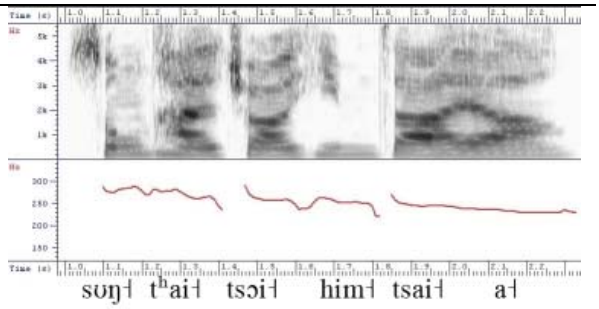
Tone 2 syllables, no SFP



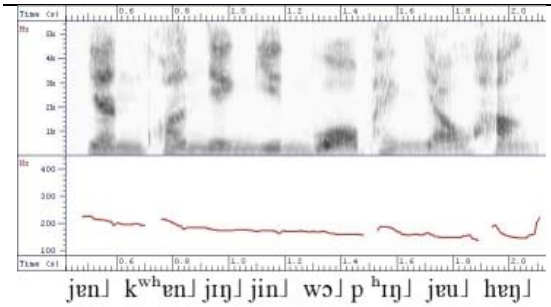
Tone 2 syllables, SFP [κE |]



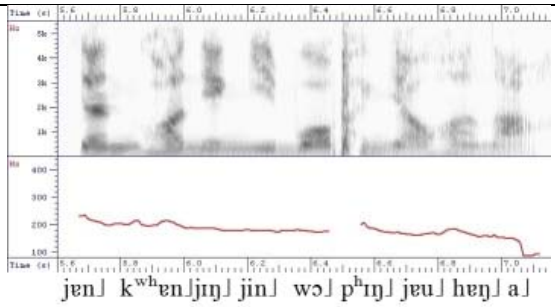
Tone 3 syllables, no SFP



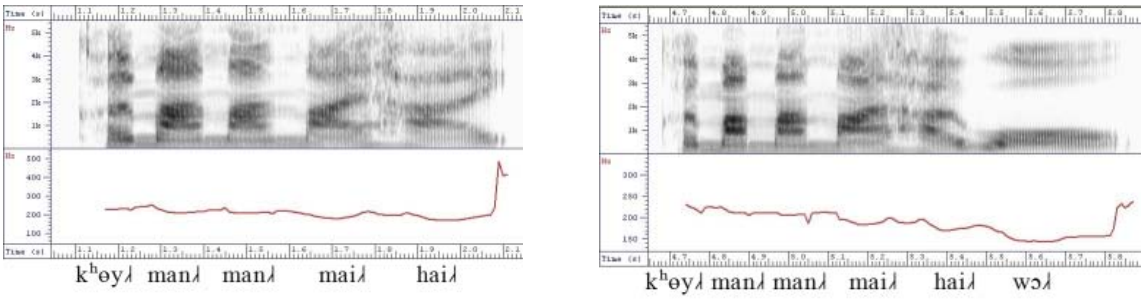
Tone 3 syllables, SFP [α˩]



Tone 4 syllables, no SFP



Tone 4 syllables, SFP [α |]



Tone 5 syllables, no SFP Tone 5 syllables, SFP [ωO˩]

Figure 3. The pitch tracings of five pairs of sentences (the first in each pair is without an SFP, and the second contains an SFP)

From the pitch tracings, it can be seen that pitch declination occurs for all the above sentences in Cantonese. For example, in the sentence consisting of Tone 1 syllables and without an SFP, the Fx values for the seven syllables are respectively 322 Hz, 308 Hz, 301 Hz, 285 Hz, 278 Hz, 266 Hz and 264 Hz. On the first glance, the presence of an SFP does not seem to affect much the intonation pattern of the utterance body. For example, when the sentence consisting of Tone 1 syllables is suffixed with the SFP [µE ˥], the pitch pattern of the utterance body is the same as the sentence without an SFP, and similar pitch declination can be seen. But it is noticed that the pitch declination is less sharp in slope, as reflected by the Fx values of the syllables in the [µE ˥]-suffixed sentence: 321 Hz, 317 Hz, 313 Hz, 292 Hz, 290 Hz, 287 Hz and 282 Hz.

How similar are the "tones" of the SFPs and the lexical tones of the syllables in the sentence-final position are compared now:

(i) SFP [µE ˥] compared with Tone1 syllable [ĸIN ˥] in the sentence-final position:

For the final syllable [ĸIN ˥], the pitch contour is quite level, and the Fx value is approximately 264 Hz. In contrast, the pitch contour of [µE ˥] is rising, with Fx values rising from 321 Hz to 332 Hz. This is reminiscent of the pitch contour of the interrogative sentences we saw in Section 4.1. Since "Tone 1" SFP [µE ˥] is a question particle, the "tone" we hear for this particle at the utterance-final position may in fact be the intonation of the interrogative sentence.

(ii) SFP [ĸE ˧] compared with Tone 2 syllable [ωα ˧] in final position:

The final [ωα ˧] syllable has a pitch contour which is a dipping followed by a rise. The SFP [ĸE ˧] also exhibits such kind of dipping-rising pitch contour. In terms of Fx values, those for the final [ωα ˧] syllable are 196 Hz – 152 Hz – 204 Hz (starting – lowest – finishing), and [ĸE ˧] have values of 199 Hz – 166 Hz – 181 Hz. Therefore, the pitch level and contour of the "Tone 2" SFP [ĸE ˧] are very comparable to a final syllable with Tone 2.

(iii) SFP [α˩] compared with Tone 3 syllable [τσαι˩] in final position:

The final Tone 3 syllable [τσαι˩] has a lowering pitch contour and has Fx values decreasing from 251 Hz to 196 Hz. This is the effect of the pitch declination and the falling intonation of a declarative sentence. The SFP [α˩] also has a lowering pitch contour, with a final Fx value of 229 Hz, comparable to that of the final Tone 3 syllable.

(iv) SFP [α ˧] compared with Tone 4 syllable [ŋ6N ˧] in final position:

The falling pitch contour of the final Tone 4 syllable [ŋ6N ˧] can be clearly seen, and the Fx value drops from 195 Hz to 151 Hz. The SFP [α ˧] has a much sharper drop in pitch contour, with the Fx dropping from 190 Hz to 100 Hz.

(v) SFP [ωO˩] compared with Tone 5 syllable [ŋαι˩] in final position:

Similar to Tone 2, the final Tone 5 syllable [ŋαι˩] also exhibits a dip-before-rise pitch contour, with Fx values of 205 Hz – 168 Hz – 194 Hz. For the SFP [ωO˩], the pitch contour is also lowering and then rising, towards a final Fx value of 156 Hz.

5. Summary and Conclusions

This paper puts forward some questions about how we should consider the "tones" of the SFPs, and presents some basic acoustic analyses of several SFPs, which reveal that the "tones" of the SFPs are likely to be the product of the interaction between tone and intonation in Cantonese. The most obvious example is the "Tone 1" question particle [µE ˥], where the pitch contour is not a level one but a rising one, equivalent to that of an intonation question. For the other SFPs that are studied in the present paper, it seems that the "tone" on the question SFP [ĸE ˧] is also intonation, corresponding to the interrogative intonation, and that the "tone" on [α˩] is also intonation corresponding to the declarative intonation. For the particles [α ˧] and [ωO˩], they may be said to have their own lexical tones and the

meanings of the utterances which possess them are conveyed mainly by their segmental phonemes and tones.

The fact that the SFPs are usually referred to by having "lexical tones" may be a shorthand or for convenience sake, making it easier to make reference to them just like other syllables in the language as having particular lexical tones. Since the native speakers are very familiar auditorily with the contrastive lexical tones, when a syllable which has Fx values close to one of the tone categories, the native speakers are likely to group this syllable into one of the contrastive tones, that is to say, the Fx values within the range of Fx values of contrastive tones would be considered and perceived as a particular lexical tone. However, in the linguistic analysis of SFPs, it may be better to make a distinction between their tones and their interaction with intonation. There are quite a number of SFPs in Cantonese which are segmentally identical (having the same phonemes and "tones"), and some previous researchers treat them as the same SFP, while others discuss them as separate entities. As we have suggested in this paper that the "tone" of an SFP may well be a product of the intonation and its inherent tone, it is important to distinguish between the different intonation patterns associated with the system of SFPs and relate to both their tones and intonation in every discussion of the meanings of individual SFPs.

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