Syntax-prosody Mapping of Right Dislocation: A Comparative Study of Cantonese and Mandarin

Ka-Fai Yip
Yale University

ABSTRACT. This paper argues for the one-to-one syntax-prosody mapping of CP and C^0 with novel evidence from right dislocation (RD) in Cantonese and Mandarin. Based on acoustic experimental results, it is shown that RDs have exactly one intonational phrase (*ι*-phrase), which is compatible with the well-received monoclausal analysis for Chinese RDs. Hence, one CP is mapped onto one *ι*-phrase. Afterthoughts with "copied" intonations in Cantonese also support the proposal by mapping two CPs onto two *ι*-phrases. Together with the assumption that one C^0 can only be realized as one intonation, variations in Cantonese and Mandarin in terms of boundary tones, "copied" intonations and the sentence-particle requirement of RDs are predicted to be correlated.

Keywords: syntax-prosody mapping, right dislocation, intonational phrases, boundary tones, afterthoughts

1. Introduction

Right dislocation (RD) is a construction giving an inverted word order as illustrated by (1) in Cantonese, a rigid SVO language.[1] The non-constituent *keoi zau-zo* "he has left" seems to be dislocated to the right of the sentence, leading to a non-canonical sentence-medial position for the sentence particle (SP) *laa3*. For expository purposes, SPs with the elements before are called *main chunk* and the elements after SPs are called *RD chunk*.

(1) main chunk / RD chunk

兩個鐘頭喇 | 佢走咗

Loeng go zungtau ***laa3*** *keoi zau-zo* (adapted from Cheung 1997:24)[2,3]

two CL hour SP 3SG leave-PFV "He has left for two hours."

Since SPs are always at sentence-final positions except in RDs, one might wonder whether the main chunk forms a separate sentence. Whether an RD consists of one sentence or two sentences in syntax invoked abundant literature. While the monoclausal analysis is strongly supported by various syntactic properties of RDs (Cheung 2009, T. Lee 2017, Lai 2019; for biclausal ones see Shi 1992, Tang 2018), little attention is paid on *prosodic* properties – does an RD consist of one intonational phrase (*ι*-phrase) or two? A novel observation is that Cantonese intonations cannot be realized on either the end of main chunks or RD chunks solely, but must be "copied" at both ends, exemplified by the rising intonation *H%* (with a ↗ pitch contour) which forms a yes-no question in (2).

(2) 兩個鐘頭↗ 佢走咗↗？

Loeng go zungtau H%(↗) *keoi zau-zo* H%(↗)?

two CL hour H% 3SG leave-PFV H% "Has he left for two hours?"

Cantonese intonations are boundary tones and can only occur at the right boundaries of *ι*-phrases (Wong 2005, B. Xu & Mok 2011). The "copied" intonations in (2) suggest that an RD has two *ι*-phrases but syntactically an RD consists of one complementizer phrase (CP) only. An apparent syntax-prosody mismatch thus arises.

The main goal of this paper is to resolve the problem of syntax-prosody mismatch in RDs. I argue that such mismatch does *not* exist but is the illusion of syntax-prosody interaction on boundary tones. Following Feng (2015, 2017), two kinds of mapping in the clausal domain

---

[1] This paper focuses on the canonical "gapped" RDs. For the "gapless" RDs in (i), dubbed as "dislocation copying" (DC), see Cheung (2015) and Lai (2019).

i. 佢會去音樂會㗎佢會

Keoi wui heoi jamngokwui gaa3 keoi wui. (adapted from Cheung 2015:227)

3SG will go concert SP 3SG will "He will go to the concert."

[2] Unless specified, all the examples are illustrated in Cantonese.

[3] Abbreviations: 1, 2, 3 for first, second, third person; C for complementizer; CL for classifier; NEG for negation; PERF for perfect aspect marker; PFV for perfective aspect marker; SG for singular; SP for sentence particle.

are proposed: (i) one CP is mapped to one *ɪ*-phrase; (ii) one C head (C^0) is mapped to one intonation given the absence of SPs. (i) receives support from an acoustic experiment on Cantonese RDs, which shows that RDs like (1) have one *ɪ*-phrase. (i) and (ii) together prevent Cantonese intonations from occurring in RDs: as boundary tones, they cannot occur at the middle of *ɪ*-phrases (i.e. the end of main chunks); as C^0, they share the same syntactic restrictions with SPs and cannot occur at the sentence-final positions of RDs (i.e. the end of RD chunks). The RD with "copied" intonations in (2) is not a canonical monoclausal RD but indeed involves a biclausal structure which might be categorized as "afterthoughts", a term adopted from Li & Wei (2017). Not only does the prosody match with syntax but it also provides hints to syntactic analysis. Besides, the proposal also predicts a correlation of intonational variation and SPs in RDs. In a language where intonations are boundary tones as Cantonese, SPs are obligatory in RDs; while in a language where intonations are not necessarily boundary tones as Mandarin, SPs may be absent in RDs.

Section 2 provides necessary backgrounds on RDs and points out the apparent syntax-prosody mismatch. Section 3 describes the prosodic properties of Cantonese RDs based on an acoustic experiment. Section 4 is the proposal of mapping CP and C^0 to prosody with explanations on why Cantonese intonations cannot occur in RDs and the nature of afterthoughts, resolving the problem of mismatch. The SP requirement of Cantonese RDs is also predicted under the proposal. Section 5 turns to Mandarin, where the intonational system differs from Cantonese in terms of boundary tones. Supported by another experiment, it is shown that variation in intonations is correlated to both variations in "copied" intonations and the SP requirement. Section 6 concludes the paper.

2. Apparent syntax-prosody mismatch in RDs

2.1 The syntax of RDs

There are at least two possible ways to analyze RDs in Cantonese and Mandarin: the *monoclausal* analysis with movement (3) (Cheung 2009, T. Lee 2017, Lai 2019) or the *biclausal* analysis with deletion in (4) (Shi 1992, Tang 2018).

(3) *Monoclausal* analysis of RDs

[$_{FocP}$ for two hours [$_{CP}$ **laa3**, [$_{TP}$ he left *t*]]] (focus movement)

(4) *Biclausal* analysis of RDs

[[$_{CP1}$ ~~he left~~ for two hours **laa3**], [$_{CP2}$ he left ~~for two hours **laa3**~~]] (deletion)

A monoclausal analysis like (3) is better in accounting for the syntactic properties of RDs. First, RDs have a different focus interpretation from non-RDs. The main chunk contains focus, while the RD chunk does not (=(5)), motivating the focus movement of main chunks. (5)b will be felicitous when answering "What did he buy?" which forces an object focus. This is not predicted by the biclausal analysis.

(5) Question: Who bought a computer? (Cheung 2009:203-204)

Answer: a. 佢會買一部電腦囉

Keoi wui maai jat bou dinnou lo1. (non-RD)

3SG will buy one CL computer SP "He will buy a computer."

b. #會買一部電腦囉佢

#Wui maai jat bou dinnou lo1 keoi. (RD)

will buy one CL computer SP 3SG

The second (and the strongest) argument comes from connectivity effects, taken from Cheung (2009:212-214). For example, *zinghai* "only" requires the associated items to be in its c-commanding scope. In the RD (6), "the novel", though precedes *zinghai*, can be associated with it. That means "the novel" in the main chunk was c-commanded by *zinghai* in the RD chunk, which is possible only in the monoclausal analysis but not the biclausal one. Note that (6) cannot be explained by a null object *pro* or ellipsis in the RD chunk. (7) shows that *zinghai* cannot be associated with a silent focus element.

(6) [嗰本小說]$_F$啊張三淨係借咗

[*go-bun-siusyut*]$_F$ *aa3 Zoengsaam **zinghai** ze-zo.*

that-CL-novel SP Zoengsaam only borrow-PFV

"Zoengsaam only borrowed THE NOVEL (and nothing else)."

(7) [[嗰本小說]$_F$好好睇啊。] *[張三淨係借咗 [$_{DP}$_]$_F$ 啊。]

[[*go-bun-siusyut*]$_F$ *hou hou-tai aa3*.] *[*Zoengsaam**zinghai** ze-zo* [$_{DP}$_]$_F$ *aa3*.]

that-CL-novel veryinteresting SP Zoengsaam only borrow-PFV SP

Int.:"The novel is very interesting. Zoengsaam only borrowed THE NOVEL."

Finally, SPs can only stay at the sentence-medial position and cannot be copied (=(8)). (b) can be explained straightforwardly by the monoclausal analysis in which there is only one CP and thus one C, assuming that SPs are C^0s. With a head-initial analysis for C^0, (a) can also be ruled out.[4] The biclausal analysis, however, overgenerates (8).

(8) a. *兩個鐘頭 佢走咗**喇**

Loeng go zungtau keoi zau-zo **laa3.*

b. *兩個鐘頭**喇**佢走咗**喇**

Loeng go zungtau **laa3 keoi zau-zo **laa3**.*

2.2 The prosody of RDs

Most studies on RDs deal with their syntax and little of them examine the prosodic properties (Li & Wei 2017 being an exception, see §4.2.2). Some of them points that there is *usually* no pause before the RD chunk (Lu 1980, Liang 2002). While this seems to support

[4] This implies that the sentence-final positions for SPs in non-RDs are derived through moving the TP to a higher specifier (Spec,CP or Spec,FocP), as argued in Cheung (2008) and Lin (2008).

the main chunk and RD chunk belonging to a same prosodic domain (*ι*-phrase), intonations cannot be realized at the RD-final position solely, but must be copied at both ends of two chunks, as (9)-(10). Cantonese intonations are boundary tones which can only occur at the right boundaries of *ι*-phrases, suggesting that the two chunks form two separate *ι*-phrases (Wong 2005, B. Xu & Mok 2011). Confusingly, intonations also cannot solely occur at the main chunk as in (11). It should be possible if the main chunk is a single *ι*-phrase.

(9) 兩個鐘頭↗佢走咗↗？
Loeng go zungtau H% *keoi zau-zo* H%? (reproduced from (2))
(10) *兩個鐘頭佢走咗↗？
**Loeng go zungtau keoi zau-zo* H%?
(11) *兩個鐘頭↗佢走咗？
**Loeng go zungtau* H% *keoi zau-zo*?

(9) constitutes a syntax-prosody mismatch. RDs are analyzed as monoclausal but in (9) there seems to be two *ι*-phrases. Nevertheless, we should not conclude the prosodic properties of RDs merely based on the intonation's distribution. There are other diagnostics for *ι*-phrases, such as pauses and pitch resetting, which require an acoustic experiment. Do RDs with SPs have one *ι*-phrases, or two? Does (9) really have two *ι*-phrases? How are intonations realized in (9) *precisely*? Is it the most natural and only way to realize intonations in RDs? An experiment is conducted to answer all these.

3. An acoustic experiment on Cantonese RDs

3.1 Method

To test (i) whether an RD is one *ι*-phrase and (ii) how intonations are realized in RDs, a trichotomy (=(12)) and two cross-cutting dichotomies (=(13)) were involved and gave seven sentence types. For (12), non-RDs with one and two sentence(s) and RDs were measured. Presumably, if an RD has one *ι*-phrase, its pitch contour should pattern with non-RDs with one sentence; but if it has two *ι*-phrases, its pitch contour should pattern with non-RDs with two sentences. For (13), the question intonation *H%* in non-RDs was compared to that in RDs, with interrogative SP *maa3* as a control group. Apart from the intonation itself, the number of *ι*-phrases for RDs with *H%* (=[7]) was also measured.

(12) The trichotomy (declarative)

Non-RD	*One sentence*	[1] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$.
Non-RD	*Two sentences*	[2] S-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$. **S**$_{\sigma\sigma}$-Adv-V-O-SP.
	RD	[3] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$-**S**$_{\sigma\sigma}$.

(13) The two dichotomies (interrogative)

	With SP maa3	*With intonation* H%
Non-RD	[4] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$?	[6] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$?
RD	[5] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$-**S**$_{\sigma\sigma}$?	[7] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**S**$_{\sigma\sigma}$?

Except the monosyllabic SPs, subjects (S), verbs (V) and objects (O) consist of two syllables (represented by "σσ") respectively. All the syllables are in T3, a mid-level tone (33). Three lexical sets were provided for each sentence type (see Appendix). Six native Cantonese speakers (three males, three females) participated in this experiment. They were undergraduate students with no speech or hearing problems, aged between 19 and 22. All subjects were recorded in a soundproof room at The Chinese University of Hong Kong using a Zoom H2n Handy Recorder with a sampling rate of 44,100 Hz. The informants needed to read each lexical set for three times, giving in total 7 sentence types x 3 lexical sets x 3 repetition x 6 informants = 378 trials. To maintain the naturalness of the recorded sentences, relevant contexts were provided for each sentence. Sentences were also randomized with fillers (stimulus-filler ratio ≈ 1:1.7).

Acoustic measurements were carried out by using Praat with manual labeling. The duration of each syllable was automatically divided into ten equidistant points at which the F0 values were tracked by a Praat script *ProsodyPro* (Y. Xu 2013). Time-normalized F0 contours with average across speakers were then obtained.

3.2 Results

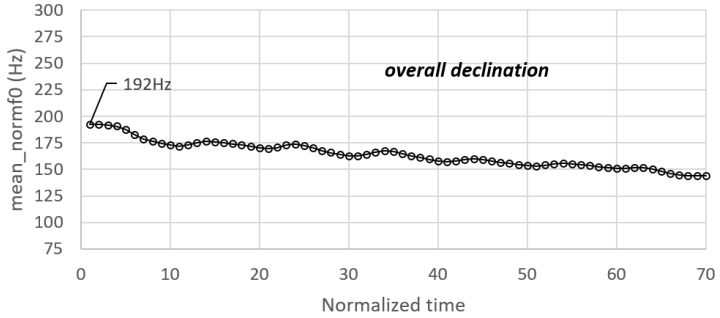
The mean pitch contours of every syllables of [1]-[7] are displayed in (14)-(19) (on next page).

3.2.1 An RD is one intonational phrase

From (14)-(15), non-RDs [1] and [2] contrast largely in prosodic properties. For [1], there is overall declination in its pitch contour. For [2], there is a clear *ɪ*-phrase boundary between the SP (=5th syllable) and the subjects of another sentence (=6th&7th syllables), indicated by a robust pitch reset (from 147 Hz to 176 Hz, 29-Hz difference) and an obvious pause (mean duration: 390 milliseconds). It is clear that [1] forms one prosodic domain while [2] forms two prosodic domains, i.e. two *ɪ*-phrases.

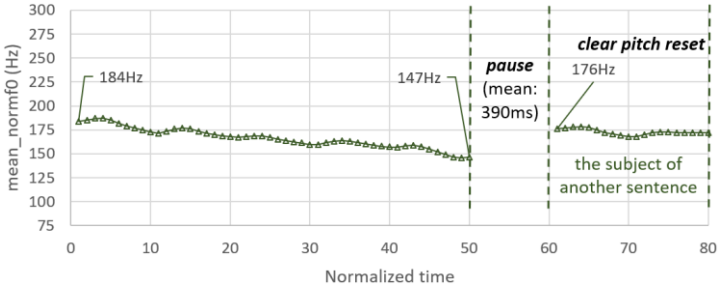
As shown in (16), the RD (=[3]) pitch contour is on a par with [1], but not [2]. There is no pause nor clear pitch reset (156 Hz to 162 Hz, 6-Hz difference), whereas there is overall declination just as [1]. These prosodic properties constitute a strong evidence on the non-existence of *ɪ*-phrase boundaries between the main chunk and the RD chunk, which follows that RD has only one *ɪ*-phrase.

(14) Non-RD with one declarative sentence [1]



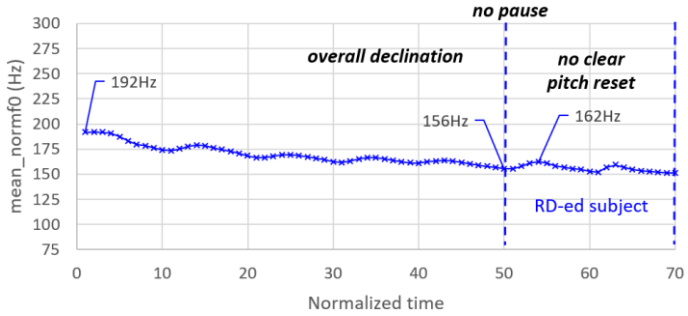
[1]

(15) Non-RD with two declarative sentences [2]



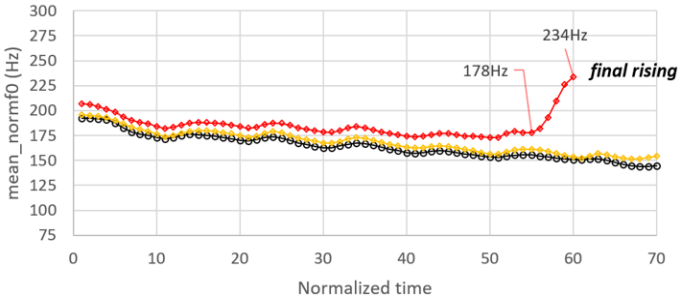
[2]

(16) RD (with declarative SPs) [3]



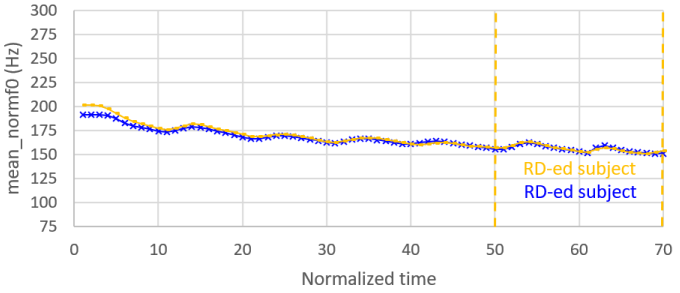
[3]

(17) Non-RD: interrogative SP *maa3* [4] vs. question intonation *H%* [6] vs. declarative SPs [1]



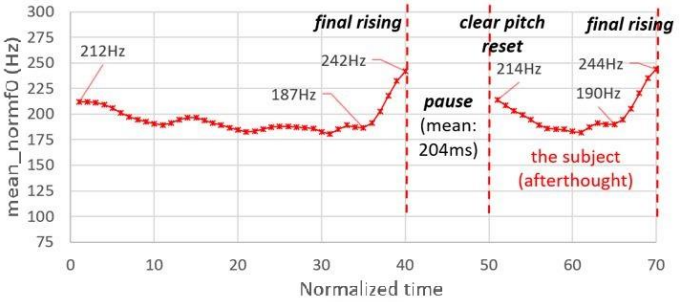
[1]
[4]
[6]

(18) RD: question SP *maa3* [5] vs. declarative SPs [3]



[3]
[5]

(19) RD: question intonation *H%* [7]



[7]

As shown in (16), the RD (=[3]) pitch contour is on a par with [1], but not [2]. There is no pause nor clear pitch reset (156 Hz to 162 Hz, 6-Hz difference), whereas there is overall declination just as [1]. These prosodic properties constitute a strong evidence on the non-existence of *ι*-phrase boundaries between the main chunk and the RD chunk, which follows that RD has only one *ι*-phrase.

3.2.2 "Copied" intonations in RDs

(17) compares interrogative non-RDs having the question SP *maa3* [4] and intonation *H%* [6] with declarative non-RDs [1]. The pitch contour of [4] is similar to [1], indicating that there is no prosodic difference between sentences with interrogative and declarative SPs. [6] has a different pitch contour. *H%* is realized by a dramatic pitch rising from the 5th point (178Hz) to the 10th point (234Hz) of the last syllable, leaving other parts of the pitch contour unchanged. This signals the nature of *H%* as a (right) boundary tone (i.e. realized at the right boundary of an *ι*-phrase).

(19), however, reveals a different pattern for *H%*. *H%* realizes twice in RDs (=[7]), at both the last syllables of the main chunk (=4th syllable) and the RD chunk (=6th syllable). *H%* seems to be "copied" in RDs. Remarkably, there are a robust pitch reset for the RD chunk (214Hz, higher than the beginning of the main chunk = 212Hz) and a pause before it (mean duration: 204 milliseconds), which suggests an existence of a prosodic boundary between the main chunk and the RD chunk. Taking the right-boundary property of *H%* into account, it can be concluded that the main chunk and the RD chunk form two separate *ι*-phrases. This conflicts with the results for [1]-[3]. Note that (18), as a control group, shows that interrogative RDs with *maa3* (=[5]) have no prosodic difference with RDs carrying declarative SPs, so as their non-RD counterparts. That means one cannot attribute the conflicting results to the clause types (declarative vs. interrogative).

It might be informative to include the response of informants here. All the informants thought that [7] was unnatural giving the similar context with [5], given in (20).

(20) [Context: You thought Sungzi never travelled to Thailand, but you found a photo of the Grand Palace at Bangkok in Sungzi's Instagram. You then ask his mom:]

[5]:宋智去過泰國？	[7]: 去過泰國宋智？
Sungzi heoi-gwo Taaigwok?	*Heoi-gwo Taaigwok Sungzi*?
Sungzi go-PERF Thailand	go-PERF Thailand Sungzi
"Had Sungzi been in Thailand?"	"Had Sungzi been in Thailand?"

Forcing them to find a natural way to say, they systematically produced "copied" intonations, i.e. (21)(a), but not (b) and (c). Indeed, they considered (b) and (c) as totally ungrammatical which cannot be rescued by any context. Contrarily, (a) can be salvaged by adding: "Sungzi hates Thailand very much and it is impossible for him to go to there." (a) expresses how unbelievable the speaker is to the discovery that he had been in Thailand.

(21) a. 去過泰國↗ 宋智↗？

Heoi-gwo Taaigwok H% *Sungzi* H%? (V-$O_{H\%}$-$S_{H\%}$, "copied" intonations)

b. *V-O-$S_{H\%}$

c. *V-$O_{H\%}$-S

3.3 Interim summary

Based on the prosodic properties conveyed by the acoustic experiment for Cantonese, RDs with SPs (declarative ones and interrogative *maa3*) have only one *ι*-phrase, while question intonation *H%* must be copied in RDs which have two *ι*-phrases. Notably, the felicity conditions for the two kinds of RDs are different, as reported by the informants.

4. The proposal and discussions

The conflicting experimental results for Cantonese RDs with SPs and intonations not only confuse us with the number of *ι*-phrases in RDs, but also imply a syntax-prosody mismatch given that RDs are monoclausal. To account for this, I propose the syntax-prosody mapping of CP and C^0 in §4.1 first, and resolve the problem of mismatch in §4.2 with a hybrid syntax-prosody explanation: (i) the status of Cantonese intonations as C^0 and boundary tones gives rise to "copying"; (ii) RDs with "copied" intonations are indeed two CPs and should be distinguished from the regular RDs. §4.3 further predicts the obligatory occurrence of SPs in monoclausal RDs.

4.1 The proposal: mapping of CP and C^0 to prosody

Inspired by Feng (2015, 2017), I propose two kinds of one-to-one syntax-prosody mapping in the clausal domain, concerning both phrases (CPs) and heads (C^0s):

(22) *Syntax-prosody mapping in the clausal domain*:

a. One CP is mapped to exactly one *ι*-phrase.

b. Given the absence of SPs, one C^0 is mapped to exactly one intonation.

Note that under the context of RD, which is a *root* phenomenon, CPs means root clauses instead of embedded clauses and SPs are also limited to those having root phenomenon.[5] (22)a means the followings: if an utterance contains one CP, it will have only one *ι*-phrase and vice versa; if an utterance contains two CPs, it will have two *ι*-phrases and vice versa. It is supported by the experimental results on Cantonese RDs (with SPs) in §3. RDs have only one CP and show prosodic properties of being one *ι*-phrase:

[5] Tang (1998) distinguishes two groups of SPs: *outer SPs* have root phenomenon while *inner SPs* do not. This distinction is correlated to their semantic/ pragmatic functions. Outer SPs are related to illocutionary force and speech acts while inner SPs are related to tense and aspects (*lei4* in Cantonese and *le* in Mandarin), and even events (*faat3* in Cantonese). Inner SPs are thus unlikely to be C^0, but T^0 or lower functional heads.

(23) [$_{FocP}$ XP$_i$ [$_{CP}$ C^0-**SP** [$_{TP}$ … t_i]]] (one CP)
( ) (one *ι*-phrase)

The second component (22)b is to say C^0 must have phonological realization, either segmental or suprasegmental. The idea of intonations as realization of C^0 dates back to Tang (2006), who proposes the question intonation *H%* is a segmentless SP and receives supports from Zhang (2014)'s experimental study. What follows by (22)b is that all SP-less root clauses have intonations. This seems to be the case in Cantonese, a language has rich boundary tones (seven in Wong 2005). Even the least-marked declaratives in Cantonese have a lower register at the last syllable (presumably *L%*) as reported in Han, Wang & Shi (2011), Han (2013) and Zhang (2014).

4.2 Resolving the problem of mismatch

4.2.1 Intonations cannot occur in RDs

To realize intonations in RDs, there are three possibilities: (i) at the end of main chunks; (ii) at the end of RD chunks; (iii) at both ends (i.e. "copied" intonations). (i) and (ii) are empirically *un*attested. As realization of C^0, intonations are syntactically well-formed at the RD-medial position (=(i)), just as SPs. Yet, prosody rules this out. As boundary tones, intonations cannot occur at the middle of *ι*-phrases:

(24) [$_{FocP}$ XP$_i$ [$_{CP}$ C^0-H% [TP … t_i]]] (syntax: well-formed)
*(**H%**) (prosody: right-boundary restriction)

The explanation for (ii) is flipped. Syntax, rather than prosody, rules intonations out from the RD-final positions. Staying at the right boundary, final-*H%* is fine in prosody. In syntax, however, C^0 has to be asymmetrically c-commanded by the RD chunk to derive the linear order of *H%* (i.e. Kayne (1994)'s LCA). That requires a lowering operation of C^0 which is generally banned in syntax. RD-final SPs in (26) are out on the same ground.

(25) *[$_{FocP}$ XP$_i$ [$_{CP}$_[$_{TP}$ … t_i C^0-**H%**]]] (syntax: the ban on lowering operation)
(H%) (prosody: well-formed)

(26) *兩個鐘頭 佢走咗**喇**
Loeng go zungtau keoi zau-zo **laa3.* (reproduced from (8)a)

Then consider (iii). "Copied" intonations in RDs are predicted to be impossible:

(27) *[$_{FocP}$ XP$_i$ [$_{CP}$C^0-**H%** [$_{TP}$ … t_i C^0-**H%**]]]
*(**H%** **H%**)

In terms of syntax, one CP can only have one C^0. Two *H%* would imply two C^{0}s and two CPs, incompatible with the monoclausal analysis. In terms of prosody, one *ι*-phrase can only have

one intonation. The first H% also violates the right-boundary restriction. However, (28) is attested in the experiment and constitutes an apparent mismatch. The proposal seems to undergenerate and even to be undermined by (28).

(28) 去過泰國↗ 宋智↗？
Heoi-gwo Taaigwok H% *Sungzi* H%? (reproduced from (21))

4.2.2 Distinguishing "afterthoughts" from RDs

I argue that (28) is not a counterexample to the one-to-one mapping. Indeed, it supports the one-to-one mapping at another side. It is clear from the experimental results that (28) has two *ɪ*-phrases and forces a biclausal structure in (29). Having two intonations is the same as having two SPs (=(30)). Both involve two CPs.

(29) [$_{CP1}$ [去過泰國] C^0-H%?] [$_{CP2}$ [宋智] C^0-H%?]
[$_{CP1}$ [*Heoi-gwo Taaigwok*] C^0-H%?] [$_{CP2}$ [*Sungzi*] C^0-H%?] (two CPs)
(H%) (H%) (two *ɪ*-phrases)

(30) [$_{CP1}$ [去過泰國] C^0-呀?] [$_{CP2}$ [宋智] C^0-呀?]
[$_{CP1}$ [*Heoi-gwo Taaigwok*] C^0-*aa4*?] [$_{CP2}$ [*Sungzi*] C^0-*aa4*?] (two questions)
go-PERF Thailand SP.Q Sungzi SP.Q
"(Really?) He had been in Thailand? THAT Sungzi?!"

One clue to distinguish (29) from regular RDs is interpretive effects. As pointed out by the informants, (29) is only felicitous when it is unbelievable for Sungzi to travel to Thailand. That is, Sungzi becomes the focus. RDs, however, cannot have focus in the RD chunk (Cheung 2009). This is reminiscent of Li & Wei (2017)'s categorization of RDs and "afterthoughts": for RDs, the second chunk does not bear focus; for afterthoughts, it does. They also show that the interpretive effects correlate with prosodic properties. Only the second chunk of afterthoughts has pitch reset, but not RDs. Following them, I regard (29) as an afterthought and assume it has two CPs.

This assumption is supported by the lack of connectivity effects. Recall that *zinghai* "only" in the RD chunk can be associated with the focused item "the novel" in the main chunk. This is shown in (31), with the SP *aa4* which forms a yes-no question.

(31) [嗰本小說]$_F$呀張三**淨係**借咗？
[*go-bun-siusyut*]$_F$ *aa4* *Zoengsaam* ***zinghai*** *ze-zo*?
that-CL-novel SP.Q Zoengsaam only borrow-PFV
"Did Zoengsaam only borrow THAT NOVEL?"

Yet, in afterthoughts with "copied" intonations (=(32)a), the focus association fails, just as the case of two questions formed by *aa4* (=(32)b). It follows that *zinghai* does not derivationally

c-command "the novel" and supports the two chunks in afterthoughts to be analyzed as two separate clauses.

(32) a. *[嗰本小說]$_F$↗？ 張三淨係借咗↗？
*[*go-bun-siusyut*]$_F$ H%? *Zoengsaam **zinghai** ze-zo* H%? ("copied" *H%*)
that-CL-novel H% Zoengsaam only borrow-PFV H%
b. *[嗰本小說]$_F$呀？ 張三淨係借咗呀？
*[*go-bun-siusyut*]$_F$ *aa4*? *Zoengsaam **zinghai** ze-zo aa4*? (two questions)
that-CL-novel SP.Q Zoengsaam only borrow-PFV SP.Q
Int. for a-b: "Did Zoengsaam only borrow it? THAT NOVEL?"

If this is indeed the case, Cantonese intonations do not and cannot occur in genuine RDs. The alleged RDs with "copied" intonations are afterthoughts with two CPs. One-to-one mapping of CPs and *ι*-phrases is still attested: two CPs are mapped to two *ι*-phrases. There is no syntax-prosody mismatch in RDs.

4.3 A further prediction: SPs in Cantonese RDs

The predicting power of the proposal can be appreciated by looking at a seemingly unrelated phenomenon in RDs. Shown in (33)a, SPs are obligatory in Cantonese RDs.[6] This seems to be surprising as the non-RD in (33)b can be SP-less.

(33) a. 唔嚟*（啊）佢。 b. 佢唔嚟（啊）。
m-lai *(*aa3*) *keoi*. *keoi m-lai* (*aa3*).
NEG-come SP 3SG 3SG NEG-come SP "He will not come."

The contrast in (33) is actually a natural consequence of the proposal. First, RDs have one CP which is mapped to one *ι*-phrase. Second, C^0 is mapped to intonations with the absence of SPs. In Cantonese, intonations are boundary tones. Third, boundary tones cannot occur in RDs as argued. Hence, C^0 in RDs can only realize as SPs but not intonations, predicting the obligatory occurrence of SPs in RDs. For non-RDs, boundary tones are not prohibited. C^0 can choose to realize as either SPs or intonations. In the case of (33)b, declarative C^0 can realize as *aa3* or a final-lowering intonation (Zhang 2014).

5. Correlated variations in Mandarin

5.1 Two predictions based on intonational variations

Mandarin differs from Cantonese in having global raising in yes-no questions. The pitch contour of the whole question is lifted, rather than just the last syllable (O. Lee 2005, Liu & Y. Xu 2005). In other words, the question intonation in Mandarin is not a boundary tone and is

[6] This is also independently observed by Lai (2019) on Cantonese DCs. While he adopts a syntactic explanation by assuming that null C^0 does not carry structure-building features that attract movement, this paper argues that (root) C^0 can be either segmental (=SPs) or suprasegmental (=intonations), but not null. The SP requirement of RDs is derived otherwise by the syntax-prosody interaction.

free from the right-boundary restriction. Given the monoclausal analysis of RDs (Cheung 2009) and the proposed one-to-one syntax-prosody mapping of CPs and C^0s, Mandarin RDs should have one *ɪ*-phrase. Moreover, since the sentence-medial position of RD's C^0 (syntactically well-formed) is not blocked by prosody, C^0 is predicted to be able to realize as a question intonation without "copying", unlike Cantonese.

(34) *Prediction one*: Mandarin intonations can occur in (genuine) RDs without "copying".

(35) follows from (34) that if the C^0 in RDs is able to realize as an intonation, it does not need to necessarily realize as an SP. Thus, SP-less RDs are predicted to exist. As a deduction from the theory, (35) must link with (34). They are predicted to be correlated.

(35) *Prediction two*: Mandarin allows SP-less RDs.

5.2 An acoustic experiment on Mandarin RDs

5.2.1 Method

The experimental design and data processing are basically the same as the experiment on Cantonese RDs (see §3.1). The only difference is that each syllable in the sentences is in T1, a high-level tone (55) except for the toneless SPs (also called "neutral tone"). For the sake of clarity, the 7 sentence types are presented below:

(36) The trichotomy (declarative)

Non-RD	*One sentence*	[1] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$.
Non-RD	*Two sentences*	[2] S-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$. **S**$_{\sigma\sigma}$-Adv-V-O-SP.
RD		[3] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$-**S**$_{\sigma\sigma}$.

(37) The two dichotomies (interrogative)

	With SP ma	*With the question intonation*
Non-RD	[4] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$?	[6] **S**$_{\sigma\sigma}$-**V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$?
RD	[5] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**SP**$_{\sigma}$-**S**$_{\sigma\sigma}$?	[7] **V**$_{\sigma\sigma}$-**O**$_{\sigma\sigma}$-**S**$_{\sigma\sigma}$?

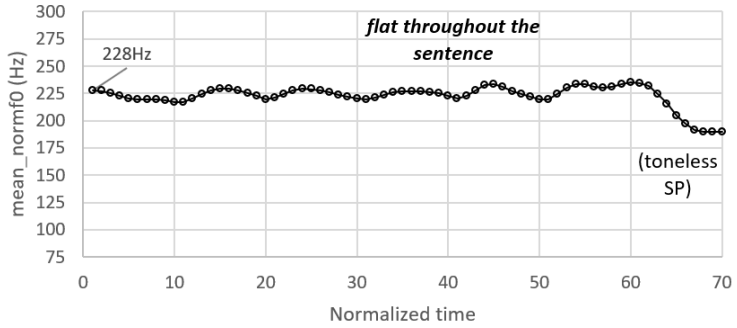
Four native Northern Mandarin speakers (two males, two females) participated in this experiment. They do not have any speech or hearing problems, aged between 19 and 24. Total trials are 7 sentence types x 3 lexical sets x 3 repetition x 4 informants = 252 trials.

5.2.2 Results

The mean pitch contours of every syllables of [1]-[3] and [6]-[7] are displayed in (38)-(42) (on next page).

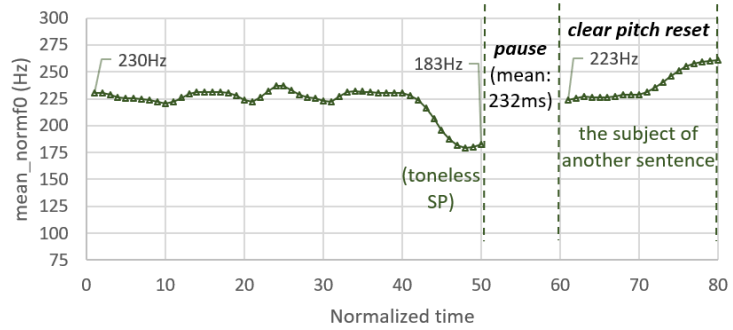
(38) shows that in Mandarin the pitch contour is flat within one *ɪ*-phrase and (39) shows that Mandarin *ɪ*-phrase boundaries are marked by pauses (mean duration: 232 milliseconds) and pitch resetting (the 1st point of the subject of second sentence is 223Hz, close to the beginning of the first sentence = 230Hz).

(38) Non-RD with one declarative sentence



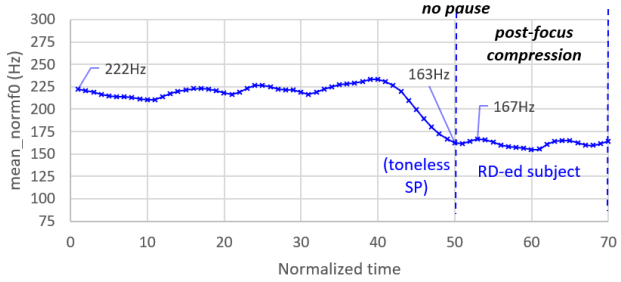
[1]

(39) Non-RD with two declarative sentences



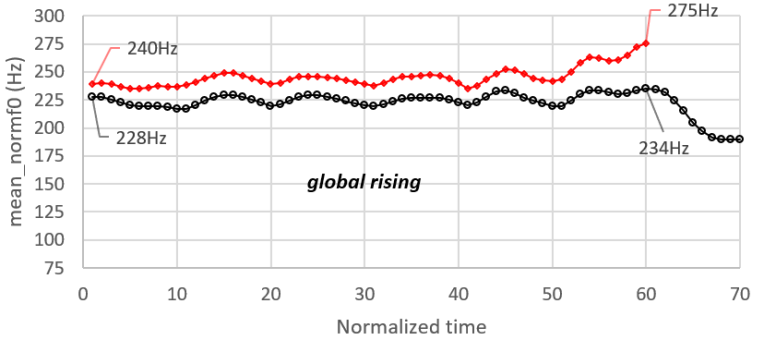
[2]

(40) RD (with declarative SPs)



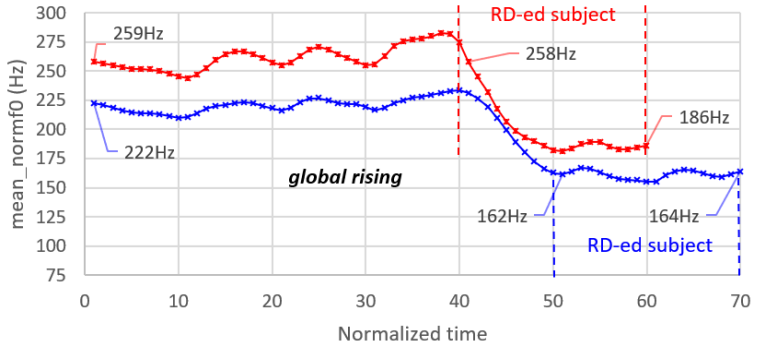
[3]

(41) Non-RD: question intonation vs. declarative SPs



[1]
[6]

(42) RD: question intonation vs. declarative SPs



[3]
[7]

(The control group [4]-[5] are not displayed due to space reasons.)

The pitch contour of RD [3] in (40), however, does not pattern with (38) nor (39). The syllables in both the main chunk and the RD chunk are in T1 (except toneless SPs), but the pitch contour of the RD chunk is significantly lower than the main chunk. There is also no pitch resetting of the RD chunk nor pause before it. On the one hand, the lack of pitch resetting and pauses can be explained if an RD has one *ɪ*-phrase only, such that there is no *ɪ*-phrase boundary in between both chunks. On the other hand, lowered pitch for the RD chunk can be interpreted as post-focus compression (PFC, Y. Xu 2011). Since the main chunk contains the focus (§2.1), the pitch range of the elements after it will be narrowed and results in a lowered pitch contour. Cantonese, in contrast, does not have PFC (Wu & Y. Xu 2010). Thus, the pitch contour for Cantonese RD chunks (see (16)) does not have the dramatic fall.

After confirming that Mandarin RDs are just like Cantonese in having one *ɪ*-phrase, (41) and (42) shows a different pattern of realizing intonations in Mandarin RDs. Mandarin's question intonation is realized by global raising of the whole sentence (=(41)), while Cantonese's one is by final rising at the last syllable. In RDs (42), the question intonation is realized globally, indicated by the pitch difference of both chunks between interrogative and declarative RDs. Importantly, there is no pitch reset for the interrogative RD chunk and usually no pause before it.[7] This suggests that the RD chunk is still a part of the *ɪ*-phrase containing the main chunk and does not form a separate domain, contrary to Cantonese. Since both chunks form an *ɪ*-phrase together, Mandarin's question intonation is realized throughout both chunks. That means, there is no intonation "copying" in Mandarin RDs. Furthermore, all the informants agreed that RDs with intonations can be used naturally in a similar context with RDs with SPs. The RD chunks do not need to be a focus, a property of genuine RDs but not afterthoughts. This confirms the prediction in (34): Mandarin intonations can occur in (genuine) RDs without "copying".

5.3 SPs in Mandarin RDs

Since Mandarin C^0 can realize as intonations in RDs, SPs are predicted to non-mandatory. Put differently, SP-less RDs should be possible in Mandarin. This prediction in (35) is indeed borne out. In Lu (1980) there are many SP-less RDs, like (43). Note that its Cantonese counterpart in (44) is ungrammatical unless an SP is present.

(43) Question: Did you eat the oranges? (Lu 1980:49)
Answer: 一個也沒有吃 我。
yi-ge ye meiyou chi wo. [**M**andarin]
one-CL also NEG.PERF eat 1SG
"I haven't even eaten one."

[7] Only one informant prefers a short pause (approximately 50 milliseconds). Crucially, he cannot accept a pause as long as (39)'s (mean duration: 232 milliseconds) which is a pause before an *ɪ*-phrase boundary.

(44) Answer: 一個都冇食*（啊） 我。

*jat-go dou mou sik**(aa3)** ngo.* [**C**antonese]

one-CL also NEG.PERF eat SP 1SG

"I haven't even eaten one."

The variation is also attested in natural data. In the movie *Young and Dangerous 2* (1996, 101 mins), the Cantonese version has 16 RDs with all carrying SPs. 0% is SP-less. While in the Mandarin version, 50% (two out of four) RDs are SP-less. (45) shows corresponding lines in bilingual versions of the movie. While both are RDs, only the Mandarin one is SP-less.

(45) a. 睇路**啊**大飛！

*Tailou **aa3** Daaifei*! [C]

watch.out SP Daaifei

"Daaifei please be careful!"

b. 小心點大飛！

Xiaoxin dian Dafei! [M]

watch.out a.bit Dafei

"Dafei please be careful!"

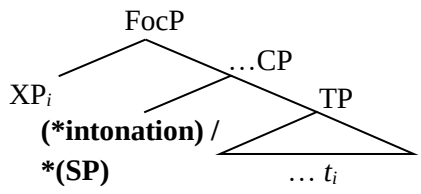
6. Concluding remarks

This paper attempted to resolve the problem of apparent syntax-prosody mismatch in Cantonese right dislocations under the one-to-one mapping of clausal syntax to prosody. While RDs are well-established as monoclausal, intonations do not occur in an RD once but twice. "Copied" intonations imply double intonational phrases and lead to a syntax-prosody mismatch. Based on an acoustic experiment on Cantonese RDs, SP-carrying RDs must be distinguished from intonation-carrying RDs in prosody properties. The former has only one *ι*-phrase while the latter has two, indicated by pitch resetting and pauses. Both can be accounted for under a one-to-one syntax-prosody mapping approach for complementizer phrases and heads. On the one hand, RDs have one CP and are mapped to one *ι*-phrase. Intonations are simply disallowed in RDs due to their status of being C^0 and boundary tones simultaneously. This also predicts the SP requirement of regular RDs. On the other hand, the "copied" intonations construction is not RDs but afterthoughts which have two *ι*-phrases, a focused second chunk and crucially a biclausal structure. This confirms that two CPs are mapped to two *ι*-phrases.

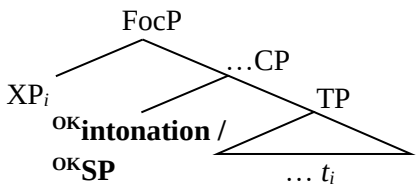
Language variation is also addressed. Mandarin intonations are not boundary tones. The right-boundary restriction for intonations is removed, allowing intonations to occur in RDs without "copying". This is correlated by the vanishment of the SP requirement in RDs:

(46) Correlated variations of Cantonese and Mandarin RDs

a. Cantonese (intonation: **boundary tones**)



b. Mandarin: (intonation: **global**)



While giving novel evidence to the one-to-one syntax-prosody mapping from the domain of RDs, this paper narrows its scope in "gapped" RDs. "Gapless" RDs, also dubbed dislocation copying (DC), are widely found in languages typologically different from Chinese such as English and French. They are often analyzed as biclausal and their prosody requires further studies to confirm the mapping. Moreover, a leftward movement analysis may be feasible to derive RDs in head-initial languages, but not in head-final languages like Japanese. How will prosody shed light on the syntactic analysis of Japanese RDs and whether it fits into the paradigm of one-to-one mapping are intriguing questions to be explored in the future.

References

Cheung, L. Y.-L. 1997. A study of right dislocation in Cantonese. M.Phil. thesis, The Chinese University of Hong Kong.

Cheung, L. Y.-L. 2008. Obligatory XP-raising in Chinese. *Toronto Working Papers in Linguistics* 28, 15–28.

Cheung, L. Y.-L. 2009. Dislocation focus construction in Chinese. *Journal of East Asian Linguistics* 18, 197–232.

Cheung, L. Y.-L. 2015. Bi-clausal sluicing approach to dislocation copying in Cantonese. *International Journal of Chinese Linguistics* 2(2), 227-272.

Feng, S. 2015. Tone, intonation and sentence final particles in Chinese. *Yuyanxue Luncong* [Essays on linguistics] 51, 52-59.

Feng, S. 2017. On grammatical effects on interactions between intonation, stress and syntax. *Yuyan Jiaoxue yu Yanjiu* [Language Teaching and Linguistic Studies] 3, 1-17.

Han, W. 2013. Xianggang yueyu yudiao chutan [A preliminary study of intonations in Hong Kong Cantonese]. Doctoral dissertation, Nankai University.

Han, W., P. Wang and F. Shi. 2011. Xianggang yueyu chenshuju yingao biaoxian [The pitch pattern of declarative sentences in Hong Kong Cantonese]. *Yueyu Yanjiu* [Cantonese Studies] 10, 74-83.

Kayne, R. 1994. *The antisymmetry of syntax*. MIT Press.

Lai, J. Y. K. 2019. Parallel copying in dislocation copying: evidence from Cantonese. *Journal of East Asian Linguistics* 28(3), 243-277.

Lee, O. J. 2005. The Prosody of Questions in Beijing Mandarin. Doctoral dissertation, The Ohio State University.

Lee, T. M. 2017. Defocalization in Cantonese Right Dislocation. *Gengo Kenkyu* (Journal of the Linguistic Society of Japan) 152, 59-87.

Li, A., and W. Wei. 2017. When right is right: postverbal adjuncts in Mandarin Chinese. Poster at TEAL-11, The Institute of Linguistics at Academia Sinica, 3-4 June 2017.

Liang, Y. 2002. Dislocation in Cantonese: Sentence form, information structure, and discourse function. Doctoral dissertation, The University of Hong Kong.

Lin, J. T.-H. 2008. Complement-to-specifier movement in Mandarin Chinese. Ms., National Tsing Hua University.

Liu, F., and Y. Xu. 2005. Parallel encoding of focus and interrogative meaning in Mandarin intonation. *Phonetica* 62, 70–87.

Lu, J. 1980. Hanyu kouyu jufali de yiwei xianxiang [Dislocation in the syntax of colloquial Mandarin Chinese]. *Zhongguo Yuwen* [Chinese Language] 1, 28–41.

Shi, Y. 1992. *Huhuan Rouxing: Hanyu Yufa Tanyi* [To Call for Flexibility: Explorations in Chinese Grammar]. Hainan: Hainan Chubanshe.

Tang, S.-W. 1998. Parametrization of features in syntax. Doctoral dissertation, University of California, Irvine.

Tang, S.-W. 2006. Yueyu yiwenju "sin" de jufa tedian [Syntactic properties of sin in Cantonese interrogatives]. *Zhongguo Yuwen* [Chinese Language] 3, 225-232.

Tang, S.-W. 2018. Yanshenju de jufa fenxi [A syntactic analysis of incremental sentences]. *Yuyan Jiaoxue yu Yanjiu* [Language Teaching and Linguistic Studies] 3, 48-57.

Wu, W. L., & Y. Xu. 2010. Prosodic focus in Hong Kong Cantonese without post-focus compression. In *Proceedings of Speech Prosody 2010*, Chicago, 100040:1–4.

Xu, B. R., and P. P.-K. Mok. 2011. Final rising and global raising in Cantonese intonation. In *Proceedings of the Seventeenth International Congress of the Phonetic Sciences*, 2173–2176.

Xu, Y. 2011. Post-focus Compression: Cross-linguistic Distribution and Historical Origin. In *Proceedings of the 17th International Congress of Phonetic Sciences*, Hong Kong, 152–155.

Xu, Y. 2013. ProsodyPro — A Tool for Large-scale Systematic Prosody Analysis. In *Proceedings of Tools and Resources for the Analysis of Speech Prosody* (TRASP 2013), Aix-en-Provence, France, 7-10.

Zhang, L. 2014. Segmentless sentence-final particles in Cantonese: An experimental study. *Studies in Chinese Linguistics* 35(2), 47-60.

Appendix: stimuli[8]

Experiment one: Cantonese RDs

[1]Non-RD (one sentence): [**S$_{σσ}$-V$_{σσ}$-O$_{σσ}$-SP$_{σ}$**] (declarative)

a. ts^{h}ɔi^{33} tsɔn^{33} p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} la^{33}. (蔡俊派晒答案喇.) "Coizeon distributed all the answers."

b. sʊŋ^{33} tsi^{33} hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ka^{33}. (宋智去過泰國㗎.) "Sungzi had been in Thailand."

c. tai^{33} jin^{33} fɐn^{33} tou^{33} an^{33} tsɐu^{33} a^{33}. (戴燕瞓到晏晝啊.) "Daaijin slept till afternoon."

[2]Non-RD (two sentences): [S-**V$_{σσ}$-O$_{σσ}$-SP$_{σ}$] [S$_{σσ}$**-Adv-V-O-SP] (declarative)

a. ŋɔ^{13} p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} la^{33}. ts^{h}ɔi^{33} tsɔn^{33} tou^{55} p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} la^{33}.
(我派晒答案喇.蔡俊都派晒答案喇.) "I distributed all the answers. So did Coizeon."

b. ŋɔ^{13} hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ka^{33}. sʊŋ^{33} tsi^{33} tou^{55} hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ka^{33}.
(我去過泰國㗎.宋智都去過泰國㗎.) "I had been in Thailand. So had Sungzi."

c. ŋɔ^{13} fɐn^{33} tou^{33} an^{33} tsɐu^{33} a^{33}. tai^{33} jin^{33} tou^{55} fɐn^{33} tou^{33} an^{33} tsɐu^{33} a^{33}.
(我瞓到晏晝啊.戴燕都瞓到晏晝啊.) "I slept till afternoon. So did Daaijin."

[3]RD: [**V$_{σσ}$-O$_{σσ}$-SP$_{σ}$-S$_{σσ}$**] (declarative)

a. p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} la^{33} ts^{h}ɔi^{33} tsɔn^{33}. (派晒答案喇蔡俊.) " Coizeon distributed all the answers."

b. hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ka^{33} sʊŋ^{33} tsi^{33}. (去過泰國㗎宋智.) "Sungzi had been in Thailand."

c. fɐn^{33} tou^{33} an^{33} tsɐu^{33} a^{33} tai^{33} jin^{33}. (瞓到晏晝啊戴燕.) "Daaijin slept till afternoon."

[4]Non-RD with SP: [**S$_{σσ}$-V$_{σσ}$-O$_{σσ}$-SP$_{σ}$**] (interrogative)

a. ts^{h}ɔi^{33} tsɔn^{33} p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} ma^{33}? (蔡俊派晒答案嗎?) "Did Coizeon distribute all the answers?"

b. sʊŋ^{33} tsi^{33} hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ma^{33}? (宋智去過泰國嗎?) "Had Sungzi been in Thailand?"

c. tai^{33} jin^{33} fɐn^{33} tou^{33} an^{33} tsɐu^{33} ma^{33}? (戴燕瞓到晏晝嗎?) "Did Daaijin sleep till afternoon?"

[5]RD with SP: [**V$_{σσ}$-O$_{σσ}$-SP$_{σ}$-S$_{σσ}$**] (interrogative)

a. p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} ma^{33} ts^{h}ɔi^{33} tsɔn^{33}? (派晒答案嗎蔡俊?) "Did Coizeon distribute all the answers?"

b. hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} ma^{33} sʊŋ^{33} tsi^{33}? (去過泰國嗎宋智?) "Had Sungzi been in Thailand?"

c. fɐn^{33} tou^{33} an^{33} tsɐu^{33} ma^{33} tai^{33} jin^{33}? (瞓到晏晝嗎戴燕?) "Did Daaijin sleep till afternoon?"

[6]Non-RD with intonation: [**S$_{σσ}$-V$_{σσ}$-O$_{σσ}$**] (interrogative)

a. ts^{h}ɔi^{33} tsɔn^{33} p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33}? (蔡俊派晒答案?) "Did Coizeon distribute all the answers?"

b. sʊŋ^{33} tsi^{33} hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33}? (宋智去過泰國?) "Had Sungzi been in Thailand?"

c. tai^{33} jin^{33} fɐn^{33} tou^{33} an^{33} tsɐu^{33}? (戴燕瞓到晏晝?) "Did Daaijin sleep till afternoon?"

[7]RD with intonation: [**V$_{σσ}$-O$_{σσ}$-S$_{σσ}$**] (interrogative)

a. p^{h}ai^{33} sai^{33} tap^{33} ɔn^{33} ts^{h}ɔi^{33} tsɔn^{33}? (派晒答案蔡俊?) "Did Coizeon distribute all the answers?"

b. hɵy^{33} k^{w}ɔ^{33} t^{h}ai^{33} k^{w}ɔk^{33} sʊŋ^{33} tsi^{33}? (去過泰國宋智?) "Had Sungzi been in Thailand?"

c. fɐn^{33} tou^{33} an^{33} tsɐu^{33} tai^{33} jin^{33}? (瞓到晏晝戴燕?) "Did Daaijin sleep till afternoon?"

[8] To transparentize the tone values, the stimuli are scripted in IPA below. Contexts and fillers are omitted here.

Experiment two: Mandarin RDs

[1]Non-RD (one sentence): [$\mathbf{S}_{\sigma\sigma}$-$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{SP}_{\sigma}$] (declarative)

a. tʂaŋ^{55} san^{55} tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma. (張三偷吃冬菇嘛.) "Zhangsan ate the mushrooms behind others."

b. tʂou^{55} tɕʰiŋ^{55} tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} lə. (周青多摘香蕉了.) "Zhouqing took more banana than allowed."

c. kuan^{55} piŋ^{55} kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} a. (關冰該開餐廳啊.) "Guanbing should open a restaurant."

[2]Non-RD (two sentences): [S-$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{SP}_{\sigma}$] [$\mathbf{S}_{\sigma\sigma}$-Adv-V-O-SP] (declarative)

a. tʰa^{55} tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma. tʂaŋ^{55} san^{55} ie^{213} tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma.
(他偷吃冬菇嘛.張三也偷吃冬菇嘛.) "He ate the mushrooms behind others. So did Zhangsan."

b. tʰa^{55} tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} lə. tʂou^{55} tɕʰiŋ^{55} ie^{213} tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} lə.
(他多摘香蕉了.周青也多摘香蕉了.) "He took more banana than allowed. So did Zhouqing."

c. tʰa^{55} kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} a. kuan^{55} piŋ^{55} ie^{213} kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} a.
(他該開餐廳啊.關冰也該開餐廳啊.) "He should open a restaurant. So should Guanbing."

[3]RD: [$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{SP}_{\sigma}$-$\mathbf{S}_{\sigma\sigma}$] (declarative)

a. tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma tʂaŋ^{55} san^{55}. (偷吃冬菇嘛張三.) "Zhangsan ate the mushrooms behind others."

b. tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} lə tʂou^{55} tɕʰiŋ^{55}. (多摘香蕉了周青.) "Zhouqing took more banana than allowed."

c. kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} a kuan^{55} piŋ^{55}. (該開餐廳啊關冰.) "Guanbing should open a restaurant."

[4]Non-RD with SP: [$\mathbf{S}_{\sigma\sigma}$-$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{SP}_{\sigma}$] (interrogative)

a. tʂaŋ^{55} san^{55} tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma? (張三偷吃冬菇嗎?)
"Did Zhangsan eat the mushrooms behind others?"

b. tʂou^{55} tɕʰiŋ^{55} tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} ma? (周青多摘香蕉嗎?)
"Did Zhouqing take more banana than allowed?"

c. kuan^{55} piŋ^{55} kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} ma? (關冰該開餐廳嗎?)
"Should Guanbing open a restaurant?"

[5]RD with SP: [$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{SP}_{\sigma}$-$\mathbf{S}_{\sigma\sigma}$] (interrogative)

a. tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} ma tʂaŋ^{55} san^{55}? (偷吃冬菇嗎張三?)
"Did Zhangsan eat the mushrooms behind others?"

b. tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} ma tʂou^{55} tɕʰiŋ^{55}? (多摘香蕉嗎周青?)
"Did Zhouqing take more banana than allowed?"

c. kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} ma kuan^{55} piŋ^{55}? (該開餐廳嗎關冰?)
"Should Guanbing open a restaurant?"

[6] Non-RD with intonation: [$\mathbf{S}_{\sigma\sigma}$-$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$] (interrogative)

a. tʂaŋ^{55} san^{55} tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55}? (張三偷吃冬菇?) "Did Zhangsan eat the mushrooms behind others?"

b. tʂou^{55} tɕʰiŋ^{55} tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55}? (周青多摘香蕉?) "Did Zhouqing take more banana than allowed?"

c. kuan^{55} piŋ^{55} kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55}? (關冰該開餐廳?) "Should Guanbing open a restaurant?"

[7]RD with intonation: [$\mathbf{V}_{\sigma\sigma}$-$\mathbf{O}_{\sigma\sigma}$-$\mathbf{S}_{\sigma\sigma}$] (interrogative)

a. tʰou tʂʰɻ^{55} tuŋ^{55} ku^{55} tʂaŋ^{55} san^{55}? (偷吃冬菇張三?) "Did Zhangsan eat the mushrooms behind others?"

b. tuo^{55} tʂai^{55} ɕiaŋ^{55} tɕiau^{55} tʂou^{55} tɕʰiŋ^{55}? (多摘香蕉周青?) "Did Zhouqing take more banana than allowed?"

c. kai^{55} kʰai^{55} tsʰan^{55} tʰiŋ^{55} kuan^{55} piŋ^{55}? (該開餐廳關冰?) "Should Guanbing open a restaurant?"