A floating tone discourse morpheme: The English equivalent of Cantonese lo1

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Abstract

Cantonese linguists have said that Cantonese sentence-final particles (SFPs) express the same kinds of meanings that are expressed by intonation in languages such as English, yet apparently no study has ever systematically attempted to discover whether any SFPs have English intonational equivalents. This study identifies the English intonational counterpart to the SFP *lo1* by looking at the pitch contours of Cantonese-to-English audio translations, which were provided by four Cantonese/English native bilingual participants. Based on the data, it is concluded that the English equivalent of *lo1* is a high-falling pitch contour. A definition using the natural semantic metalanguage is formulated to define *lo1*, and native English-speaker judgments indicate that this same definition also defines the meaning of *lo1*'s English equivalent. Examples are given to demonstrate that this definition succeeds at defining either *lo1* or its English equivalent in any context within which they are used. It is proposed that this *lo1*-equivalent pitch contour is a floating tone morpheme in the English lexicon. Linguists have long debated whether or not any forms of intonation have context-independent meanings. This study offers empirical evidence in support of the argument that they do.

Keywords: Cantonese; discourse particle; floating tone; evidential marker; discourse intonation; natural semantic metalanguage
1. Introduction

Most studies on Cantonese sentence-final particles (SFPs) say that English intonation and SFPs are closely related (e.g., Cheung, 1986; Kwok, 1984; Matthews and Yip, 1994; Yau, 1980; Yip, 2002). They have different forms but are considered to have similar functions and meanings. SFPs are a class of bound segmental morphemes that attach to the ends of sentences, while intonation is formed primarily by the manipulation of pitch.

Even though it is widely assumed that SFPs and intonation have shared meanings, only one study as far as the author knows has ever attempted to discover any English intonational counterparts of Cantonese SFPs (Pennington and Ellis, 2000) and only one attempt has ever been made to discover the Mandarin equivalents of English intonation (Chao, 1932). The study reported here is part of a larger study aimed at filling this research gap (Author, 2010). This portion of the study finds and describes the form and meaning of the English equivalent of the SFP *lo1*. While *lo1* is a segmental morpheme, its English equivalent is a suprasegmental pitch contour.

A definition is developed for *lo1* using Wierzbicka’s (1996) natural semantic

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1 Luke (1990) argued for the term ‘utterance particles’ rather than sentence-final particles because they can attach to utterances that are arguably smaller than a sentence. It is beyond the scope of this paper to defend.
2 The following abbreviations are used throughout the paper: D = discourse element; $F_0$ = fundamental frequency; NSM = Natural Semantic Metalanguage; P = proposition; SFP = Cantonese sentence-final particle.
metalanguage (NSM), and native English-speaker judgments are collected as a form of evidence to show that *lo1* and its English equivalent have the same meaning. It is taken as a working hypothesis that *lo1* and its English counterpart are equivalents with regard to function, meaning, and grammatical category, i.e., that they are both discourse particles that function to link the sentence to the discourse in the same way.

This paper is organized as follows. The next section describes the forms and functions of intonation and SFPs, and explains the three-way relationship among intonation, lexical tones and SFPs. Section 3 introduces the natural semantic metalanguage and proposes an NSM definition for *lo1*. Section 4 describes the research design and methodology. Then, based on the Cantonese-to-English translations, section 5 describes the form of *lo1*’s English equivalent. Section 6 demonstrates that the NSM definition is able to accurately describe the uses of *lo1* and its English equivalent in any context where they appear. Section 7 explains the polysemy of *lo1* and the final section provides a summary and conclusion of the study. Throughout the paper, the term SFP refers to Cantonese SFPs.

2. **Intonation and discourse particles**

Cheung (1986:251) said it is “beyond doubt” that lexical tones, SFPs, and intonation are interrelated because lexical tones and intonation both share the same form, while SFPs and
intonation share the same functions. To help readers better understand this three-way relationship among SFPs, intonation and lexical tones, this section first describes the forms of intonation and lexical tones, and then the forms of discourse particles. After that the overlapping functions of SFPs and intonation are described in order to explain why the complex lexical tone system of Cantonese has resulted in its using segmental particles to express the types of meanings that are expressed by intonation in English.

2.1. The forms of intonation and lexical tones

Intonational forms consist of pitch, length and loudness. Pitch is considered by linguists to be the most important of the three, followed by length and then loudness (Chun, 2002; Cruttenden, 1997; Johns-Lewis, 1985; Hirst et al., 2000). The terms pitch, length and loudness refer to the cognitive, subjective interpretation of their physical counterparts, which are, respectively, fundamental frequency (or $F_0$) measured in hertz, duration measured in seconds, and intensity measured in decibels.

Pitch is frequently measured as and referred to as its physical counterpart $F_0$ (Botinis et al., 2001; Chun, 2002; Ladd, 2008; Pierrehumbert and Hirschberg, 1990), but linguists acknowledge that pitch and $F_0$ are not the same thing. $F_0$ is an acoustic measurement of what speakers produce, while pitch is the way in which listeners perceive $F_0$ (e.g., Chun, 2002:4). As
such, a number of linguists have pointed out that the final judge of pitch is the human ear, not mechanical measurements (Gussenhoven, 2004:3; Hirst, 1977:2; Pike, 1945:16; Roach, 2009:starting at 4:23). Based on the idea that only some F0 movements are perceptually relevant, t’ Hart et al. (1990) developed the Institute of Perception Research (IPO) method, which is a perceptual model of intonation. Since pitch is subjective, native-speaker judgments should be taken into account to the extent possible in order to increase the validity of any claims about a form of intonation.

Many scholars have either recognized and/or followed the practical step of analyzing intonation in terms of pitch alone (e.g., Botinis et al., 2001; Brazil, 1997; Chun, 2002; ‘t Hart et al., 1990; Wells, 2006), and this practice has been adopted here. Intonation is analyzed in this study by examining the F0 contours of the audio data, supplemented by native English-speaker intuition for the reasons just explained. The method used for gathering native-speaker judgments of pitch is described in section 4.4.

Lexical tones are closely related to intonation because they are also composed primarily of pitch, so for obvious reasons they restrict the use of intonation. It is therefore reasonable to assume that the more complex a language’s system of lexical tones, the more this will interfere with that language’s use of intonation, and Cantonese has a relatively complex tone system. It has six lexical tones (Bauer and Benedict, 1997; Yip, 2002), with tonal contrasts that involve both height and orientation, severely restricting the speaker’s ability to manipulate pitch for anything
other than the expression of lexical tone (Cheung, 1986; Yip, 2002). Changing the tone(s) of a Cantonese word will alter its lexical meaning rather than merely add connotative meaning. This has been argued to have caused various kinds of attitudes, epistemic modality and speaker stances that are expressed intonationally in English to be expressed through the use of SFPs in Cantonese.

2.2. The forms of segmental discourse particles

The forms of segmental discourse particles, including both modal particles and SFPs, are no different from the forms of other segmental morphemes. As far as the author is aware, the only question linguists have regarding the forms of SFPs is whether or not the tone and/or segments of a given SFP should be analyzed as separate morphemes. Should the SFP 佬, for example, be analyzed as a single morpheme, or as three separate morphemes in the forms of an onset 佬, a rime -o, and a tone 佬, as proposed by Sybesma and Li (2007)?

Other than Sybesma and Li (2007), all descriptions of SFPs have assumed that their individual segments are phonemic parts of a single morpheme. There has not been as much

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3 Although intonation is severely restricted in Cantonese, some forms are still present. Cantonese has the apparently universal characteristics of prosody, such as downdrift (Cheung, 1986; Flynn, 2003), the manipulation of pitch range or level (Cheung, 1986; Pennington and Ellis, 2000), and the marking of syntactic phrasing (Fox et al., 2008). It also allows the use of rising tones to form declarative clause questions (Fox et al., 2008; Ma et al., 2011).
agreement regarding the nature of SFPs’ tones, however, which have been analyzed in two ways: either as typical Cantonese lexical tones or as forms of intonation (e.g., Wu, 2009; see Sybesma and Li, 2007:1767ff and references cited there for discussion).

If a form of English intonation is concluded to be equivalent to /lo1/, then that form of intonation will be equated to different things depending on which of the above hypotheses is adopted: 1) to a morpheme that includes a lexical tone; 2) to a morpheme plus a form of intonation; or 3) to three separate morphemes à la Sybesma and Li (2007). The author considers 1) to be the most likely, but it is unnecessary for our purposes here to commit to one of these three hypotheses.

The segmental components of SFPs make them easier to recognize than forms of English intonation from one occurrence to the next. The same is true of segmental discourse particles in other languages as well. The purpose of this research is to exploit the recognizability of a given SFP (in this case /lo1/) from one of its occurrences to the next in order to discover the intonational form used to express this same meaning in English. Such research can only succeed if /lo1/ has an English intonational counterpart with the same (or nearly the same) function and meaning. This is only likely to be true if 1) the functions and meanings of SFPs are in general similar to the functions and meanings of English intonation, and 2) if /lo1/ expresses a meaning that is commonly expressed in most if not all languages. It will be shown that 1) and 2) are both likely to be the case in the following section and section 3.2, respectively.
2.3. The functions of intonation and discourse particles

Most authors agree that intonation has the grammatical syntactic function of delimiting phrases. This function is unrelated to the present study and will therefore not be discussed. What is relevant here are the discourse and attitudinal functions of intonation.

Crystal (1997:173) said that intonation functions “to express a wide range of attitudinal meanings—excitement, boredom, surprise, friendliness, reserve, and many hundreds more.” Referring to the functions of SFPs, Bauer and Benedict (1997:291) said that they:

perform different kinds of speech-acts, such as requesting, reminding, refusing, advising, asserting, persuading, questioning, etc., and to express the speaker’s emotional attitudes of surprise, outrage, passion, blaming, doubt, dissatisfaction, patience, impatience, conceit, hesitation, reluctance, etc.

An example of “questioning” is the SFP me1, which marks a declarative clause as a question expressing surprise. This can be compared to the well documented use of a rising tone in English to perform the same function (see Bartels, 1999 and Gunlogson, 2003 for detailed discussions of English rising declaratives). Baker and Ho (2006:40) informally described this comparison, saying that the way to express the meaning of me1 in English is to “raise your voice almost to a squeak.” Chan (2001:59) said that me1 could be expressed in English intonationally as “an echo question.” In Author (2010), it was demonstrated that me1 consistently translated into English as a rising tone by English/Cantonese native bilinguals. No additional lexical items were
added to any of the translations that could not be attributed to the lexical items in the Cantonese sentences to which *me1* was suffixed. This indicates that *me1* was translating solely as the rising tone, and not as any other segmental word(s).

Another Cantonese question particle *aa4*, consistently translated into English as a rising pitch contour that did not rise to as high of a pitch level at its endpoint as did the translations of *me1*-suffixed sentences (Wakefield, forthcoming). This supports the claim that some SFPs share the same (or very similar) functions and meanings with specific forms of English intonation.4

Numerous authors have compared the functions of SFPs to those of intonation (e.g., Cheung, 1986; Kwok, 1984; Matthews and Yip, 1994; Pennington and Ellis, 2000; Yau, 1980; Yip, 2002), and it is widely assumed that Cantonese has developed a rich inventory of SFPs because its complex lexical tone system restricts the use of intonation. Yau (1980:51) suggested “there is a mutual compensation between [SFPs] and intonation patterns and that the more a language relies on the use of [SFPs] in expressing sentential connotations, the less significant will be the role played by intonation patterns, and vice versa.” He concluded that Cantonese and English represent the two extremes of this continuum, and other linguists have supported this claim by saying that, as far as they know, Cantonese has more SFPs than any other language studied thus far (e.g., Leung, 1992/2005; Luke, 1990). If true, then English lies at one end of the

4 Another claim of a link between a specific SFP and form of English intonation came from Yip and Matthews (2001), who said that the SFP *zek1* can be expressed in English as coy intonation.
continuum along with all the languages that have a very limited number of SFPs,\(^5\) and Cantonese lies (perhaps) alone at the other end with the largest known number of SFPs, and one of the most limited uses of intonation.

There are varying accounts of the actual number of SFPs that Cantonese has, ranging from 30+ (Kwok, 1984; Law, 1990; Luke, 1990), to 80 or more (e.g., Leung, 1992/2005:83). A larger number is arrived at by categorizing polysemous particles as two or more distinct particles. For example, Leung (1992/2005) described two SFPs that share the same form \(lo1\), which he referred to as \(lo1\)\(_1\) and \(lo1\)\(_2\). This study relates to only a single meaning of \(lo1\), which is the one that Leung (1992/2005) referred to as \(lo1\)\(_1\). The fact that \(lo1\) has another meaning with the same form does not affect the conclusions made in this paper (see section 7 for discussion).

In addition to SFPs, the meanings of discourse particles in other languages have also been compared to those expressed by intonation. In the introduction to Ladd’s (2008:5) treatment of intonation, he said “...it has long been observed that many languages use segmental morphemes to convey the kinds of meanings that in other languages can often be signaled intonationally.” Arndt (1960), for example, concluded that Russian and German particles have functions that resemble those of intonation rather than of other segmental word classes. In

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\(^5\) English has sentence-final elements that are arguably comparable to Cantonese SFPs—not only in meaning but also in form (i.e., segmental particles)—so we cannot say English has no SFPs. Some sentence-final examples are question tags, the question particle ‘huh?’ used for confirmation, the Canadian ‘eh’, and debatably the American restrictive focus marker ‘is all’ that means “only.”
studies with goals similar to the present one, Schubiger (1965) compared specific forms of
English intonation to the German modal particles *doch* and *eben*, and Chao (1932) did the same
for Mandarin sentence-final particles.

There is clearly not a one-to-one correspondence between every SFP and some form of
English intonation; some translate into English (at least partially) as segmental words, and others
arguably don’t translate into English at all. However, there is good reason to believe that some
SFPs do have English intonational equivalents, and that those SFPs can therefore be exploited to
discover the forms of English intonation that express their meanings. It was predicted that the
SFP under investigation here (i.e., *lo1*) has an English equivalent because it has a meaning that
is probably commonly expressed in human languages (see section 3.2). Cantonese-to-English
translations were used to test whether this is indeed the case, and if so, to see if this meaning is
expressed in English solely as a form of intonation (see section 5).

3. **Defining *lo1***

Prior studies have provided descriptions of the meanings and functions of SFPs, and the
studies written in English have added paraphrases of the SFPs’ meanings to the English
translations of SFP-suffixed sentences (e.g., see example sentence (2B) in section 3.2). Such
paraphrases of SFPs are helpful to understanding their meanings, but they are not likely to be
their English-equivalent forms, nor their precise English-equivalent meanings. One of the two
goals of this study was to discover the actual equivalent form of *lo1* in English. The other goal
was to improve upon all previous paraphrases by developing a definition that is proposed to
accurately define *lo1*, and then to test whether this definition also succeeds at defining its English
equivalent.

3.1. Defining SFPs with NSM

The natural semantic metalanguage theory hypothesizes that humans are endowed with
primitive concepts that are lexicalized in all languages. If true, then these semantic primes exist
as a subset of every language's lexicon. Semantically complex words, the meanings of which are
mostly language- and culture-specific, are considered to stem from combinations of these
semantic primes. All semantically complex words can therefore be precisely defined through
paraphrases that are made up entirely of the primes.

The goal in developing an NSM definition of *lo1* is the same as that of Besemer and
Wierzbicka (2003:19), who wrote an NSM definition for the SFP *lah* in Singapore English. They
wanted to “come up with a formula which would make sense in all the contexts in which [lah] can
occur.” The end result of such a “formula” is a speaker-oriented definition using semantic primes.
Definitions like these are intuitively understood by any native speaker of the language in which
the primes are written, and their validity can therefore be tested against any native-speaker’s intuition.

The NSM definitions of *lo1* (see (6) in the next section) and its English equivalent (see (12) in section 5.3) are meant to serve as a language-neutral means to link *lo1* and its English equivalent together, i.e., to provide exactly the same simply-worded definition in both Cantonese and English. The NSM theory hypothesizes that a definition written in English NSM primes is isomorphic with a version of that same definition written in Cantonese NSM primes (for details of the NSM theory, see Goddard, 1994, 2004, 2008 and Wierzbicka, 1996).

Some linguists have said that SFPs have little or no semantic content, suggesting that they cannot be defined independently of the contexts within which they appear (e.g., Baker and Ho, 2006; Kwok, 1984; Luke, 1990). Others, to varying degrees, have argued that SFPs have consistent, context-independent meanings (e.g., Fung, 2000; Leung 1992/2005; Sybesma and Li, 2007). This study assumes the latter, arguing that discourse particles have meanings independent of the discourse. In this sense they are comparable to pronouns, which can be defined independently of the context, but which, like all deictic elements, rely on the context for their interpretation.

SFPs and pronouns are not quite the same, however, because a pronoun is itself a deictic element, whereas an SFP has a meaning that includes one or more deictic elements. These deictic elements entailed in the meanings of SFPs have caused some authors to include
information from the discourse and or the proposition in their descriptions of SFPs (Fung, 2000:6).

An example of doing this for 101 is Kwok’s (1984) having said that 101 gives the reason for something when it attaches to reasons, and that it points out what is obvious when it attaches to obvious information (see example (2) in the next section for one of Kwok’s illustrations of when 101 means “obvious”).

In essence Kwok (1984) was defining the proposition to which 101 attaches, rather than defining the particle itself. This can be avoided by including a deictic word in an SFP’s definition.

A good analogy is two possible definitions of the English plural morpheme. One definition could be that the morpheme -s in the word “cats” means “more than one cat,” but this is akin to what Kwok did and is not desirable because “cat” is included as part of the definition. It is better to say that -s always means “more than one X,” and that in this context X = “cat.” SFPs are bound morphemes that attach to the ends of sentences (or what some linguists prefer to call utterances).

Defining an SFP can therefore be equated to defining a bound morpheme; it must include a deictic element that refers to whatever it attaches to. In the example just given, X replaces the count noun to which -s attaches; for 101, the determiner THIS replaces the proposition to which 101 attaches.

The definition for 101 given in (6) in the following section includes the NSM determiner THIS, whose antecedent is the proposition (P) to which 101 is suffixed, and a substantive plus determiner SOMETHING ELSE, whose antecedent is the discourse element (D) that is related to
P in the specific way that \(lo1\)'s meaning entails. Related to the P of this definition, Kwok (1984:7-8) said that “the meaning of a particle may vary according to the type of structure to which it is affixed,” and in related to D, Luke (1990) said \(lo1\) is only meaningful in reference to the particular contexts in which it appears. Both authors are correct because the deictic elements in \(lo1\)'s definition that refer to P and D depend on their antecedents in the sentence and in the discourse context for their reference, respectively.

Using deictic elements to refer to P and D makes it possible to define \(lo1\) in a way that remains consistent for each of its occurrences, regardless of context. If \(lo1\) can be defined independently of the discourse context, and if it can further be shown that \(lo1\) has an English equivalent that is a form of intonation, then this provides empirical evidence in support of the argument that discourse related forms of intonation can have context independent meanings.

3.2. An NSM definition of \(lo1\)

Yip and Matthews (2001:157) said that \(lo1\) “is often used together with \(mai6\) ‘then’ which suggests that what follows [i.e., what comes between \(mai6\) and \(lo1\)] is an obvious conclusion.”

They provided this example:
(1) 你做得唔開心咪搵第二分工囉。
"Lei5 zou6 dak1 m4-hoi1sam1 mai6 wan2 dai6-ji6 fan6 gun6 lo1."
you do Adv-M NEG-happy MAI find second CL job LO
‘If you’re not happy in your work, then find another job.’

Kwok (1984:58) also indicated that *lo1* expresses "obviousness" in her paraphrase translation of *lo1* shown in (2B):

(2)  A: 幾時開場呀？
"Gei2-si4 hoi1 coeng4 aa3?"
when start CL(film) PRT
‘When does the film start?’

B: 兩點半囉。
"Loeng5 dim2 bun3 lo1"
two CL(time) half LO
‘Two thirty, of course. Don't you know?’

The English translation of (2B) without *lo1* would be “two thirty,” nothing more. The preposition phrase adjunct “of course” and the additional sentence “Don’t you know?” combine to form Kwok’s translation of *lo1*, which implies that *lo1* means the proposition to which it attaches is obvious and that the speaker thinks the listener should know it. This idea of obviousness has been repeated throughout the literature, and the NSM definition proposed for *lo1* at the end of this section can be seen roughly as a paraphrase of “this is obvious.”

In Luke’s (1990:119-198) detailed discussion of *lo1*, he said that it indicates to listeners
that the sentence to which \textit{lo1} is suffixed is linked to and determined by “something else,” which is shared knowledge or something in the prior discourse, either linguistic or pragmatic—this is the D of the definition in (6). Luke discussed a wide variety of functions, uses and properties of \textit{lo1}, and concluded that, based on the context within which it appears, \textit{lo1} can, among other things:

- contain an epistemology feature;
- contain a backward-looking feature;
- confirm an expectation;
- report events that follow naturally under given circumstances;
- formulate suggestions and advice.

The definition proposed in this paper for \textit{lo1} accounts for why it has all of these so-called “features.” Regarding the \textit{epistemology} feature, Luke said that “states-of-affairs are presented as simply and unproblematically known, i.e., having a good sound common sense epistemological basis” (Luke 1990:123). Other linguists have also noted this feature of \textit{lo1}. Lee and Law (2001) said that \textit{lo1} was one of the SFPs that expresses epistemic modality. Fung (2000) said that it functions to mark the realization of an epistemic state, and Li (2006) said it is both epistemic and discourse related.

Subsumed within this epistemology feature is the next feature that Luke mentioned, which he called a \textit{backward-looking} feature. One of his examples of this was (3), which was taken from a radio call-in program in which a boy and a girl called in and were both put on the air at the
same time. The DJ talked to the girl first and then addressed the boy. When the boy, Kei, heard the DJ say “And the boy?” Kei took it as a cue to say his name. The DJ didn’t hear Kei say his name, however, because it was drowned out by laughter, so he asked Kei for his name after Kei had already said it:

(3) DJ: 男仔呢？
Laam4-zai2 le1?
boy PRT
“And the boy?”

Kei: 阿 Kei。
Aa3-kei4.
PRT-kei
‘Kei.’

DJ: 係你叫乜名呀?
Hai6. Lei4 giu3 mat1 meng2 aa3?
be 2s call what name PRT
‘Yes. What’s your name?’

Kei: 阿 Kei 嘍。
Aa3-kei4 lo1!
PRT-kei LO
‘Kei!’

DJ: 阿 Kei 嘍::: 我都未知道。
Aa3-kei4 lo1!::: Ngo5 dou1 mei6 zi1-dou3.
PRT-kei LO::: 1s also not-yet know
‘Kei! I didn’t know (your name) yet.’
Kei apparently assumed that the DJ should have heard him say his name the first time, not realizing that it was drowned out by laughter. As a result, when the DJ asked for his name, Kei repeated it with lo1 attached. Luke (1990:129) said lo1 signals the listener “to look backward in the discourse… to establish a link between the present utterance and something that has been said before (in this case the giving of his name the first time round).” Luke also pointed out that the DJ expressed an understanding of this meaning of lo1 by repeating Kei’s reply (Aa3-kei4 lo1::), and stressing lo1 by lengthening its rhyme considerably (represented as ::). The DJ then said, “I didn’t know (your name) yet,” clearly showing the DJ’s understanding that Kei expected him to know his name.

Luke (1990:131) said this backward-looking feature not only points back to prior utterances of the exact information that the listener seeks, but may also point to prior information in the discourse, or to “a known state of affairs,” through which the listener can get the answer “by means of an inference.” This backward-looking feature could be considered a form of evidential modality, which can be seen as the source of the “common sense” epistemic knowledge that Luke referred to. Aikhenvald (2004:186) said that “evidentials are part of the encoding of epistemology in the sense of how one knows what one knows.” It is proposed that the backward-looking feature and the epistemology feature are in fact the same thing.

Another property of lo1 that Luke mentioned is to confirm an expectation. In the following
exchange, speaker A believes that speaker B’s girlfriend must have left him for some reason in addition to knowing that he had been a cook before.

(4) A: 相信唔淨係噉嘅。

   Soeng1-seon3 m4  zing3-hai6 gam2 ge3.

       believe              NEG only              thus PRT

   ‘I believe that’s not all it is.’

B: 嗩，佢話我好唔細心啦。

   Ze1,      keoi5 waa6 ngo5 hou2 m4  sai3-sam1 laa1.

       PRT      2s       say 1s     very NEG small-heart PRT

   ‘I mean, she said I wasn’t caring.’

A: 係囉。

   Hai6 lo1.

       be       LO

   ‘Yeah!’

Speakers can say *Hai6 lo1* “Yeah!” to convey the idea that the listener’s immediately-preceding utterance confirms an expectation; in this case it is speaker A’s expectation that there was an additional reason for B’s separation from his girlfriend. This property of *lo1* that “confirms an expectation,” as Luke (1990:131) put it, need not be seen as different from the backward-looking feature because expectations stem from prior knowledge (i.e., from D).

The next use of *lo1* that Luke cites is that of “reporting.” He said *lo1* is attached to reports of events that can be expected to happen naturally as a result of certain events, or under certain
circumstances. This too entails the backward-looking feature since the propositional report \( P \) in the sentence “\( P \ lo1 \)” is an event that follows naturally from some event or circumstance \( D \) that exists in the prior discourse (or perhaps pragmatic information). Luke gave the following example of a report:

(5) 咁嘅有駕的士，咪截咗的士出嚟囉。

\[ \text{Aam1-aam1 jau5 gaa3 dik1si2, mai6 zit6-zo2 dik1si2 ceot1-lei4 lo1.} \]

just have CL taxi MAI catch taxi out-come LO

‘There just happened to be a taxi, so we came by taxi.’

In (5), the report “we came by taxi” follows naturally from the circumstance “there just happened to be a taxi.” This is obviously backward looking because the report gets its interpretation of being natural and obvious by looking back in the discourse at the circumstance within which it occurs, namely there just happening to be a taxi.

The final property that will be mentioned of those that Luke listed for \( lo1 \) is that of giving suggestions or advice (see Luke, 1990:155-162). An example of this is sentence (1), cited above from Yip and Matthews (2001). Luke (1990:162) said that \( lo1 \) is frequently used when giving advice because it establishes a link between the problem and the recommended solution. Taking what has been said about \( lo1 \) thus far, it makes sense that it would be used for suggestions and advice giving. It presents the suggestion or advice as something that is \textit{obvious} and directs the listener to \textit{look back} at something in the prior discourse for the evidence which shows it to be so.
Fung (2000:112) said that “lo1 assumes the hearer should have a high level of knowledge of the proposition.” It is argued that it goes beyond merely an assumption of “a high level of knowledge,” and that the speaker assumes the hearer either has full knowledge of the proposition, or could have full knowledge of it if he or she thought about it, because he or she is assumed to know some discourse element D, which provides, or can lead to, full knowledge of the lo1-suffixed proposition P. This description of what seems to be going on in the mind of the speaker is in line with the majority of what the literature says, and this type of description, which is based on speaker-oriented thoughts, formulates the following proposed definition of lo1:

(6) \[ P \text{lo1} = \]

你能夠知道呢樣嘢(P)
lei5 nang4gau3 zi1dou3 lei1 joeng6 je5 (P)
2s can know this CL thing
‘you can know this (P)’

因為你知道另外一樣嘢(D)
jan1wai4 lei5 zi1dou3 ling6ngo6i6 jat1 joeng6 je5 (D)
because 2s know other one CL thing
‘because you know something else (D)’

All that is required to license the use of lo1 (and its English equivalent) is for the speaker to believe that the listener knows D—whether or not the listener actually knows D is irrelevant.

This definition of lo1 captures everything that is said about lo1 in the literature except for the statements that the author argues are incorrect. For example, it captures Kwok’s (1984) claim
that *lo1* points out what is obvious, but not her claim that it gives the reason for something.

The meaning ascribed to *lo1* in (6) is not new *per se* because it does not include any meaning that has not previously been attributed to *lo1* in the literature. However, as far as the author knows it is the first attempt to provide a simply-worded, single-sentence definition of *lo1* that is proposed to include all and only the meaning expressed by the particle, and is proposed to apply to each and every context within which *lo1* may occur. As already explained, this is a necessary tool that the present study requires for the purpose of cross-linguistic comparison.  

An NSM paraphrase is only one of several methods that could be used to define *lo1*, but it was judged to be the most suitable method for the purposes of this study. The SFP *lo1* could be described at length, as has been done in the literature, but this is not an ideal way to elicit from native-English speakers their intuition about whether or not a form of English intonation has the same meaning as *lo1*. A single word such as "obviousness," or formal terminology such as "listener-oriented evidentiality" would either be too vague or jargonistic, respectively. An NSM paraphrase, if correctly formulated, is comparatively better at helping native-English speakers understand the function and meaning of *lo1*, enabling them to judge whether or not any form of intonation translated by the bilingual participants carries that same meaning.

The expression of evidentiality appears to be common, perhaps universal, in human

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6 NSM definitions can also be used to contrast the meanings of two or more related SFPs. Wakefield (2011) uses NSM definitions to discuss the contrast between the semantically related SFPs *lo1* and *aa1maa3.*
4. The research design and methodology

Even though linguists have said for many decades that discourse particles and English intonation are related (Ladd, 2008:5), the author is aware of only three studies which had a goal comparable to this one, which was to discover the intonational counterparts of particles: Chao (1932) looked at English intonation and its Mandarin equivalents; Schubiger (1965) compared English intonational forms to German modal particles; and Pennington and Ellis (2000:376) listed the “English equivalents of some Cantonese utterance particles.” Pennington and Ellis’s attempt is obviously the most closely related to the present study, but unfortunately it was only a very minor portion of their study and their list of SFPs and their English equivalents was not accompanied by any explanation as to how it was determined that they were in fact equivalents.

There are five ways in which the present study’s methodology improves on previous studies that have contrasted discourse particles with forms of intonation. First, this study used the intuition of native bilinguals, defined here as speakers who appear to be equally native in each language. Such people are what Valdés and Figueroa (1994:11) referred to as “ambilinguals,”
which they defined as “two native speakers in one individual.” Second, this study translated from the direction of segmental particles to suprasegmental intonation instead of vice versa. Third, oral translations of recorded speech were used as opposed to translations of written sentences. Fourth, the pitch contours of the English intonation were analyzed and native-English speakers were consulted about their impressions of the pitch form. Fifth, this study provided a simply-worded definition of the particle under investigation, helping native-English speakers to judge if the intonational form found in the translations has the same meaning as the particle.

4.1. The participants

Using native-speaker intuition as a source of data has obvious limitations, but it is nevertheless a widely used and accepted source for judging meaning and/or acceptability in linguistic research. The tokens of the SFP-suffixed sentences used for the translations of this study were assumed to be acceptable because they were either taken from an audio corpus of naturally-occurring conversations or from constructed dialogues for which native speakers were consulted. It was therefore not the participants’ judgments of acceptability that were needed, but rather their intuitive knowledge of meaning, and their ability to accurately translate the linguistic representation of this meaning from its segmental form in Cantonese to its form in English, which was predicted to be a form of intonation.
Chao (1932), who provided his own translations, was a native speaker of the target language only.7 Schubiger (1965) did not say whether she, or any of the other translators in her study, were native bilingual speakers of English and German, so the status of her study’s participants is unclear. Martha Pennington (2011, p. c.), whose L2 Cantonese has not reached an advanced level, used her own judgments to determine the English equivalents of the SFPs listed in Pennington and Ellis (2000). Ideally, such translation tasks should be done by native bilinguals if possible.

The author assumed the literature to be correct in saying that intonation is, to a significant degree, the English counterpart to SFPs. It was therefore concluded that native English-speaking participants would be best, because intonation is one of the most difficult things for L2 learners to master (Chun, 2002). If we assume that SFPs are the Cantonese equivalent of English discourse intonation, it follows that it would be best if the participants were also native speakers of Cantonese, because they would be more likely to intuitively understand the abstract meanings of the SFPs. Therefore, the best participants for a study such as this are native bilingual speakers.

The four participants who helped with this study are all of Hong Kong Chinese origin and speak Cantonese in their homes. They were all educated in English-medium schools by native speakers.

7 The following quote from Chao (1932:106) indicates that he did not consider himself to have native-speaker intuition of English intonation: “no attempt was made in constructing a complete and very systematic treatment of English intonation, as if to supercede the authorities in their own national subject.”
English-speaking teachers. Their status as native bilinguals was not based on their backgrounds, however, because bilinguals who share the same list of language-related background characteristics may nevertheless end up with very different language abilities (Valdés and Figueroa, 1994). Their status as native bilinguals was based on how they sounded to native speakers of both English and Cantonese.

Asking other native speakers to judge their status as native bilinguals is obviously impressionistic, but Butler and Hakuta (2004:125) said there is no clear method for determining the norm for a native speaker. Therefore, other than through the impressions of other native speakers, it is not clear how to determine if one or both of a bilingual’s languages meets the native-speaker norm. Valdés and Figueroa (1994:30-31) said it is generally assumed that there is no need to test the linguistic competence of native speakers so as to prove they are native speakers. The test of being “fully native” is based on whether or not a speaker sounds native to other native speakers (p. 36). Other than this, there are no recognized tests, as far as the author knows, which are designed to determine if a person is a native speaker of a given language.

Whether or not the participants of this study are actually native speakers of both languages is relevant to this study, so native-speakers of both English and Cantonese were consulted to see if they agreed.

The initial test of being a native bilingual was each participant’s self-judgment as a native bilingual. The next test was the author’s impression of their English, and a native-Cantonese
speaker’s impression of their Cantonese. Finally, in order to get more objective judgments about the native-ness of the bilinguals’ two languages, each participant was recorded saying anything s/he wanted to say in Cantonese and then in English for approximately 30 seconds each. The relevant language samples were then played to ten native-Cantonese and ten native-English speakers, who were asked to answer “yes” or “no” based on whether or not each participant sounded like a native speaker.\(^8\) The results were as follows:

Table 1: Judgments of the native-ness of the participants’ English and Cantonese

<table>
<thead>
<tr>
<th>Language</th>
<th>English</th>
<th>Cantonese</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>female-a</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>male-a</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>female-b</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>male-b</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

Three of the ten native-English speakers judged female-b to be a non-native speaker of English. This is perhaps because she had what sounded to the author to be a British accent of a non-standard variety, which contrasted with the other participants’ accents, each of which sounded like Standard American English. Five of the ten native-English speakers who judged the

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\(^8\) I thank one of the anonymous reviewers for suggesting this method of judging the participants’ status as native bilinguals.

\(^9\) The participant referred to as male-b chose—for whatever reason—not to participate in the follow-up study, so unfortunately no Cantonese language sample was recorded from him, and the judgment of the native-ness of his English was based on the sentences from his Cantonese-to-English translations.
participants’ English were Americans, two of whom judged female-b to be non-native. It will be seen in section 5.1 that female-b uses a different pitch pattern from the other participants in some of her translations. This could be something in addition to her accent that affected the native-English speakers’ judgment of the native-ness of her English.

One of the ten native-English speakers judged female-a to be a non-native English speaker, and two judged male-b to be a non-native English speaker. This again may have been related to their accents. Accent was not a factor for the judgments of their Cantonese, because all of the native bilinguals speak the standard variety of Cantonese as it is spoken in Hong Kong, which is the same variety spoken by all of the native-Cantonese speakers who judged their Cantonese.

The bilingual participants were judged to be native bilinguals by the majority of native speakers who listened to them. A score of seven out of ten does not mean that female-b was judged to be seventy-percent native; it means that she was judged to be fully native by seventy percent of the English speakers who heard her speak. This means the English of all of the bilingual participants was very native like, if not native. Native bilinguals were selected for this study because they were assumed to be more likely to succeed at the task, but the critical test of validity is not based on the linguistic status of the participants; it is ultimately based on whether or not they are seen to have produced consistent translations of an intonational form that native-English monolinguals recognize as being part of their language, and identify as meaning what
means based on its NSM definition. This of course does not mean that the native-ness of the participants’ English is irrelevant. The fact that there are only four native bilingual participants, due to their being extremely difficult to find, and the fact that some native-English speakers judged some of the participants’ English to be less than fully native must be acknowledged as a limiting factor for this portion of the study.

4.2. Translating from an SFP-rich to an SFP-poor language

Lee and Law (2001) pointed out that SFPs represent a lexicalized form of a variety of knowledge states, and therefore provide a good window through which to observe epistemic notions. The author agrees with this and further argues that SFPs provide a good window through which to discover the forms of these epistemic notions in a language such as English, which often manifests such notions in a more difficult to recognize, suprasegmental form. Using forms of intonation to discover their SFP equivalents is less reliable, because forms of intonation are much more difficult to identify from one occurrence to the next than are SFPs. This is what Chao (1932) did when he translated English intonation into Mandarin SFPs. Similarly, Schubiger’s (1965) direction was mostly English to German in her attempt to match German modal particles to forms of English intonation. Instead of doing what Chao and Schubiger did, it is more reliable to start with forms that are easily identifiable, and then attempt to identify their less easily identifiable
counterparts, i.e., to translate SFPs or modal particles into intonation.

4.3. The corpus and data collection

When choosing which type of linguistic data to use for an SFP-related study, arguments can be made for using either naturally-occurring data, constructed data, or a combination of the two. The choice will depend on the goals of the study. The goal of this study was to elicit accurate English translations of lo1-suffixed sentences to discover the English-equivalent form of lo1, if any. SFPs are found primarily in casual colloquial speech, so it was concluded that the best source for collecting tokens of SFPs is a corpus of naturally-occurring casual speech.

In addition to translations from an audio corpus, lo1-equivalent intonation was contrasted with neutral intonation using constructed minimal-pair dialogues that were acted out by native-Cantonese speakers and recorded.\(^\text{10}\) The two sentences in each minimal pair differed based on whether they were suffixed with lo1 or with the neutral SFP aa3. Lee (2000:107) referred to aa3 as a "neutral particle" that makes an utterance sound complete or less blunt. A neutrally-intoned, aa3-suffixed sentence should translate into English as something like what Stockwell (1972:87-88) referred to as the "'neutral' or 'normal' or 'colorless' intonation contour for any sentence, serving as a baseline against which all other possible contours are contrastable, and thereby meaningful.”

\(^{10}\) I thank the anonymous reviewer who suggested using minimal-pair sentences.
The translation of minimal pairs, differing only by the suffixing of *lo1* vs. *aa3* should in theory provide a baseline contour against which the *lo1*-equivalent contour can be contrasted.

Translating from audio recordings differs from Chao’s (1932) and Schubiger’s (1965) translations of written lines from stage plays and translations of written sentences from the literature on English intonation, and contrasts with Schubiger’s (1965) written translations from classic literature. Austin (1975:74) said it is very difficult to represent intonation in writing. The intonational markings used in the literature on intonation are certainly detailed and informative, but they are still inferior to the spoken form.

For the data collection, audio files of five dialogues that included a *lo1*-suffixed sentence were extracted from a searchable audio corpus called the Hong Kong Cantonese Corpus (HKCanCor—http://www.hku.hk/hkcancor/), which was created by K.K. Luke and O.T. Nancarrow. Each of the five extracted dialogues included enough material from the preceding discourse to allow the participants to understand the context within which *lo1* was used. In addition to the translations of *lo1* from those five dialogues, three *lo1*-suffixed sentences from three constructed, minimal-pair dialogues were translated. Three of the four participants translated all eight *lo1*-suffixed sentences. Male-b did not translate the three minimal-pair sentences because he only participated in the original portion of the study, which included the five HKCanCor dialogues. In all, 29 tokens of *lo1*-suffixed sentences were translated.

An individual translation session was arranged for each participant, and none were
allowed to hear the translations of the others. The participants were given the following instructions to read:

Pretend you are the person who says the phrase that you are going to translate. Imagine that all of the people conversing are perfectly bilingual, just like you, and that they will therefore completely understand your English translation. With this in mind, mimic the speaker, including attitude, tone of voice, intonation, mood, etc. Imagine your English version of the phrase being inserted in place of the Cantonese phrase in such a way that the conversation would continue along exactly as it does on the audio.

A dialogue was first played in its entirety. Then only the target sentence was played.

Although this experiment was an attempt to tap into the participants’ subconscious linguistic intuition, there was no reason to assume that allowing them to consciously think about the task would be detrimental to the results. It was concluded that conscious consideration would in fact increase the likelihood of their succeeding at the task. They were essentially required to mimic, which is similar to acting. While conscious consideration of the sameness of the Cantonese and English utterances as a whole was encouraged, the participants were never asked to consider if /o1 had been translated accurately. There was no attempt to get them to consciously consider, or figure out, the English equivalent of /o1 itself.

The participants were allowed as much time as they needed. They were allowed to listen to the audio (in its entirety, partially, or both) as many times as it took for them to get it clear in their minds. They were allowed to redo any translation that they felt they could improve on.
The translations of the five sentences from the HKCanCor dialogues were recorded directly into an IBM Thinkpad T43 notebook computer using a Sony ECM-MS908C microphone that was handheld by the participants. The software used for capturing the data was Audacity 1.3 Beta (Unicode). The purpose of collecting additional translations of minimal-pair sentences was to obtain a more accurate description of the form of the \( lo1 \)-equivalent intonation. More sophisticated equipment was therefore used for this task: Apple Protools 5.2 software, set at 24 Bit and 48 KHZ; Protools Interface digidesign 888/24; and an AKG model SE300B microphone. Rather than allowing the participants to hold the microphone, a stand was used to eliminate the chance of friction noise and to maintain a constant distance between the microphone and each participant’s mouth.

4.4. Description of the pitch

The pitch of the translations was analyzed because it was predicted that \( lo1 \) would translate into English as a form of intonation. This section explains how the \( F_0 \) of the translations is displayed and how native English-speaker intuition of the pitch pattern was elicited.

Within each of the figures that show the \( F_0 \) contours of the translations, lines above and below a speaker’s median range are used to represent a one-octave range. The center line marked with its hertz value represents the speaker’s estimated median pitch, which was
calculated as the geometric mean of the speaker’s highest and lowest $F_0$ point from within all of his or her own translations. The scale of the figures is Hz (Logarithmic), meaning that the values are given in hertz but scaled logarithmically. A given distance on the Y-axis therefore corresponds to a pitch interval, which is a log difference rather than a linear distance. This method follows suggestions by Hirst (2012, p.c., for details see De Looze and Hirst, 2010).

In addition to looking at the graphic representations of the $F_0$ contours, native-English speakers’ intuitive interpretations of the audio data were elicited (the reasoning behind this was explained in section 2.1). The judgments from native-English speakers were elicited by playing all of the translations of the $lo1$-suffixed sentences in rapid succession, and asking them to listen for any form of intonation that repeats in most or all of the translations. They were then asked to draw this form of intonation inside a rectangle according to how they perceived it. The rectangle was wider than it was high, and was divided horizontally through the center with a dotted line, which the participants were told represented the middle of a speaker’s pitch range.

The meaning of this $lo1$-equivalent intonation was then explained to the English-speaking participants based on the definition of (6) plus two constructed contexts that were used to illustrate the use of $lo1$-equivalent intonation. They were then asked if they were familiar with this form of intonation and whether they felt that it had this meaning. Their next task was to create a 2-to-4 line dialogue using this form of intonation, and then to “act out” their dialogue by reading it aloud. This final task assessed their ability to construct a suitable context for the $lo1$-equivalent
intonation, and to see whether or not they would pronounce it accurately and naturally according to the author’s judgment.

The form of the *lo1*-equivalent intonation was taken to be any shape that repeated itself in most or all of the translations' F₀ graphs. Eliciting drawings of the pitch contour from the native English-speaking participants was an attempt to integrate the IPO method alongside the physical representations of the acoustic data —only informally, however, because none of the participants were phonologists and none were trained in the IPO method. This informal elicitation was a means of gathering supplementary evidence to support any claim that a particular form of intonation repeats itself in the translations, and that it is heard by native-English speakers to have a shape that corresponds to the portion of the F₀ contours in the data that is claimed to be equivalent to *lo1*.

It must be noted that no attempt is made in this paper to propose a detailed formal description of the phonetic and phonological properties of the *lo1*-equivalent pitch contour. A proposal for what its specific phonological representation may be is beyond the scope of this paper and is a topic left for future research.

5. The English Equivalent of *lo1*

This section discusses the pitch contours of the Cantonese-to-English translations. The
participants only translated the \textit{lo1}-suffixed sentences within each dialogue. Translations of all other sentences are the author’s.

5.1. \textit{Translations from HKCanCor}

Five \textit{lo1}-suffixed sentences were translated by the participants from five separate dialogues. The $F_0$ contours from two of the dialogues are shown below. In this first dialogue, the portion that was translated was speaker A’s second utterance, which was translated as “Yeah” with what will be referred to informally as a high-falling pitch contour. This is represented in the English translations (also informally) by a curved line that immediately precedes the syllable with which it is associated:

(7) A: Maths 考 A 至少要九十五分以上喎。
Maths \textit{haau2} A \textit{zi3 siu2 jiu3 gau2sap6 fan1 ji5soeng6 wo3}. test most few need ninety point above SFP
‘To get an A in Maths, you need at least ninety-five points.’

B: 你頂窿錯兩題咗, 只可以。
\textit{Lei5 ding2lung2 co3 loeng5 tai4 zaa3, zi2 ho2ji5}. 2s most wrong two CL(question) SFP only can
‘At the most, all you can get wrong is two questions.’
A. 係嘅。
   *Hai6 lo1.*
   be   LO
   ‘Yeah.’

Figures 1 to 4 show the F0s of the four participants’ translations:

- **Figure 1:**
  female-a’s translation of (7)
  “Yeah.”

- **Figure 2:**
  female-b’s translation of (7)
  “Yeah.”

- **Figure 3:**
  male-a’s translation of (7)
  “Yeah.”

- **Figure 4:**
  male-b’s translation of (7)
  “Yeah.”

The dialogue in (8) involves two people who were talking about some piece of equipment.

Speaker B said that if everything was ready, then she was going to “pull it.” Speaker A did not know what it was that speaker B wanted to pull, so he asked:

(8)   A: 你拉乜嘢呀?
   *Lei5 laai1 mat1je5 aa3?*
   2s  pull  what   SFP
   ‘What are you going to pull?’

B:  拉呢粒嘢囉。
   *Laai1 li1 lap1 je5 lo1.*
   pull  this  CL  thing LO
   ‘(Pull)\this thing.’
The target sentence shows the participants' English translations: “(Pull) this thing.”

In the translations from female-a, male-a, and male-b, the high-falling tone is associated with the word “this.” Female-a’s tone was particularly high, going well above the top of the one-octave range shown in the figure, and even rising above the figure’s top border. Female-b, in contrast to the other three participants, placed the high-falling tone on “thing” rather than on “this” (figure 6). She did something similar for another dialogue in which lo1-equivalent intonation was used with the word “hot pot.” She placed the high-falling tone on “pot” rather than on “hot,” which is where the other participants placed it.

In order to confirm that female-b’s English intonation was not fundamentally different from other native-English speakers, two dialogues were constructed to elicit her pronunciation of the

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11 The Praat script used for this study caused the F₀ contour associated with “thing” in figure 5 to disappear. When a linear F₀ scale is used, the F₀ of “thing” appears below 100 Hz.
utterances “pull this thing” and “hot pot” using both neutral and contrastive intonation. For both types of intonation, her nuclear stress was unambiguously placed on “this” and “hot,” respectively, which is what one would expect from a native-English speaker.

According to the author and to other native-English speakers consulted, the \textit{lo1}-equivalent tone sounds best when it is positioned where the nucleus would be in a neutrally-intoned version of the utterance, i.e., on “this” and “hot” for the two sentences just discussed.

There is not a contrastive meaning in dialogue (8), so technically a discourse-related pitch contour would not need to be positioned on “this.” Female-b’s \textit{lo1}-equivalent pitch contour was always placed on the final syllable, while the nuclei of her neutrally-intoned translations and the high tones of her contrastive translations were placed elsewhere. This indicates that her mind distinguishes the \textit{lo1}-equivalent tone, which has scope over the whole sentence, from contrastive intonation, which typically has scope over a grammatical element that is embedded within the sentence. A tentative prediction is that, in order to avoid ambiguity, no speakers would ever place discourse tones with sentential scope (e.g., the \textit{lo1}-equivalent tone) anywhere other than sentence finally or where the nucleus of a neutrally-intoned version of the sentence normally goes.

Two of the other three \textit{lo1}-suffixed sentences extracted from HKCanCor were also translated by all four participants using a high-falling tone. The remaining \textit{lo1}-suffixed sentence did not translate this way, and will be discussed in section 7.
5.2. Translations of minimal-pair sentences from constructed dialogues

As explained in section 4.3, minimal-pair sentences were translated in order to provide a more refined description of the \(lo1\)-equivalent tone. The three minimal-pair sentences, each of which comes from a pair of dialogues, are shown in (9), (10), and (11). Each of these sentences is suffixed with either the neutral SFP \(aa3\), or the SFP \(lo1\). Six or seven of the nine English translations of the \(aa3\)-suffixed sentences appear neutrally intoned; the remaining two or three appear to use forms of meaningful intonation, which will be discussed below. In contrast, the translations of the \(lo1\)-suffixed sentences consistently used a high-falling tone. The participant referred to as male-b did not translate for this follow-up portion of the study.

(9) 我飲咗酒呀/囉。
\textit{Ngo5 jam2-zo2 zu2 aa3/lo1.}
1s drink-PERF alcohol AA/LO
“I drank / \(\check{\text{drank}}\) (alcohol).”

(10) 我冇鎖匙呀/囉。
\textit{Ngo5 mou5 so2si4 aa3/lo1.}
1s NEG key AA/LO
“I don’t have a key / \(\check{\text{key}}\).”

(11) 係呀/囉。
\textit{Hai aa3/lo1.}
Be AA/LO
“Yeah / \(\check{\text{Yeah}}\).”
The F0 contours for the translations from each of the three participants for dialogue (9) show the following contrast between the aa3- and lo1-equivalent forms of intonation on the sentence “I drank (alcohol),” which was a response to the question “Why can’t you drive?”:

Figure 9:  
female-a’s translation of aa3

Figure 10:  
female-a’s translation of lo1

Figure 11:  
female-b’s translation of aa3

Figure 12:  
female-b’s translation of lo1

Figure 13:  
male-a’s translation of aa3

Figure 14:  
male-a’s translation of lo1

There are clear differences between the two translations in the minimal-pair from female-a (figures 9 and 10) and between the two translations in the minimal-pair from male-a (figures 13 and 14). The F0 contours of the translations of their aa3-suffixed sentences are virtually flat. In contrast the peaks of the high-falling tones in the translations of their lo1-suffixed sentences are significantly higher than the starting pitch levels of those utterances. The peak of the high-falling tone in female-b’s translation of lo1 (figure 12) did not rise as high in comparison, but she still produced what is clearly a high-falling contour. Interestingly, the translation of her aa3-suffixed sentence (figure 11) also has a high-falling contour. Perhaps the peaks on the nuclei of female-
b’s neutrally intoned intonational phrases rise to a higher degree than those of female-a’s and male-a’s. Another possibility is that, for whatever reason, female-b added emphatic intonation to her translation of the *aa3*-suffixed sentence. It is difficult to tell from listening to the audio whether emphatic or neutral intonation was used for this translation.

The next three pairs of F0 contours show the contrast between the *aa3*- and *lo1*-equivalent forms of intonation on the sentence “I don’t have a/the/my key(s),” which was a response to the question “Why can’t you open the door?”:

**Figure 15:**
female-a’s translation of *aa3*

**Figure 16:**
female-a’s translation of *lo1*

**Figure 17:**
female-b’s translation of *aa3*

**Figure 18:**
female-b’s translation of *lo1*

**Figure 19:**
male-a’s translation of *aa3*

**Figure 20:**
male-a’s translation of *lo1*

The translations of the *lo1*-suffixed sentences from all three participants clearly show a high-falling tone on “key(s)” (figures 16, 18, and 20). Female-a’s translation of *aa3* (figure 15) is obviously neutrally intoned. Female-b’s translation of *aa3* (figure 17) also appears to be neutrally intoned; the high tone that is associated with the nucleus of the intonational phrase on “have” has a high peak, but according to the author’s judgment, it does not sound to have either a contrastive
or emphatic meaning. Male-a’s translation of *aa3* (figure 19) has what the author judges to be a low rising tone, which sounds to be marking “I” for prominence in order to contrast it with a pragmatically understood “you” or “someone else.” The rise at the end of the intonational phrase appears to express that the speaker wants the listener to say something about it. The sentence seems to imply: “I don’t have the keys (I thought you/someone else had them).” This meaning does not come from the meaningless SFP *aa3*, but is instead a connotative meaning that male-b added to the sentence himself. In the elicitation of minimal pairs like these, it is difficult if not impossible to control for any potential interference of connotative meaning that is added to the discourse from the minds of participants. Interestingly, this does not seem to be a problem for the *lo1*-suffixed members of each pair. This is probably because the connotative meaning is made clear by *lo1*’s presence, resulting in a consistently translated form in English.

The final three pairs of F0 contours show the contrast on the word “Yeah,” which expressed affirmation with *aa3*-attachment in response to the question, “Are you Miss Chan?” and agreement with *lo1*-attachment in response to the statement, “Everything is really expensive these days”:

Figure 21: female-a’s translation of *aa3*

Figure 22: female-a’s translation of *lo1*

Figure 23: female-b’s translation of *aa3*

Figure 24: female-b’s translation of *lo1*
The translations of the *lo1*-suffixed sentences all have a high-falling contour. This contrasts with the translations of the *aa3*-suffixed sentences. Female-a’s translation of the *aa3*-suffixed sentence (figure 21) is once again virtually flat, and is therefore obviously neutrally intoned. Male-a’s translation of *aa3* (figure 25) rises at the end of the intonational phrase just as it did in his previous translation of *aa3* (figure 19). The translation shown in figure 25 was in answer to the question “Are you Miss Chan?” and the rise sounds as if it functions to pass the turn to the listener in order to elicit some related information, i.e., “Yeah (I’m Miss Chan. Why do you want to know).” Female-b’s translation of *aa3* (figure 23) rose higher on the nucleus of the intonational phrase than did female-a’ (figure 21), but still sounded neutrally intoned. Taking all three of female-b’s translations of *aa3* into account (figures 11, 17, and 23), she perhaps has a higher peak on the nuclei of all her neutrally intoned utterances in comparison to female-a and male-a.

The data from both the HKCanCor dialogues and minimal-pair dialogues indicate that *lo1* consistently translates as a high-falling tone. It is obvious, however, that the pitch contour does not have an unvarying shape. This is to be expected because the shape of a tone—whether a lexical tone or a tonal morpheme—will vary from one occurrence to the next, and its various shapes can be analyzed as allotones.
Some of the translations of the $lo1$-suffixed sentences clearly show a rise before the fall, but it is the fall that sounds prominent to native-English speakers. It is therefore concluded that when there is a rise, its sole function is to enable the fall. Many of the translations do not rise from a low tone, and those that do rise don’t sound like they include a low tone that is marking prominence. This is why the tone is consistently referred to as high-falling, and never as a rise fall.

The method for eliciting native-speaker judgments was described in section 4.4. After hearing all of the translations of the $lo1$-suffixed sentences played in rapid succession, 8 of the 10 native-English speakers drew a shape similar to what the $F_0$ contour in figure 7 would look like if it were a smooth contour. All of the native-English participants said they recognized this form of intonation and all agreed that it had the meaning of (6) or something similar. Only seven of the ten succeeded at creating a dialogue using the $lo1$-equivalent tone, but this is perhaps because the other three had trouble thinking of an appropriate context, rather than because they didn’t recognize the tone.

For the present study, it is assumed that $lo1$-equivalent intonation has the same form as emphatic and contrastive intonation. Hirst (1983) argued that emphatic and contrastive intonation are two lexical entries that have the same form with different meanings. He explained that this is no more problematic than for other homophonous morphemes. Adding $lo1$-equivalent intonation as a third homophonous morpheme is also unproblematic; which of the three meanings is expressed will be determined by the context. If emphatic and $lo1$-equivalent intonation are
same form, and if female-b was using emphatic intonation in figure 11, then the difference 

between the two forms of intonation on the sentences in figures 11 and 12 would be one of 
degree rather than of kind.

It is worth noting that defining intonation strictly in terms of pitch, as has been done here, 
may prevent us from distinguishing two different forms of intonation. Lo1-equivalent intonation 
may systematically differ from emphatic and contrastive intonation in some way other than pitch, 
but this is left for future research to determine.

5.3. The grammatical status of the lo1-equivalent tone

This study argues that the form of intonation discovered here is a morpheme in the same 
sense that the SFP lo1 is a morpheme. This is comparable to Hirst’s (1983) argument that 
emphatic and contrastive intonation are tonal morphemes in the form of floating tones. Yip 
(2002:273) said a floating tone is a segment-less particle consisting only of tone. She gave the 
rising tone of Cantonese echo questions as an example of a floating-tone particle, and Tang 
(2006) further argued that that same rising tone belongs to the class of Cantonese SFPs. Leung 
(1992/2005) additionally concluded that there are six SFPs consisting solely of a tone, and there 
is theoretically no reason to assume that Cantonese can have discourse related floating tones but 
that English cannot.
Liberman (1979:97) discussed one particular pitch contour in English and concluded that it was "a sort of intonational word, a unit of meaning" (emphasis his). He went on to say:

Like any such argument, ours is essentially an appeal to intuition. It is well known that the meaning of a more conventional sort of word, e.g., "game," is difficult to state with theoretical precision, yet everyone will agree that there is a word "game," and that it does mean something. This agreement is based on our ability to recognize this word as an element of any utterance in which it may occur, as an abstract feature which is common to these otherwise quite different utterances, and which contributes something towards their final interpretation.

All we require... is that the reader be convinced that there exists an intonational unit, a "tune," an abstract feature which is common to the otherwise rather different examples we have cited, and which contributes something to their communicative value.

Likewise two arguments are put forth here which are each an appeal to intuition: first is that lo1 has the meaning proposed for it in the NSM definition of (6); and second is that the English floating tone discovered in the native bilinguals’ translations also has that meaning, and can therefore be defined as follows:

\[
(12) \quad \text{"P } \searrow \text{" = you can know this (P) because you know something else (D)}
\]

Liberman’s (1979) idea of comparing a segmental word with a tone is used here to argue that the tone defined in (12) is an intonation morpheme—more specifically, a discourse particle in
the form of a floating tone à la Hirst (1983). Linguists all agree that \textit{lo1} is a discourse particle, and since its English equivalent appears to have a very similar (if not exactly the same) meaning and function, then it is reasonable to suggest that “\textit{\textbackslash{\textquotedbl}{\textbackslash{}}}” is a morpheme of the same grammatical category as \textit{lo1}. As to its form, the pitch pattern of “\textit{\textbackslash{\textbackslash{}}}” is for the time being analyzed merely as the surface form of the interaction between this floating tonal morpheme and other accentual and boundary tones.

6. Testing the NSM definition

One way of testing the NSM definition in (6) and (12) is to see whether it can accurately describe the uses of \textit{lo1} and its English equivalent in a variety of contexts where they are used. This section does this by identifying the discourse variable D for some of the dialogues in sections 3 and 5, and explaining how knowing D leads to knowing P in the mind of the speaker. For each example of \textit{lo1} that will be discussed, it is assumed that, to the extent that the context and dialogue are translated fully and accurately into English, then D and P are the same in both English and Cantonese, and the \textit{lo1}-equivalent floating tone has the same meaning and performs the same function as does \textit{lo1}.

Example (1) from Yip and Matthews (2001) demonstrated using \textit{lo1} to give a suggestion or give advice, which was one of the properties of \textit{lo1} that Luke (1990) discussed. In this example,
the D and P are both contained in a single conditional sentence “If D, then P”:

(1’) 你做得唔開心咪搵第二分工囉。

Lei5 zou6 dak1 m4-hoi1-sam1 mai6 wan2 dai6-ji6 fan6 gung1 lo1.

you do Adv-M NEG-happy MAI find second CL job LO
‘If you’re not happy in your work, then find another job.’

Applying the lo1-equivalent floating tone to “job” sounds very natural and is perfectly suitable to the context, and it provides the meaning of (12), just as suffixing lo1 onto the Cantonese sentence provides the meaning of (6). To show how the definition describes the meaning of lo1 and its English equivalent in this context, the antecedents of THIS and SOMETHING ELSE (i.e., P and D) are shown in parentheses in italics:

you can know this (P: to find another job) because you know something else (D: you’re not happy in your work).

Dialogue (4) was an example of what Luke (1990) referred to as the confirmation of an expectation. The speaker said that he or she believed there was a reason that the listener separated from his girlfriend in addition to the reason already given. The listener confirmed this expectation of the speaker’s by stating another reason. The speaker then responded by saying,

Hai6 lo1 (be-LO) “Yeah,” which indicated that his expectation had just been confirmed.
The floating tone, like lo1, is assumed to attach to the proposition, but it must be phonologically realized across the only overt word of the utterance: “Yeah.” It is proposed that in this dialogue we can construe lo1 and “” as being attached to a phonologically null proposition, the meaning of which is pragmatically understood from the speaker having earlier said: “I believe that [i.e., her knowing you had been a cook] is not all it is.” This proposition is the P of the definition in (6) and (12), and is shown in (4’) as an ellipsis [P]. The speaker’s thought process in relation to the listener can be stated in this way: “in addition to your girlfriend knowing that you used to be a cook, you know that there is some other reason (D) that she left you.” When the listener stated an additional reason (i.e., that his ex-girlfriend said he was not caring), this provided the speaker with an overt expression of D, and at the same time demonstrated to the speaker that the listener knew D. By saying Hai6 lo1, the speaker was saying:

you can know this (P: that knowing you’d been a cook wasn’t the only reason she left you)
because you know something else (D: she said you’re not caring)

As was the case in (4), one of the speakers in dialogue (7) said Hai6 lo1 “Yeah.” Unlike in (4), however, the use of Hai6 lo1 in (7) expresses agreement with what the listener just said.
This is the meaning that Lee and Law (2001) attributed to *Hai6 lo1*, which they called a “formulaic expression.” In this case we can construe *lo1* and ““ as being attached to a null proposition that equals the immediately-preceding utterance of the listener’s. This proposition is again shown as an ellipsis [P]:

(7’) A: 係[P]囉。

*Hai6 [P] lo1.*

be LO

‘“Yeah, [P].’

P is semantically the same as the listener’s immediately-preceding utterance, and D is the speaker’s utterance prior to that. What the speaker conveys with *Hai6 lo1* in (7) is that the listener’s utterance is a fact P, which belongs to a set of facts that the listener can know as a result of knowing D (i.e., the speaker’s earlier utterance).

you can know this (P: *at the most, all you can get wrong is two questions*)

because you know something else (D: *that to get an A in Maths, you need at least ninety-five points*).

Dialogue (4) came from Luke (1990:131), who said that the speaker’s use of *Hai-lo1* in that example expressed that the listener had just said something which confirmed an expectation of the speaker’s. The author agrees with that analysis for example (4), but Lee and Law’s (2001)
description of *Hai6 lo1* as an expression of agreement explains (7) better than Luke’s (1990) description of it as the confirmation of an expectation. This is because the immediately-preceding utterance from the listener in (7) did not confirm an expectation of the speaker’s. At the same time Lee and Law’s (2001) description of *Hai6 lo1* as an expression of agreement with something the listener has just said does not explain the use of *Hai6 lo1* in (4), because the speaker was not merely agreeing with something that the listener just said.

Furthermore, neither Luke’s (1990) nor Lee and Law’s (2001) explanation can account for why *Hai6 lo1* can be used as a reply to a question. Consider a scenario in which two co-workers arrive 10 minutes late to a room where a company meeting has been scheduled to take place, and, to their surprise, the room is empty. If speaker A asks, *Dim2gaai2 mou5 jan4 ge2? (why NEG person PRT)* “Why’s nobody here?” then it would be acceptable for speaker B to respond by saying *Hai6 lo1* “Yeah,” especially if speaker B follows it up with a repeat of speaker A’s question.

A description of *Hai6 lo1* “Yeah” that works in all three of these contexts is one that construes it as having an ellipse that includes a covert P: *Hai6[P] lo1* “Yeah [P].” When it is used for agreement, P is what the listener just said. When it expresses the confirmation of an expectation, then P is most likely a pragmatically understood proposition based on something that was said previously by the speaker herself or himself. When it is used in response to a question, P is something like “that’s a good question,” and in the scenario above, D would be: “a meeting
was scheduled to take place in this room; our co-workers should be in this room now.”

For the dialogue in (8), we need to speculate as to what D is, because it was not evident from the audio recording. It seems likely that D is one of two things in the speaker’s mind: 1) it is something that she assumed was commonly known information regarding the particular piece of machinery they were talking about; or 2) it is pragmatic information, perhaps in the form of having previously pulled (or pointed to) that “thing” in the presence of the listener. Assuming the former, then *lo1* and its English equivalent express the following in this context:

you can know this (P: *[I will pull] this thing*)
    because you know something else (D: *this is the thing that people pull on this machine*)

Applying the NSM definition to all of the other dialogues cited in this paper is straightforward and the result is the same in each case; it appears to accurately express the intuitively understood meaning of *lo1* and its English equivalent. The evidence discussed thus far indicates that *lo1* translates consistently into English as a high-falling contour, and that both function to express the meaning of (6) and (12). There was one dialogue from the data, however, that indicates there is another meaning of *lo1*—one which is not equivalent to this same floating tone in English. The following section discusses this and explains why it is not a problem for the conclusions of this study.
7. \textit{lo1} is polysemous

Many Cantonese linguists have said that \textit{lo1} is polysemous (e.g., Leung, 1992/2005; Fung, 2000; Tang, p.c., 2010), and the author therefore assumes this to be the case. Adopting Leung’s notation, the \textit{lo1} of this study will be referred to in this section as \textit{lo1}_1, and the other meaning of \textit{lo1} as \textit{lo1}_2. There was one dialogue used in the present study that appears to contain an example of \textit{lo1}_2, spoken by speaker B in the last line of (13):

\begin{quote}
\text{(13) A: 我問佢攞廿張，唔知佢攞唔攞到？}
\text{Ngo5 man6 keoi5 lo2 jaa6 zoeng1, m4-zl1 keoi5 lo2 m4-lo2 dou2?}
\text{1s ask 3s get twenty CL(ticket) NEG-know 3s get NEG-get achieve 'I asked him to get me 20 tickets. I wonder if he can.'}
\end{quote}

\begin{quote}
\text{B: 攏咁多做咩呀？}
\text{Lo2 gam3 do1 zou6 me1 aa3?}
\text{get so many do what PRT 'What do you want so many for?'}
\end{quote}

\begin{quote}
\text{A: 周圍俾人囉。}
\text{Zau1-wai4 bei2 jan4 lo1.}
\text{everywhere give people LO 'To give around to people.'}
\end{quote}
B: 你方便嘅，咪俾兩張我囉。

Lei5 fong1-bin6 mai6 bei2 loeng5 zoeng1 ngo5 lo1.
You convenient MAI give two CL(ticket) 1s LO
‘If it’s okay, then give me two.’

The utterance by speaker A in line three of (13) is a typical use of \textit{lo1}, and \textit{lo1}-equivalent intonation sounds natural if used on the second syllable of “around.” The final utterance by speaker B, however, used what appears to be an example of \textit{lo1}_2. Consultations with native-Cantonese speakers indicated that some speakers consider this use of \textit{lo1}_2 to be natural, but that others do not. Only one of the bilingual participants (male-a) translated it as the form of intonation that sounds like the floating tone used in the translations of the other dialogues. Since \textit{lo1} has two meanings, it is possible to interpret its use by speaker B as either \textit{lo1}_1 or as \textit{lo1}_2. If it is interpreted as \textit{lo1}_1, then listeners will interpret speaker B to be saying:

\begin{quote}
\textit{you can know this (P: to give me two tickets) because you know something else (D: it’s okay for you to do so)}
\end{quote}

This could be considered presumptuous to the point of being unnatural, which may be why some Cantonese speakers think speaker B’s utterance sounds odd. On the other hand, if B is interpreted as using \textit{lo1}_2, then the utterance is natural. The attitude applied by Leung (1992/2005:72) to a speaker using \textit{lo1}_2 is one of passivity and low mannered-ness, and, along
those lines, some native-Cantonese speakers that the author consulted said that speaker B’s use of \( \textit{lo1} \) in (13) indicates hesitancy. This meaning seems natural for the context of (13). Whether or not speaker B’s use of \( \textit{lo1} \) in (13) sounds natural to listeners may depend on if (or how readily) the meaning of \( \textit{lo1} \) is available to them.

It is beyond the scope of this paper to attempt to define \( \textit{lo1} \), but whatever the meaning of \( \textit{lo1} \), its definition is different from \( \textit{lo1} \), and it would therefore either not have an English-equivalent form, or it would translate into English using a form that is different from \( \textit{lo1} \)-equivalent intonation (it seems unlikely that polysemy would evolve in both languages in the same way). The existence of \( \textit{lo1} \) therefore poses little problem for the conclusions of this paper, which only relates to \( \textit{lo1} \).

8. **Summary and conclusions**

This study tested whether English has an equivalent of the Cantonese SFP \( \textit{lo1} \). Based on the results of the native-bilingual participants’ translations, and on subsequent consultations with native-English speakers about these translations, it was concluded that English has a semantic and functional equivalent of \( \textit{lo1} \) in the form of a high-falling pitch contour. Although this \( \textit{lo1} \)-equivalent tone was discovered by translating \( \textit{lo1} \) from Cantonese, it is part of the English grammar and can therefore be studied and discussed independently of \( \textit{lo1} \). It is tentatively
assumed to have the same form as emphatic and contrastive intonation.

The findings here support the literature’s claim that the types of meanings that are expressed by SFPs are at least partially expressed in English by intonation. This study uniquely provided empirical evidence which indicates that the meaning of a specific SFP is expressed in English, and is done so solely by a specific form of intonation. The implication is that SFP-rich languages such as Cantonese can be exploited to discover some of the forms of connotative meanings in other languages.

It was hypothesized that the pitch contour discovered in this study is a discourse particle in the form of a floating tone, which, like all morphemes, has a consistent form and meaning independent of the discourse context. Ladd (1978:142-144) reviewed the debate in the literature about whether intonation has context-free meaning and concluded that linguists had not considered the possibility that intonational meaning is no different from segmental meaning. He explained that the difficulty in giving context-free definitions to intonational forms can be compared to the difficulty in doing the same for Japanese sentence particles, which is an excellent and insightful comparison that is highly relevant to the present study.

Ladd (1978:142-143) said many linguists find it difficult to accept the idea that intonation may have meanings independent of discourse contexts, adding that this “unfavorable reaction… must be seen as part of the larger debate over how to account for context-dependence in general.” The NSM definition of this study was an attempt to account for the meaning of a
discourse particle whose interpretation relies on reference to an antecedent in the discourse. The native English-speaker judgments provided evidence that the context-free definition of \( lo1 \) also applies to its English intonational equivalent, supporting Ladd’s argument that intonational meaning can indeed be treated like segmental meaning.

More recently, in the introduction to Ladd’s (2008:5) volume on intonation, he said that if the comparison between segmental particles and intonation that linguists have long talked about is valid, then “it is clearly important not to define intonation solely in terms of phonetic suprasegmentals.” He nevertheless chose not to include segmental particles in any of his discussion that followed, apparently awaiting further evidence to support the link between intonation and discourse particles.

The recognition of the \( lo1 \)-equivalent form of intonation by the native English-speaking participants is compelling evidence that it exists in the grammar of English, and that it is a close if not an exact counterpart to \( lo1 \). This can be seen as a strong step towards validating the connection between particles and intonation that Ladd (2008) referred to, providing justification for his argument that intonation should be reanalyzed in a fundamental way. However, instead of modifying the meaning of the term “intonation” to include segmental forms such as SFPs, it perhaps makes more sense to analyze intonation as consisting of suprasegmental morphemes, i.e., as floating tones à la Hirst (1983). If we followed Ladd’s (2008) suggestion to refer to segmental particles as intonation, it would require us to redefine the term “intonation,” and it
would say nothing about the morphemic status of suprasegmental intonation. Alternatively, if we were to redefine discourse intonation in terms of floating tones, “intonation” would remain suprasegmental, it would not affect the definition of “floating tone,” and it would entail the idea that intonation is morphemic.

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