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UNIVERSITY OF HAWAI'I AT MĀNOA
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<http://ling.hawaii.edu>

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SPLIT INTRANSITIVITY IN CANTONESE

JENNIFER SOU

This paper investigates the phenomenon of split intransitivity in Cantonese utilizing two approaches to map intransitive verbs into verb groupings: the Unaccusativity Hypothesis (UH) based on a syntactic distinction, and the Auxiliary Selection Hierarchy (ASH) based on a semantic representation. The results of this study are sufficient to demonstrate an unaccusative/unergative distinction in Cantonese, with each approach partially accounting for the variation in intransitive verbs. But because of the disparity evident within verb classes, it suggests neither hypothesis clearly predicts the split of unaccusative and unergative verbs. The major finding of this research is that some individual verbs defy groupings according to the two diagnostics. Observations of variation within verb classes at the lexical level may suggest a need in the direction toward a morphosyntax perspective when discussing split intransitivity in Cantonese.

Keywords: Cantonese, split intransitivity, Unaccusativity Hypothesis

1. INTRODUCTION. The phenomenon of *split intransitivity*, the notion that there is division among different classes of intransitive verbs in relation to the behavior of their sole nominal argument, has been studied across several typologically distinct languages including Italian, German, Dutch, Spanish, English, Japanese, Mandarin Chinese, and Korean. A seminal account for this phenomenon is known as the *Unaccusative Hypothesis* (Perlmutter 1978; Burzio 1986), which maintains that the differences between verbs come down to the underlying syntactic structure falling into two classes: unergative verbs, which select an external argument as its sole nominal argument, and unaccusative verbs, which select an internal argument. Another approach to account for the division is known as the *Auxiliary Selection Hierarchy* (Sorace 2000), which posits that intransitive verbs are on a multi-class gradient reflected by auxiliary selection subject to various lexical semantic factors like telicity and agentivity. Sorace's approach does not actually challenge the Unaccusative Hypothesis, nor does it argue that split intransitivity is purely semantic, but it does re-frame intransitive verbs through a diagnostic that many linguists have utilized and interpreted because of its overlap into the core notions of split intransitivity, questioning whether a binary distinction is warranted. This paper investigates the status of split intransitivity in Cantonese Chinese. I attempt to map intransitive verbs into verb groupings using both approaches—the Unaccusativity Hypothesis (UH) based on a syntactic distinction, and the Auxiliary Selection Hierarchy (ASH) based on a semantic representation—to account for the phenomenon. While split intransitivity in Mandarin Chinese has been studied (e.g. Liu 2007; Laws and Yuan 2010), its existence and discussion of it in Cantonese has been, to my knowledge, non-existent. Therefore, this study brings empirical data from a new language to the literature. By combining findings from elicitations of native speakers with formal acceptability judgment surveys, the depiction of split intransitivity in Cantonese becomes a little clearer.

I argue that the results of this study are sufficient to demonstrate an unaccusative/unergative distinction in Cantonese, with each approach partially accounting for the variation in intransitive verbs. But because of the disparity evident within verb classes, it suggests investigation at individual verb level may be required to determine the motivation for contrast.

This paper is structured as follows. Section 2 will give a detailed literature review of the UH and ASH. Section 3 introduces features of Cantonese providing some foundation about the grammar. In section 4 I present data elicited through elicitation sessions with four native speakers. Through this method, the intuition of Cantonese speakers was drawn on spontaneously and explicit discussion about acceptability conducted. Here I show that Cantonese does exhibit split intransitivity given the asymmetry in the acceptability and unacceptability with respect to two diagnostics: subject position and aspect selection. The position of the subject in relation to the verb has consequences for what types of sentences will be grammatical, as does the selection of an aspect marker in relation to the verb. Section 5 reports the method and results from two formal acceptability judgment surveys to gain further support for the observations in

section 4. The surveys, while rigid compared to the elicitations, has its strength in controlling for confounding factors and the ability to reach a greater number of participants, meaning the ability to quantify a wide range of native speaker intuition. The purpose of the first experiment was to test the interaction between verb classes and subject position, and the purpose of the second experiment was to test the interaction between verb classes and aspect selection. Section 6 discusses the overarching results. Through elicitation both theories are supported, providing evidence that syntax and semantics play a role in split intransitivity. Contradictory, through uniform experimental methods, the evidence is more complex and inconclusive, leading to a need for more research.

I conclude that although split intransitivity can be mapped into verb groupings partially following the UH and ASH divisions, neither hypothesis clearly predicts the split of unaccusative and unergative verbs in Cantonese. The major finding of this research is that some individual verbs defy groupings according to the two diagnostics. Observations of variation within verb classes at the lexical level may suggest a need in the direction toward a morphosyntax perspective when discussing split intransitivity in Cantonese.

2. TWO THEORIES IMPACTING SPLIT INTRANSITIVITY: THE UNACCUSATIVE HYPOTHESIS AND THE AUXILIARY SELECTION HIERARCHY. This section describes two relevant theories, the Unaccusative Hypothesis and the Auxiliary Selection Hierarchy, influencing the research on split intransitivity in this paper.

2.1 THE UNACCUSATIVE HYPOTHESIS. In an attempt to explain why intransitive verbs exhibit a split phenomenon, originally observed in Romance and Germanic languages, Perlmutter (1978) posited that there are two classes of intransitive verbs: unergatives and unaccusatives. The core notion of his idea, known as the Unaccusative Hypothesis (UH), is that the sole nominal arguments of intransitives differ in their behavior in relation to the verb based on its semantics. The theory differentiates the unaccusatives from the unergatives by syntactic representation, where the sole nominal argument is an underlying object for the former and an underlying subject for the latter.

The distinction, according to Burzio (1986), can be realized through Government-Binding terms of each type of verb.¹ Unergatives licenses its sole nominal argument as an external argument, which, Burzio posits, is in the specifier position of the VP. Unaccusatives licenses its sole nominal argument as an internal argument, which is the complement to the verb. The UH predicts a clear-cut distinction between the unergative and the unaccusative class, therefore all intransitives must be in one of these two categories. Baker (1997) further characterizes the unaccusative-unergative split in terms of thematic roles, where agent-like subjects align with unergativity and theme/patient-like subjects align with unaccusativity.

Some studies (Van Valin 1990; Dowty 1991; Zaenen 1993) have argued that one clear-cut split does not reflect the nuances evident in various languages, especially when considering auxiliary selection as a diagnostic.

2.2 AUXILIARY SELECTION HIERARCHY. Sorace’s (2000) seminal work on the ASH proposes a hierarchy based on verb class variation to gauge the boundary between unaccusatives and unergatives, supporting the theory that posits verb distinction is semantically determined and syntactically encoded (Levin and Rappaport 1995). She shows that auxiliary selection is not random, but it is a phenomenon where consistency can be detected in the selection of a particular auxiliary over another. As Sorace examined across Western European languages, it became clear that there are verbs that consistently prefer the auxiliary BE, while others consistently preferred the auxiliary HAVE.

- (1) a. *Italian* (Sorace 2000:863; (1a))
 Maria è venuta alla festa.
 Maria is come to the party
 ‘Maria came to the party.’

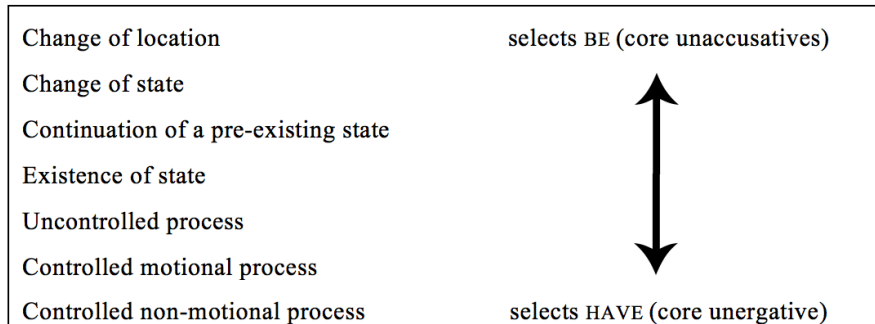
¹ Perlmutter (1978), on the other hand, was working in the Relational Grammar framework.

- b. German (Sorace 2000:864; (1d))
 Der Zug ist spat angekommen
 the train is late arrived
 ‘The train arrived late.’
- (2) a. *Italian* (Sorace 2000:874; (33a))
 I colleghi hanna chiaccherato tutto il pomeriggio.
 the colleague have chatted whole the afternoon
 ‘My colleagues chatted the whole afternoon.’
- b. *German* (Sorace 2000:874; (33d))
 Kurt hat den ganzen Sonntag gearbeitet.
 Kurt has the whole Sunday worked.
 ‘Kurt worked all day Sunday.’

The Italian and German examples in (1) exhibit verbs, ‘come’ and ‘arrive’, that typically prefer the auxiliary BE type verbs, where the verbs in (2), ‘chat’ and ‘work’, prefer the auxiliary HAVE.

Therefore, there is variation in the selection criteria, which is uniform in terms of core intransitive verbs—those at the extremes of the hierarchy—and displays consistent variable behavior within other classes of verbs cross-linguistically. The selection criteria is semantically based, and results in multiple verb classes manifested on a gradient. In her paper describing Romance and Germanic languages, Sorace describes each level of lexical semantic characterization from verbs denoting transitions and states to process as seen in figure 1.

FIGURE 1. The auxiliary selection hierarchy (Sorace 2000)



Sorace is able to map intransitive verbs onto unaccusative or unergative syntax and identifies three main characteristics she takes into account: telicity and agency. At the top are the change of location, or telic, verbs (the core unaccusatives), and at the bottom are the controlled agentive verbs (the core unergatives), while the middle is variable, especially where stative verbs meet uncontrolled verbs. Sorace (2000) reports that there are different boundaries of auxiliary selection cross-linguistically, stating “classes may be merged, or languages may make finer distinctions within individual classes” (886) and “the cutoff point (of verb classes) cannot be identical in all languages” (887). The gradient aspect of the ASH allows for that variability, a flexibility not seen in the binary theory of the UH.

3. CANTONESE BACKGROUND. Cantonese is a Sino-Tibetan language genetically related to Mandarin, though the two languages are not mutually intelligible due to differences in pronunciation, grammar, and lexicon (Yip and Matthews 1999). As will be shown below, word order is canonically SVO, though there are a few exceptions which will be highlighted in the following sections. It is a classifier language, where a word, typically adjacent to a number, categorizes the noun. In Cantonese, the classifier may also be used with a noun alone to denote a definite or indefinite item, or in a possessive construction. Cantonese does not express tense grammatically; instead, verbs are marked by an aspect marker, which indicates if an event has begun, is ongoing, or has been completed, though not all phrases require an aspect marker. The present

is the default tense, therefore no aspect marker is required at all. Aspect markers are also not needed if adverbs of times are used or implied in the context of discourse (Yip and Matthews 1999).

Transitive constructions in Cantonese² show an SVO word order, as in (3) and (4):³

- (3) 隻 貓 飲 奶。
 Zek³-maau¹ jam² nai⁵.
 CLF-cat drink milk
 ‘The cat drinks milk.’
- (4) 我 個 老 公 買 五 件 衫。
 Ngo⁵ go³ lou⁵gung¹ maai⁵ ng⁵ gin⁶-saam¹.
 1SG POSS husband buy five CLF-clothes
 ‘My husband buys five pieces of clothing.’

The above examples are in the present tense, which means no aspect markers are needed. In (3) and (4) different classifiers represent three ways they can be used: as a definite marker in ‘the cat’, as a possessive in ‘my husband’, and following a number to classify the noun in ‘five pieces of clothing’.

- (5) 兩 公 婆 詢 緊。
 Loeng⁵ gung¹po⁴ aau³-gan².
 two male matron yell-PROG
 ‘The married couple is arguing.’
- (6) 條 船 沉 咗。
 Tiu⁴-syun⁴ cam⁴-zo².
 CLF boat sink-PFV
 ‘The boat sank.’

The intransitive sentences shown in (5) and (6) both have aspect markers following the verb to denote internal temporal structure of the event. In (5) the present tense action ‘yell’ has the additional progressive marker following the verb to note that the action is continuous. In (6) the perfective marker follows the verb ‘sink’ to indicate that action is completed.

4. ELICITATION. To investigate the occurrence of split intransitivity in Cantonese, data was initially collected through one-on-one elicitation sessions with four native speakers. This method of data collection assists in discovering nuances of the language through discussion and can bring a deeper understanding to what can and cannot be grammatical regarding intransitivity in Cantonese. What follows suggest that Cantonese exhibits split intransitivity through three diagnostics: post-verbal subject, floating quantifier (FQ), and aspect marker selection.

4.1 POST-VERBAL SUBJECT AS A SPLIT INTRANSITIVITY DIAGNOSTIC. First, the elicitations with the consultants revealed that some intransitive verbs are restricted to the SV sentence structure while other intransitive verbs allow for the canonical SV with a pre-verbal subject or a VS order with a post-verbal subject. The ability of some intransitive verbs, but not others, to license post-verbal subjects in other SVO languages such as Italian and German (Burzio 1986) has been evidenced.

In sentences (7) and (8) the (a) sentences show an SV word order. According to my consultants, flipping the order to have a post-verbal subject, as seen in all the (b) sentences, results in unacceptability.

- (7) a. 小 朋友 跳 緊。
 Siu² pang⁴jau⁵ tiu³-gan².
 small friend friend jump-PROG

² Cantonese examples are presented in the Jyutping romanization system, developed by the Linguistic Society of Hong Kong (Fan et al. 1997).

³ Glossing follows Leipzig conventions.

‘The child is jumping.’

- b. *跳緊 小 朋友。
Tiu³-gan² siu² pang⁴jau⁵.
jump-PROG small friend friend
‘The child is jumping.’

- (8) a. 兩 公 婆 訥緊。
Loeng⁵ gung¹po⁴ aa³-gan².
two male matron yell-PROG
‘The married couple is arguing.’

- b. *訥緊 兩 公 婆
Aau³-gan² loeng⁵ gung¹po⁴.
yell-PROG two male matron
‘The married couple is arguing.’

In contrast, flexibility in the word order is exhibited in examples (9) and (10). These intransitive verbs exhibit a phenomenon where the verb can be in either second (SV) or first (VS) position, or alternatively can be described as having the subject be pre- or post-verbal.

- (9) a. 人 死咗。
Jan⁴ sei²-zo².
people dead-PFV
‘People died.’

- b. 死咗 人。
Sei²-zo² jan⁴.
dead-PFV people
‘People died.’

- (10) a. 砂 煲 爆咗。
Saa¹bou¹ baau³-zo².
clay pot explode-PFV
‘The clay pot exploded.’

- b. 爆咗 砂 煲。
Baau³-zo² saa¹ bou¹.
explode-PFV clay pot
‘The clay pot exploded.’

The observed ability in Cantonese to exhibit pre-verbal subjects with some intransitive verbs and pre- or post-verbal subjects with other intransitive verbs supports this language having split intransitivity.

4.2. FLOATING QUANTIFIER AS A SPLIT INTRANSITIVITY DIAGNOSTIC. In Miyagawa’s (1989) observations of Japanese, which is also a classifier language, it is hypothesized that the NP and its Quantifier Phrase (QP) must mutually c-command each other forming a constituent, which can be used to interpret the relationship of the NP and QP in (11a) and (12a). But he noted that the quantifier can “float” in certain conditions, which is why (11b) is ungrammatical but (12b) is grammatical.

- (11) a. (Sorace and Shomura 2001:251; (3a))
Gakusei-ga sannin wazato waratta.
student-NOM three intentionally laughed
‘Three students intentionally laughed.’

- b. (Sorace and Shomura 2001:252; (3b))
 *Gakusei-ga wazato sannin waratta.
 student-NOM intentionally three laughed
 ‘Three students intentionally laughed.’
- (12) a. (Sorace and Shomura 2001:252; (4a))
 Gakusei-ga sannin Tokyo-ni tsuita.
 student-NOM three Tokyo-at arrived
 ‘Three students arrived in Tokyo.’
- b. (Sorace and Shomura 2001:252; (4b))
 Gakusei-ga Tokyo-ni sannin tsuita.
 student-NOM Tokyo-at three arrived
 ‘Three students arrived in Tokyo.’

He analyzed this behavior as a movement where the subject separates from and thus strands the quantifier (hence the phrase “floating quantifier”) and a NP trace is left behind. This syntactic phenomenon occurs when a NP modified by a quantifier is seen in verbs reflecting an internal argument position (12). He further posits that this movement is not possible in verbs, or as he states unergative verbs, with external NP structures, as in (11). Studies of Japanese by Sorace and Shomura (2001) and Fukuda (2017) have investigated this phenomenon, and assert the contrast allows the floating quantifier to be a diagnostic for split intransitivity.

Following the analysis by Miyagawa (1989), I assume that a NP and its modifying QP form a constituent in Cantonese, which is able to exhibit movement. As demonstrated below from elicitations, the same floating quantifier phenomenon can be observed in Cantonese with the intransitive verb ‘die’ (13c) and not allowed with others like ‘play’ (14c).

- (13) a. Quantifier associated with a post-verbal subject
 死咗 三個 人。
 Sei²-zo² saam¹-go³ jan⁴.
 dead-PFV three-CLF people
 ‘Three people died.’
- b. Quantifier associated with a pre-verbal subject
 三個 人 死咗。
 Saam¹-go³ jan⁴ sei²-zo².
 three-CLF people dead-PFV
 ‘Three people died.’
- c. Floated quantifier associated with a subject
 人 死咗 三個。
 Jan⁴ sei²-zo² saam¹-go³.
 people dead-PFV three-CLF
 ‘Three people died.’
- (14) a. Quantifier associated with a pre-verbal subject
 六個 子女 成日 喺 沙灘 玩。
 Luk⁶-go³ zai²nei⁵ seng⁴jat⁶ hai² saa¹taan¹ waan².
 six-CLF son daughter whole day at sand beach play
 ‘The six children always play at the beach.’

b. Quantifier associated with a post-verbal subject

*成日 喺 沙灘 玩 六個 子女。
 Seng⁴jat⁶ hai² saa¹taan¹ waan² luk⁶-go³ zai²nei⁵.
 whole day at sand beach play six-CLF son daughter
 ‘The six children always play at the beach.’

c. Floated quantifier associated with a subject

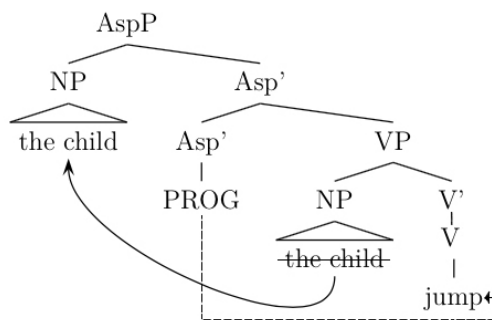
*子女 成日 喺 沙灘 玩 六個。
 zai²nei⁵ seng⁴jat⁶ hai² saa¹taan¹ waan² luk⁶-go³.
 son daughter whole day at sand beach play six-CLF
 ‘The six children always play at the beach.’

Example (13) shows a clause with the intransitive verb ‘die’ where the whole subject, including the quantifier, is acceptable in a (a) post-verbal position or a (b) pre-verbal position. It also can (c) leave the quantifier phrase *saam¹-go³* in the post-verbal position by itself to “float”, while the subject moves ahead of the verb, satisfying the basic SVO word order. By contrast, the examples (14b) and (14c) show that these sentence patterns are unacceptable when the intransitive verb is ‘play’. The elicitations further found the verbs ‘explode’, ‘burn’, ‘melt’, ‘fall’, and ‘sink’ to exhibit the same pattern as ‘die’, while verbs ‘smile’, ‘cry’, and ‘yell’ behave the same as ‘play’.

4.3 IMPLICATIONS OF THE INITIAL FINDINGS: A SYNTACTIC ANALYSIS OF CANTONESE SPLIT INTRANSITIVITY. The phenomenon of split intransitivity is clearly evidenced by the data. There are intransitive verbs with agent-like subjects and theme-like subjects, and only the latter display the relevant syntactic characteristics. This can be accounted for using syntactic representations correlating to the UH.

Under an analysis based on the UH, example (7), ‘The child is jumping,’ can be represented by the structure in (15), which shows the subject ‘the child’ originates in the Spec VP position and ‘jump’ is in the V position, and the subject is assumed to move into the Spec AspP position. The subject is agent-like, and is impossible in any other position with this verb. I predict that the tense element, in the case of Cantonese the aspect marker (Asp), originates structurally higher than the verb, but to account for the aspect marker being realized after the verb, “affix hopping” occurs so that the aspect marker moves down and attaches to the verb (as shown in (15) as a dotted line) because morphologically it is a bound morpheme and must be suffixed to a verb (Chomsky 1957:39).

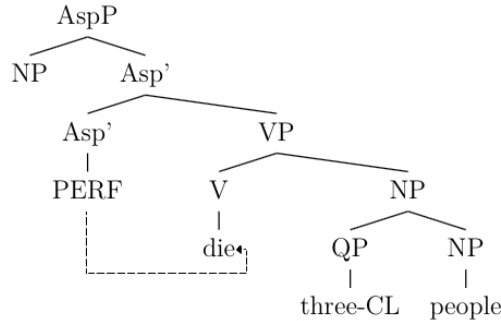
(15)



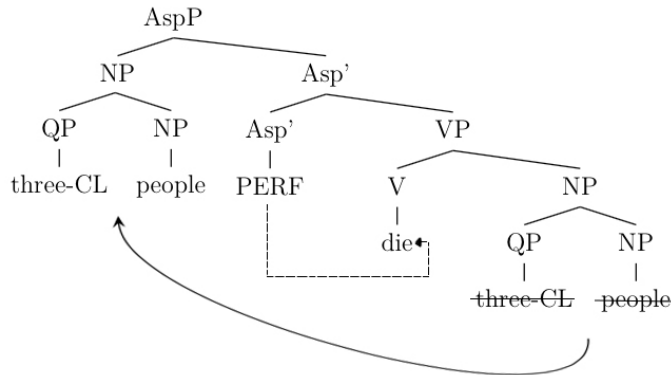
By representing example (13a), ‘Three people died,’ through syntactic structure, the subject of the verb is base generated in the complement of V position, which is an internal argument, shown in (16a). The quantifier phrase (QP) and subject NP make up the subject constituent. Due to the original syntactic position of the subject being in what would be the object position of a transitive clause, the impression is that the NP would share similar properties associated with an object or be theme-like. The subject of intransitive verbs that have this quality is observed to differ from other intransitive verbs which originate in the subject position, an external argument.

In addition to (13a), there are two other possible word orders for the verb ‘die’ depicted in (13b) and (13c). Raising to the Spec AspP is assumed to occur in these two instances. If the whole internal subject argument (QP and NP) raises to Spec AspP position, the result will be the subject in the pre-verbal position, leaving nothing in the complement of VP, the word order of (13b) is syntactically represented in (16b). In (16c) a similar process occurs, but the subject NP is separated from the quantifier, so only the subject raises to the Spec AspP position and the quantifier is stranded. This results in the word order of (13c). Topicalization is widely used and accepted in Cantonese (Yip and Matthews 1999), which is what is assumed to motivate the subject NP moving from the complement position into the Spec AspP position, and thus is responsible for permitting classifiers to “float” in grammatical sentences.

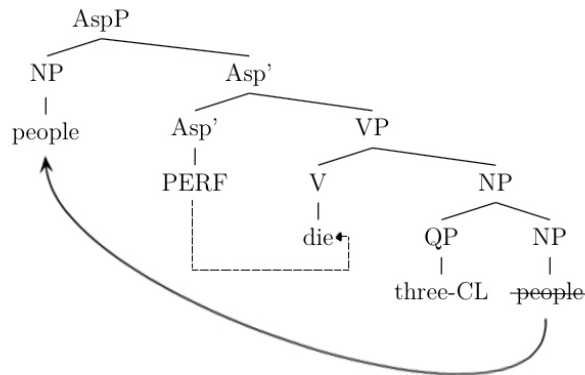
- (16) a. Quantifier associated with a post-verbal subject



- b. Quantifier associated with a pre-verbal subject



- c. Floated quantifier associated with a subject



As evidenced through the above syntactic representations, the structural origin of the subjects of agent-like intransitive verbs is in the external position while with theme-like intransitive verbs it is the internal argument position. This implies a two-class split among intransitive verbs; those like ‘die’ and ‘explode’ exhibit syntactic qualities of unaccusative verbs, and those like ‘play’ or ‘jump’ exhibit syntactic qualities of unergative verbs.

4.4 ASPECT MARKER SELECTION AND A SEMANTIC ANALYSIS OF CANTONESE SPLIT INTRANSITIVITY.

In this section, I show that auxiliary selection, or rather aspect marker selection, in Cantonese lends additional support to the generalization that Cantonese exhibits split intransitivity, but not necessarily supportive of the binary approach posited by the UH.

Following the research on aspect marker selection in Mandarin Chinese by Liu (2007), I selected two grammatical aspect markers to test in Cantonese: the perfective marker 咗 $-zo^2$, which indicates a completed action, and the imperfective durative marker 住 $-zyu^6$, which indicates a continuous activity.⁴ From the data gathered by elicitation, a view of variability in selection of 咗 $-zo^2$ and 住 $-zyu^6$ emerges, associating with some similar conclusions regarding the semantic space found by Sorace (2000), and especially that of Mandarin by Liu (2007) and Laws and Yuan (2010).

There is a distinct preference for certain verbs only being able to select the perfective marker. In examples (17) and (18) the (a) sentences are acceptable with the 咗 $-zo^2$ marker and unacceptable in the (b) sentences with the 住 $-zyu^6$ marker.

- (17) a. 新娘 來咗。
 San¹noeng⁴ loi⁴-zo².
 bride arrive-PFV
 'The bride arrived.'
- b. *新娘 來住。
 San¹noeng⁴ loi⁴-zyu⁶.
 bride arrive-DUR
 ('The bride arrives.')
- (18) a. 個 氣球 喺 天空 消失咗。
 Go³ hei³kau⁴ hai² tin¹hung¹ siu¹sat¹-zo².
 CLF air ball at sky sky vanish.lose-PFV
 'The balloon disappeared in the sky.'
- b. *個 氣球 喺 天空 消失住。
 Go³ hei³kau⁴ hai² tin¹hung¹ siu¹sat¹-zyu⁶.
 CLF air ball at sky sky vanish.lose-DUR
 ('The balloon disappears in the sky.')

The selection pattern observed with other types of intransitive Cantonese verbs, on the other hand, are less definite. Some only take on the durative marker 住 $-zyu^6$ while rejecting the perfective 咗 $-zo^2$ marker, as shown in examples (19) and (20).

- (19) a. 個 胃 拿住。
 Go³ wai⁶ naa⁴-zyu⁶.
 CLF stomach arrest-DUR
 '(My) stomach aches (from sickness).'
- b. *個 胃 拿咗。
 Go³ wai⁶ naa⁴-zo².
 CLF stomach arrest-PFV
 ('(My) stomach ached (from sickness).')

⁴ The contrast between the imperfect and perfect aspect choices is available only with these two markers: 咗 $-zo^2$ and 住 $-zyu^6$. If the imperfect marker is replaced by another imperfect aspect marker, 緊 $-gan^2$, denoting the progressive, then the phrases would not contrast and result in grammatically permissible phrases.

- (20) a. 個 胃 頂住。
 Go³ wai⁶ ding²-zyu⁶.
 CLF stomach hold-DUR
 ‘(My) stomach aches (from fullness).’
- b. *個 胃 頂咗。
 Go³ wai⁶ ding²-zo².
 CLF stomach hold-PFV
 ‘(My) stomach ached (from fullness).’

Other intransitive verbs can select either 咗 -zo² or 住 -zyu⁶ as seen in (21) and (22).

- (21) a. 老師 嘔咗 (喺街市)。
 Lou⁵ si¹ au²-zo² (hai²gaai¹si⁵).
 old teacher vomit-PFV (be.at street market)
 ‘The teacher vomited (at the market).’
- b. 老師 嘔住 喺街市。
 Lou⁵ si¹ au²-zyu⁶ hai² gaai¹ si⁵.
 old teacher vomit-DUR be.at street market
 ‘The teacher is vomiting at the market.’
- (22) a. 小朋友 喊咗。
 Siu²pang⁴jau⁵ haam³-zo².
 small friend cry-PFV
 ‘The child cried.’
- b. 小朋友 喊住 玩。
 Siu²pang⁴jau⁵ haam³-zyu⁶ wan².
 small friend cry-DUR play
 ‘The child is crying while playing.’

In example (21a) the prepositional phrase is optional after the verb and perfective aspect marker. But as seen in (21b) it is required after the verb and imperfective aspect marker, without the prepositional phrase the sentence would be ungrammatical.

This variability in aspect marker selection supports the phenomenon of split intransitivity in Cantonese, but presents a more complex relationship, compared to a binary one, for the groupings of intransitive verbs. Table 1 maps the intransitive verbs and their aspect marker selection from examples (17) - (22) in a similar fashion to the ASH.

TABLE 1. Hierarchy of intransitive verb class based on their aspect marker selection in Cantonese

| Verb class | Verb examples | English translation | Aspect marker selection |
|----------------------|---|---------------------|---|
| Change of location | 來 (loi ⁴) | ‘arrive/come’ | 咗 -zo ² |
| Change of state | 消失 (siu ¹ sat ¹) | ‘disappear’ | 咗 -zo ² |
| Non-motional process | 喊 (haam ³) | ‘cry’ | 咗 -zo ² or 住 -zyu ⁶ |
| Uncontrolled process | 嘔 (au ²) | ‘vomit’ | 咗 -zo ² or 住 -zyu ⁶ |
| Uncontrolled process | 拿 (naa ⁴) | ‘ache (sick)’ | 住 -zyu ⁶ |
| | 頂 (ding ²) | ‘ache (full)’ | |

A few divergent findings in Cantonese emerge compared to Sorace's ASH (2000). According to the ASH, non-motional process verbs, like 'play', 'work', and 'talk', represent a core unergative class, insinuating that this class would prefer only the imperfective marker. The evidence from Cantonese shows that the non-motional process verb 'cry' accepts either aspect marker, suggesting that this verb class cannot be a core unergative class.

The selection of aspect markers by uncontrolled process verbs appears to depend on the individual verb. 'Vomit' can select either aspect marker, while 'ache' (sick) and 'ache' (full) are evidenced to only select the imperfective marker. This finding seems to have similarities to Sorace's observation about the dependency on the animacy and agency of the subject correlating to aspect selection in Italian for uncontrolled process verbs. She finds that human, nonagentive subjects strongly select HAVE for bodily functions like *vomit*, *cough*, and *sneeze*, whereas inanimate subjects displaying an uncontrolled process like *ring*, *echo*, or *thunder* show variable selection (Sorace 2000:877). The opposite seems evident in Cantonese because 'vomit' requires a human subject (21), yet is observed to have variable aspect selection. On the other hand, 'ache' (sick) and 'ache' (full), can only correspond to the stomach, an inanimate subject, as seen in examples (19) and (20). It is ungrammatical to replace 'stomach' with 'person'. This evidence suggests uncontrolled process verbs affecting inanimate subjects may correspond to a core unergative class in Cantonese, not non-motional process verbs as the ASH suggests. This observation could mean that split intransitivity is indeed semantically based. However, traditional verb classes may not be the motivation of each split, but instead is on a verb-by-verb semantic basis.

5. EXPERIMENTS. To gain further insight and confirm—in a controlled and systematic fashion—the previously exhibited intuitions of native Cantonese speakers regarding intransitive verbs, two formal acceptability judgment experiments were additionally conducted. While elicitation sessions allow for detailed discussion and impromptu discoveries, utilizing a judgment experiment can control for unintended interactions or affects. The surveys concentrated on 10 verbs from five verb classes. The verbs controlled for animacy of their subject and meaning (i.e. as a main verb without need of a directional element), while the overall sentences were controlled for context, subject position, and limited elements that may affect acceptability. By using the same verbs throughout the experiments, I am able to compare results consistently. Moreover, a judgment experiment through a survey can reach far more participants in a limited amount of time than one-on-one elicitations, thus allowing for the ability to quantify intuition across a wide range of people. The benefits of the elicitations should not be shortchanged, however, because the data initially gathered through a flexible environment helped to shape the following two rigid experiments.

In both experiments, participants judged the acceptability of sentences on a Likert scale from 1 being totally unnatural to 7 being a totally natural Cantonese sentence.⁵ The instructions were to base their rating on the naturalness of the sentence in spoken Cantonese and not formal written language. Also, they did not need to analyze or correct the sentences, and the evaluation should be done by themselves, so the opinions are their own.

They were both administered through a Google Forms survey. This method was the best method to reach native Cantonese respondents located in different parts of the world, specifically located in Hong Kong, Macau, Singapore, Los Angeles, and New York.

Using *R* (R Core Team 2020) the participant ratings were converted into z-scores so the results measure how many standard deviations below or above the individual means are before being analyzed.

Interaction plots were created to visualize the means of verb classes and the subject position as well as if there is an interaction between the two factors in Experiment 1. An interaction plot was also created for Experiment 2 to visualize the means of verb classes and aspect marker, and to realize any interaction between those two factors.

The statistical analysis was determined by running linear mixed effects models with subject position and verb classes as fixed effects for Experiment 1 and verb classes and aspect markers for Experiment 2,

⁵ The first experiment actually had unnatural at 7 and natural at 1, but for ease of analysis purposes it was switched, and therefore the second experiment reflected the 1 unnatural to 7 natural Likert rating scale.

the individual differences among participants and differences among items calculated as random effects using lme4 package in R (Bates et al. 2015). *P*-values are calculated using the lmerTest package, which uses the Satterthwaite approximation for degrees of freedom (Kuznetsova et al. 2017). This model was used to find which conditions and interactions are significant predictors to acceptability.

5.1 EXPERIMENT 1: INVESTIGATING THE RELATIONSHIP OF INTRANSITIVE VERB CLASSES AND SUBJECT POSITIONS. The purpose of the first experiment is to gain empirical evidence through an acceptability judgment experiment to identify if there is a meaningful interaction between verb classes and sentence structure. The findings from native speaker elicitations suggest subject position as a diagnostic. Therefore, testing different intransitive verbs from different verb classes with various subject positions may suggest where along the verb classes a split would emerge.

The verb class factor tests for five levels: change of location, change of state, stative, motional process, and non-motional process. The subject position factor tests three levels: pre-verbal, post-verbal, and floating quantifier subject positions. It is predicted that judgments for pre-verbal subjects in all verb class levels would be rated similarly high. Post-verbal subjects and floating quantifier sentences are predicted to show a similar division between two groups: change of location, change of state, and stative verbs will cluster together with a marginal acceptability rate—lower than the pre-verbal subject sentences but not completely unacceptable—and motional and non-motional process verbs will cluster together being rated poorly near unacceptable on the scale. Results from this experiment supporting the prediction would mean that the UH accounts for split intransitivity, consistent with the findings from the elicitation as reported above.

5.1.1 MATERIALS. The experiment was designed so that participants would be able to judge the naturalness of various sentences consisting of target verbs and sentence structures with assorted lexicalizations.

Verb selection was based on the gradient described in Sorace’s ASH. Five verb categories were chosen to represent the broader hierarchy to include both core unaccusative and unergative verbs, as well as peripheral verbs.⁶ These verb classes are: change of location, change of state, stative, controlled motional process, and controlled non-motional process (see table 2). The two verbs selected from each class are compatible with a human subject to control for potential effects of animacy, thus 10 verbs from five classes were tested in total.

TABLE 2. Cantonese verbs tested according to the ASH verb classes

| Verb Class | Cantonese experimental verbs | English translation |
|-------------------------------------|--|---------------------|
| (a) Change of location | 翻嚟 (faan ¹ lei ⁴) | ‘come’ |
| | 出嚟 (ceot ¹ lei ⁴) | ‘go out’ |
| (b) Change of state | 死 (sei ²) | ‘die’ |
| | 消失 (siu ¹ sat ¹) | ‘disappear’ |
| (c) Stative | 停留 (ting ⁴ lau ⁴) | ‘stay’ |
| | 生存 (saang ¹ cyun ⁴) | ‘survive’ |
| (d) Controlled motional process | 跳舞 (tiu ³ mou ⁵) | ‘dance’ |
| | 跳 (tiu ³) | ‘jump’ |
| (e) Controlled non-motional process | 喊 (haam ³) | ‘cry’ |
| | 玩 (waan ²) | ‘play’ |

⁶ Uncontrolled process verbs were not selected for the experiments because of difficulty controlling for animacy.

Each verb was used in three structural conditions: pre-verbal subject, post-verbal subject, and with a floating quantifier. Each verb was also used in three basic structures, but involve different lexical items expect for the verb. The target sentence was embedded inside a complex sentence to provide some contexts to improve their naturalness and to make the purpose of elicitation less obvious. Therefore, the 10 verbs times three structural conditions times three lexicalizations were developed into 90 unique sentences which were distributed into three surveys using the Latin Square method, so 30 experimental sentences were tested in each survey. Each participant was able to judge each verb in each condition in varying lexicalizations. Predictions of experimental sentences were that 19 would be acceptable (all change of location and change of state verbs, only the pre-verbal subject conditions containing motional and non-motional process, and half of the stative verbs) and 11 would not. (23) provides a set of example sentences in each structural condition with the verb ‘disappear’. The verb is italicized while the target phrase is the embedded clause in bold.

(23) a. Pre-verbal subject condition

新任 市長 向 市民 宣布 兩個 細佬哥 喺 河邊
 san¹jam⁶ si⁵zoeng² hoeng³ si⁵man⁴ syun¹bou³ loeng⁵go³ sai³lou²go¹ hai² ho⁴bin¹ne
 w.elect mayor toward citizens announce two-CLF children PREP riverside
 消失。
siu¹sat¹
disappear
 ‘The new mayor announced to the public that **two brothers disappeared by the river.**’

b. Post-verbal subject condition

新任 市長 向 市民 宣布 喺 河邊 消失 兩個
 san¹jam⁶ si⁵zoeng² hoeng³ si⁵man⁴ syun¹bou³ hai² ho⁴bin¹ siu¹sat¹ loeng⁵go³
 new.elect mayor toward citizens announce PREP riverside disappear two-CLF
 細佬哥。
 sai³lou²go¹
 children
 ‘The new mayor announced to the public that **two brothers disappeared by the river.**’

c. Floating quantifier condition

新任 市長 向 市民 宣布 細佬哥 喺 河邊 消失
 san¹jam⁶ si⁵zoeng² hoeng³ si⁵man⁴ syun¹bou³ sai³lou²go¹ hai² ho⁴bin¹ siu¹sat¹
 new.elect mayor toward citizens announce children PREP riverside disappear
 兩個。
 loeng⁵go³
 two-CLF
 ‘The new mayor announced to the public that **two brothers disappeared by the river.**’

The experimental questions were put in random order for each survey. Distractor sentences were placed in between each experimental sentence so participants received more variety and the purpose of the survey would be less obvious.

The same 30 distractor sentences were used in each survey in the same order. These sentences were designed so there is a 50:50 ratio of acceptable and unacceptable sentences throughout the whole survey—experimental and distractor. Therefore, there were 10 sentences expected to be judged as acceptable and eight judged to be unacceptable or marginal. Some acceptable distractor sentences were similar to the experimental sentences but might include a prepositional phrase or aspect marker; these were intentionally not used for the experimental sentences to avoid unexpected interactions with the subjects or classifiers and/or affecting the meaning of the verb. Other acceptable sentences included verbs which had questionable intransitivity; therefore, they are not used as experimental sentences. The predicted unacceptable and

marginal sentences are due to utilizing Mandarin vocabulary rather than Cantonese, having a FQ that is expected to not be permissible, or being utterly ungrammatical.

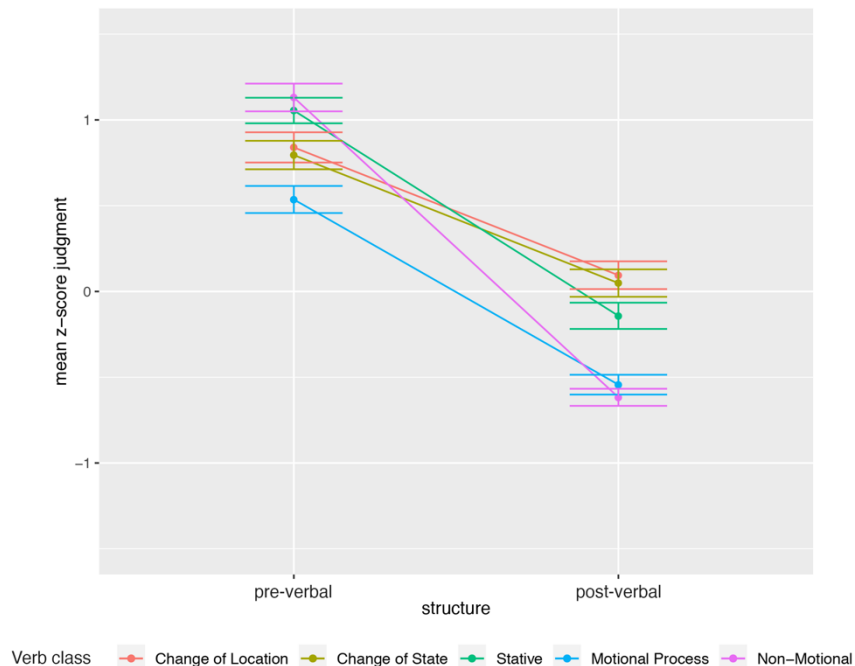
Each survey started with three practice sentences to judge. These were developed so that one would be rated acceptable, one unacceptable, and one somewhere in the middle. The participants were not told about practice nor distractor sentences. Each survey consisted of 63 judgment sentences followed by 10 demographic questions for each of the three versions. The survey was estimated to take 20 minutes to complete.

5.1.2 PARTICIPANTS. Participants were recruited through personal contacts and word-of-mouth. The only requirement was that they identified as native Cantonese speakers. For the first experiment 55 participated, but the data from two participants were excluded. One was eliminated because the participant was not a native Cantonese speaker and the other because it was the second survey submitted by the participant. There were 32 female participants, 20 male participants, and one person who preferred not to answer this question. Their ages range from 26-68 years old.

5.1.3 RESULTS. This experiment evaluates native speaker judgments of two factors: verb class and subject position. The verb classes test for five levels: change of location, change of state, stative, motional process, and non-motional process. The subject positions test three levels: pre-verbal, post-verbal, and floating quantifier. It is predicted that judgments for pre-verbal subjects in all verb class levels would be rated similarly high. An interaction between the verb classes and sentence structure is predicted to occur along the splitting of two verb class groups. Post-verbal subjects and floating quantifier sentences are predicted to show a similar division between two groups: change of location, change of state, and stative verbs will cluster together with a lower acceptability rate than the pre-verbal subject sentences, and motional and non-motional process verbs will group together to be rated poorly on the acceptability scale.

The analyses split the data in two to compare the z-score means for the pre-verbal subject with the post-verbal subject in the first analysis, and the pre-verbal subject and the FQ in the second. First, the results of the experiment testing the five verb classes with the pre-verbal and post-verbal structures is visualized in an interaction plot, figure 2.

FIGURE 2. Pre-verbal versus post-verbal interaction plot



The pre-verbal z-score means are higher than those of the post-verbal condition. The z-score means for all verb classes except motional process under the pre-verbal structure cluster around 1.0. Motional process

z-score mean is lower, at about 0.6. The non-motional z-score mean in the pre-verbal condition scored the highest, which is unexpected, and it is unknown why these sentences were judged so well. Comparatively, for the post-verbal structure judgments, visually there is evidence of a split between change of location, change of state, and stative clustering around 0, and motional process and non-motional process clustering around -0.5. From observation there should be a significant interaction between non-motional verbs and stative verbs with post-verbal structure.

The results of the linear mixed effect models are shown in table 3. The post-verbal structures are confirmed to be statistically significant ($\beta = -0.73$, $SE = 0.23$, $p = 0.00238$). Verb classes are not significant overall. However, there is significant interaction between the post-verbal structure and the non-motional process verb class ($\beta = -0.99$, $SE = 0.32$, $p = 0.0031$).

TABLE 3. Linear mixed effects models of pre-verbal and post-verbal subjects difference and its interaction with five verb classes⁷

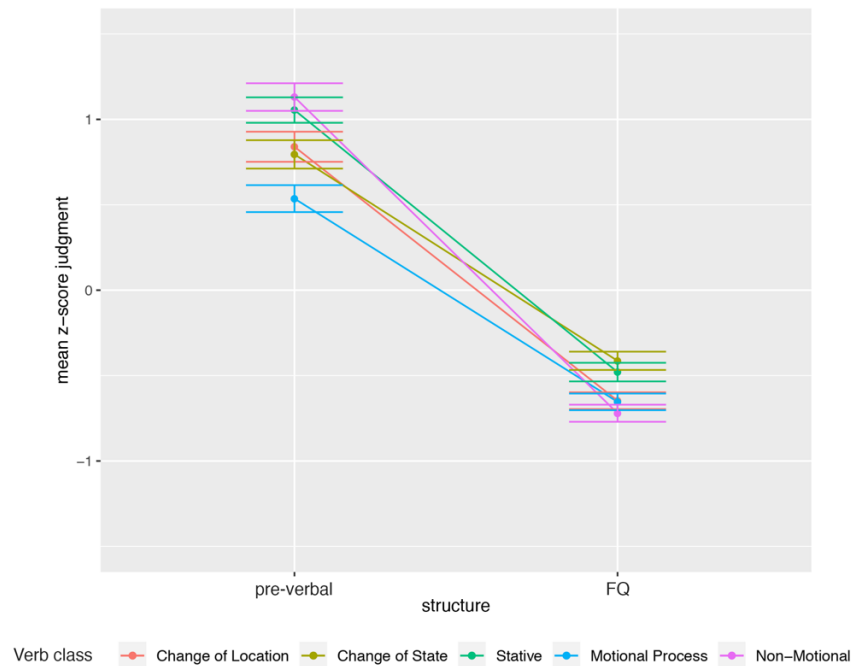
| Measure | Estimate | <i>t</i> -value | <i>p</i> -value |
|------------------------------|-------------|-----------------|------------------|
| (Intercept) | 0.83(0.16) | 5.19 | $p < .001^{***}$ |
| Post-verbal subject position | -0.73(0.23) | -3.2 | $p = .002^{**}$ |
| Class 2 | -0.05(0.23) | -0.21 | $p = 0.84$ |
| Class 3 | 0.21(0.23) | 0.93 | $p = 0.36$ |
| Class 4 | -0.30(0.23) | -1.33 | $p = 0.19$ |
| Class 5 | 0.28 (0.23) | 1.22 | $p = 0.23$ |
| Post-verbal x Class 2 | -0.00(0.32) | -0.00 | $p = 0.1$ |
| Post-verbal x Class 3 | -0.45(0.32) | -1.39 | $p = 0.17$ |
| Post-verbal x Class 4 | -0.34(0.32) | -1.05 | $p = 0.3$ |
| Post-verbal x Class 5 | -0.1(0.32) | -3.1 | $p = 0.003^{**}$ |

‘***’ $p \leq 0.001$, ‘**’ $p \leq 0.01$

The second analysis of z-score judgments for the verb classes interacting with pre-verbal structures and FQ structured sentences are shown in figure 3.

⁷ Class 2 = Change of state, Class 3 = Stative, Class 4 = Motional process, Class 5 = Non-motional process

FIGURE 3. Pre-verbal versus floating quantifier interaction plot



The FQ structured sentences, regardless of the verb class used, are all judged below the mean, all hovering around -0.6. This result is unexpected, since the original elicitations indicated that verb class would influence acceptability of FQ structured sentences. With all of the verb classes being judged so poorly, this indicates that verb class is not the issue but the actual FQ structure, which should be significant but not in the expected conditions of that significance. There also does not seem to be a significance in interaction between verb classes and structure.

The results of the linear mixed effect models, table 4, show that FQ structures are significant ($\beta = -1.48$, $SE = 0.19$, $p < 0.001$). Again, verb classes are not significant overall. Moreover, there is no significance between the FQ structure and any verb classes.

TABLE 4. Linear mixed effects models of pre-verbal and floating quantifier subjects difference and its interaction with five verb classes⁸

| Measure | Estimate | <i>t</i> -value | <i>p</i> -value |
|---------------------|-------------|-----------------|------------------|
| (Intercept) | 0.83(0.13) | 6.26 | $p < .001^{***}$ |
| FQ subject position | -1.48(0.19) | -7.87 | $p < .001^{***}$ |
| Class 2 | -0.05(0.19) | -0.25 | $p = 0.8$ |
| Class 3 | 0.21(0.19) | 1.12 | $p = 0.27$ |
| Class 4 | -0.30(0.19) | -1.61 | $p = 0.11$ |
| Class 5 | 0.28(0.19) | 1.47 | $p = 0.15$ |
| FQ x Class 2 | 0.28(0.27) | 1.06 | $p = 0.29$ |
| FQ x Class 3 | -0.45(0.27) | -0.17 | $p = 0.87$ |
| FQ x Class 4 | 0.29(0.27) | 1.11 | $p = 0.27$ |
| FQ x Class 5 | -0.35(0.27) | -1.32 | $p = 0.19$ |

***, $p \leq 0.001$

Because of the lower than expected results for motional process and the high acceptability of non-motional process pre-verbal subject scores, breaking down the data at the individual verb level over all structures is investigated, displayed in figure 4.

FIGURE 4. Judgments of individual verbs across each structure

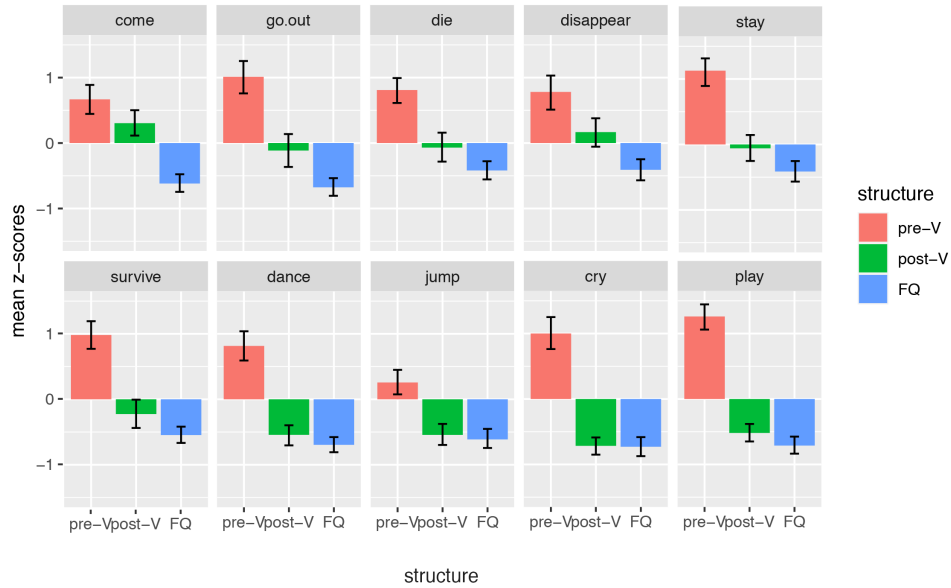


Figure 4 reveals the reason for the motional process verb class receiving lower acceptable judgments than the other four classes. Instead of resulting in a score similar to ‘dance’ (0.8), the other verb tested in this category, ‘jump’, had a z-score of around 0.3. This lowers the overall score of the class, leaving it an outlier from the rest of the class judgments within the pre-verbal structure.

Furthermore, while the interaction plot for the comparison between the mean z-scores for the pre-verbal subject condition and the post-verbal subject condition shows that there is a grouping for verbs in change

⁸ Class 2 = Change of state, Class 3 = Stative, Class 4 = Motional process, Class 5 = Non-motional process

of location, change of state and stative, the participants were more willing to allow the subject and classifiers to follow the verbs ‘come’ and ‘disappear’ more than the other verbs in these classes, mainly ‘go out’, ‘die’, ‘stay’ and ‘survive’. The verbs ‘dance’, ‘jump’, ‘cry’ and ‘play’ in the post-verbal structure are highly disliked, supporting the split division of verb classes seen in the interaction plot.

Statistically analyzing the individual verbs, the interaction between the post-verbal structure and both non-motional verbs ‘cry’ ($\beta = -1.32$, $SE = 0.47$, $p = 0.0073$) and ‘play’ ($\beta = -1.37$, $SE = 0.47$, $p = 0.0055$), as well as with ‘dance’ ($\beta = -0.97$, $SE = 0.47$, $p = 0.0448$) from the motional process class, are significant. Importantly, there is no significance in interaction with ‘jump’ ($\beta = -0.41$, $SE = 0.47$, $p = 0.3842$), the other verb tested in the motional process class. The p -values for the interaction between the post-verbal structure and the two stative verbs ‘stay’ and ‘survive’ are not quite significant. And there is no significance for the post-verbal structure and the classes of change of location and change of state.

In contrast, all verbs in a FQ structure result in z-scores well below the mean. Participants judging these sentences as unacceptable overall is an unexpected result. The only significant individual verb is ‘play’ ($\beta = 0.55$, $SE = 0.27$, $p = 0.0518$). There is no significant interaction between the FQ structure and any individual verbs.

5.1.4 DISCUSSION OF EXPERIMENT 1. The data from Experiment 1 provides partial support of the UH. The analysis of the Cantonese intransitive verbs along the line of the UH developed in Section 3 predicted a split among change of location, change of state, and stative verb classes versus controlled motional processes and controlled non-motional processes. The post-verbal structure is significant in determining acceptability of verb classes, where a clear split between two groups emerged. But due to the lower than expected acceptance of the pre-verbal condition containing the verb ‘jump’, a monolithic split between canonical unaccusative and canonical unergative verbs cannot be confirmed.

Most surprisingly, the data between the elicitation session and the first experiment conflict in regards to the FQ structure. It could mean that the FQ structure is not an appropriate diagnostic for split intransitivity being that they were all judged lower than the average in the survey. But because of the initial observance of acceptable FQ sentences, I interviewed a few of the participants after concluding the survey experiments as to why. The answer was that acceptability depended on the context. This suggests that the FQ structure is highly sensitive to contexts and possibly more restricted in embedded contexts than root contexts. According to a study by Kush et al. (2019), they found that “island effects” were potentially behind acceptability of topicalized phrases in Norwegian, a language where topicalized sentences are often observed in natural discourse. These “island effects” highly depended on context; participants judging sentences absent of context were rated lower than those in the presence of context. This phenomenon may be the reason why the elicited sentences with floating quantifiers were deemed acceptable in Cantonese, but because the target clause was embedded in the survey experiment so its NP was topicalized to strand the quantifier without context, participants judged those sentences, no matter the verb class, as unacceptable. Further work on FQ in Cantonese will need to be done to control for this possible development.

5.2 EXPERIMENT 2: ASPECT MARKER SELECTION. The purpose of the second experiment is to find meaningful interaction between the verb classes and aspect marker selection. From the elicitations aspect marker selection may be a diagnostic of an intransitive verb hierarchy. The prediction is that if the ASH could account for Cantonese split intransitivity, then participant judgment would display a gradual distinction between each class of verbs, and an aspect selection contrast would emerge.

5.2.1 MATERIALS. For consistency, the five verb classes, 10 verbs, and overall sentence structures from the first experiment were reused for this experiment, although with different lexicalization. The same perfective 咗 $-zo^2$ and imperfective 住 $-zyu^6$ aspect markers are carried over from the initial elicitations. Again, the perfective marker is expected to be highly compatible with core unaccusative verbs such as change of location verbs (according to the ASH), while the imperfective marker is expected to be highly compatible with core unergative verbs such as non-motional process verbs (also according to the ASH).

Peripheral verbs are expected to be judged to accept both aspect markers quite similarly—neither high nor low.

For this experiment, each target verb was used in two different lexicalizations, therefore there were a total of 20 unique sentences. These sentences were wholly distinct from the sentences in the first experiment. With each sentence paired with each of the aspect markers being researched there were 40 experimental sentences. These were split between two lists so that each survey would be composed of every lexicalization, but the aspect marker would be different for each sentence per list. From the observations made in the one-on-one elicitation session, it is predicted that each survey was expected to have four acceptable sentences (perfective change of location and change of state verbs), eight sentences of marginal acceptability (all stative verbs and the imperfective motional and non-motional process verbs), and eight sentences deemed unacceptable (imperfective change of location and change of state, and perfective motional and non-motional process verbs).

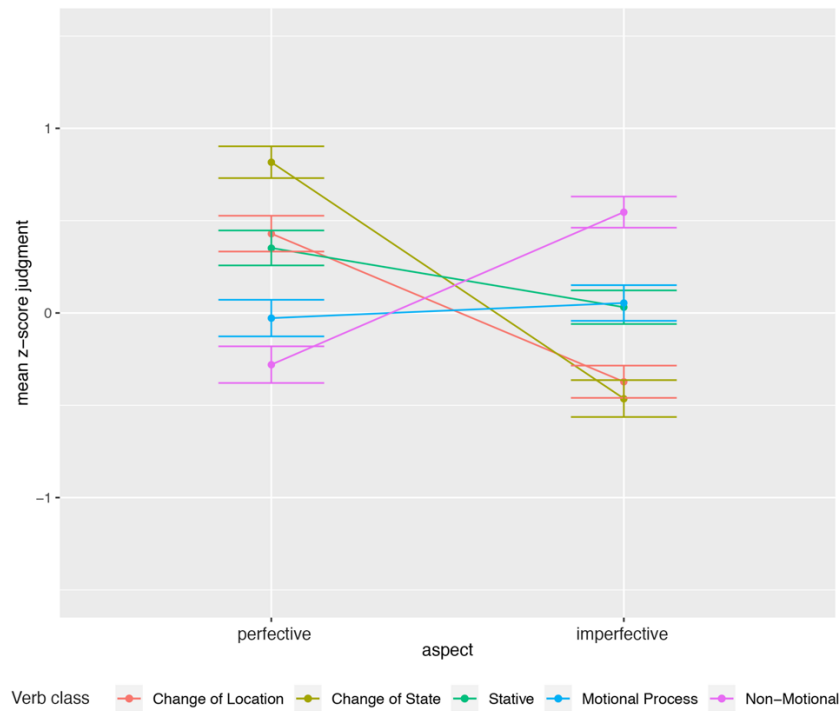
As with the experiment one, this experiment had distractor sentences. These 20 distractor sentences were distinct from the previous experiment and were used in each survey in the same order. These sentences were designed so there would a balanced ratio of acceptable, mid-range acceptable, and unacceptable sentences throughout the whole survey—experimental and distractor. Therefore, there were nine sentences expected to be judged as acceptable, six marginal and five totally unacceptable. Acceptable sentences were similar to the experimental sentences but the verbs being tested were not the same. Marginal sentences used more Mandarin vocabulary or grammar, or may have missing particles which do not negatively impact the sentence completely. Unacceptable sentences were due to ungrammaticality.

The experimental sentences were put into a pseudo-random order, with a distractor sentence in between every other one to eliminate repetition and to ensure that there would not be any clues as to what is being tested. At the beginning there were three practice sentences; like the previous experiment, these were developed so that one would be rated acceptable, one unacceptable, and one somewhere in the middle. The participants were not told about practice nor distractor sentences. Each survey consisted of 43 judgment sentences followed by 11 demographic questions. This survey was estimated to take 15 minutes to complete.

5.2.2 PARTICIPANTS. Participants were recruited the same way as the previous experiment: via personal contacts and word-of-mouth. A total of 41 participants completed the survey, but data from one participant were excluded because the submission was deemed invalid due to the fact that the participant rated the sentences with only a 1 or a 7. Nineteen responses were from females, 20 from males, and one person declined to answer. Their ages ranged from 18–68, and 24 participants overlapped between the two experiments.

5.2.3 RESULTS. Figure 5 depicts the interaction plot of the acceptability results from Experiment 2 of aspect markers and verb class.

FIGURE 5. Aspect marker and verb class interaction plot



Upon visual observation it is likely that an interaction occurs between aspect markers and verb classes. A somewhat gradual progression of acceptability of perfective aspect markers is detected starting with non-motional process around -0.5 to the most accepted verb class, change of state, at 0.8. On the other hand, the imperfect marker with non-motional class verbs was judged most acceptable at around 0.55, while the most unacceptably judged are the change of state verbs at -0.45. It is interesting that the imperfective marker has about a z-score of 0 for both stative and motional process class verbs. Instead of a gradual progression of acceptability of the imperfect marker, the results show a distinct 3-way grouping.

The results of the linear mixed effect models are shown in table 5. The aspect marker is confirmed as a significant predictor of acceptability ($\beta = -0.8$, $SE = 0.31$, $p = 0.00152$). Non-motional process class verbs are also significant at ($\beta = -0.7$, $SE = 0.31$, $p = 0.03$). As for interactions, there are two that are significant: non-motional process verbs ($\beta = 1.62$, $SE = 0.44$, $p < 0.001$) and motional process verbs ($\beta = 0.89$, $SE = 0.44$, $p = 0.0522$).

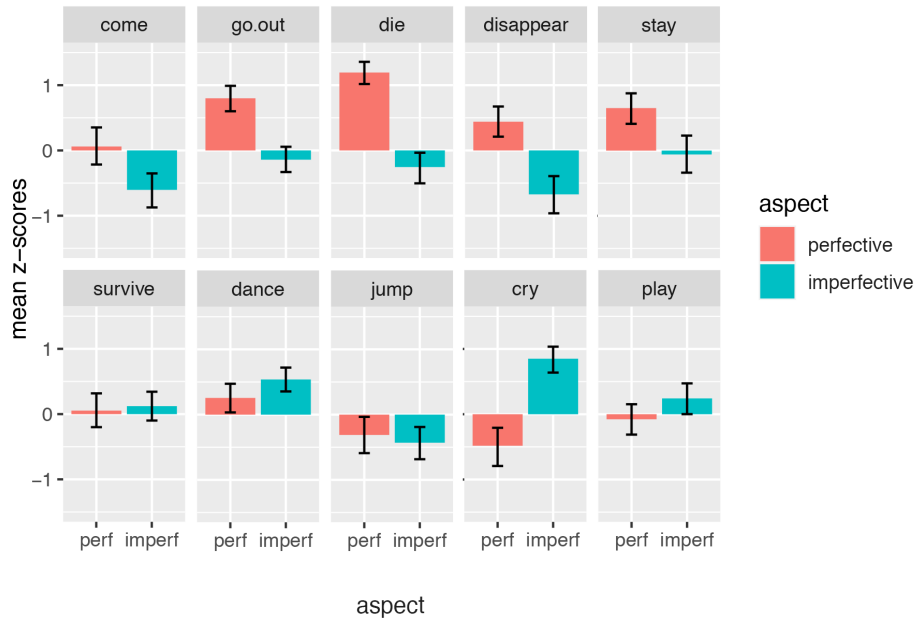
TABLE 5. Linear mixed effects model of perfective and imperfective aspect markers and its interaction with five verb classes⁹

| Measure | Estimate | <i>t</i> -value | <i>p</i> -value |
|---------------------|-------------|-----------------|--------------------|
| (Intercept) | 0.43(0.22) | 1.97 | <i>p</i> = 0.06 |
| Imperfective aspect | -0.8(0.31) | -2.57 | <i>p</i> = 0.015* |
| Class 2 | 0.37(0.31) | 1.2 | <i>p</i> = 0.24 |
| Class 3 | -0.08(0.31) | -0.25 | <i>p</i> = 0.8 |
| Class 4 | -0.46(0.31) | -1.49 | <i>p</i> = 0.15 |
| Class 5 | -0.7(0.31) | -2.25 | <i>p</i> = 0.03* |
| Aspect x Class 2 | -0.47(0.44) | -1.06 | <i>p</i> = 0.3 |
| Aspect x Class 3 | 0.47(0.44) | 1.08 | <i>p</i> = 0.29 |
| Aspect x Class 4 | 0.89(0.44) | 2.02 | <i>p</i> = 0.052* |
| Aspect x Class 5 | 1.82(0.44) | 3.67 | <i>p</i> < .001*** |

***, *p* ≤ 0.001, **, *p* ≤ 0.05

A more detailed inspection of each individual verb is conducted so that a comparison across the two experiments at verb level could be made. The influence of each individual verb and the interaction with aspect marker selection is plotted out in figure 6.

FIGURE 6. Judgments of individual verbs across aspect selection.



The verbs ‘die’ and ‘cry’ may be of significance because the perfective marker is judged as highly acceptable for ‘die’ and the imperfective marker is judged as highly acceptable for cry. Also, the scores for the verb ‘jump’ contrasts with those of ‘dance’, the other verb in the motional process class. The difference between the two verbs in Experiment 2 is similar to the differing results of these two verbs for Experiment 1.

⁹ Class 2 = Change of state, Class 3 = Stative, Class 4 = Motional process, Class 5 = Non-motional process

The statistically significant individual verbs are ‘go out’ ($\beta = 0.74$, $SE = 0.33$, $p = 0.035$), ‘die’ ($\beta = 1.13$, $SE = 0.33$, $p = 0.003$) and ‘stay’ ($\beta = 0.6$, $SE = 0.33$, $p = 0.083$). Interaction significance is between the aspect marker and the verbs ‘dance’ ($\beta = 0.95$, $SE = 0.46$, $p = 0.053$), ‘cry’ ($\beta = 1.96$, $SE = 0.46$, $p = 0.0004$), and ‘play’ ($\beta = 0.99$, $SE = 0.46$, $p = 0.046$).

5.2.4 DISCUSSION OF EXPERIMENT 2. The data from Experiment 2 is inconclusive to confirm or deny the ASH accounting for Cantonese split intransitivity. There is a gradual acceptability trend occurring between verb classes and each aspect marker, but the trend is not significant enough to claim support for the theory. However, the data does suggest a three-way division of aspect marker acceptability based on verb class: 1) the perfective aspect marker preference of change of state and change of location verbs (except for ‘come’) and the stative verb ‘stay’, 2) no clear preference between the two aspect markers for the stative verb ‘survive’ and motional process verbs, and 3) the imperfective aspect marker preference of non-motional process verbs.

The expectation for Experiment 2 is a gradual acceptance of the perfective aspect marker 咗 $-zo^2$. It would strongly correlate with change of location then change of state, and the remaining verb classes—stative, controlled motional processes and controlled non-motional processes—would be variable between the perfective and the imperfective. Instead, the strongest correlation with the perfective marker is with change of state, then change of location. Stative verbs have a slight preference for the perfective 咗 $-zo^2$, while controlled motional process is variable between the two aspect markers. The imperfective marker is significantly correlated with non-motional process verbs. Similar to the complex findings of Laws and Yuan (2010) with Mandarin, the Cantonese results are just as messy. The data shows the extreme difference between change of state verbs and non-motional process verbs, which signify that the core categories do not match those of the ASH. Laws and Yuan argue that core-peripheral distinctions differ across languages, and I believe the Cantonese data supports that observation. Furthermore, the behavior of the motional process verbs with the aspect markers is unexpected since there is no meaningful difference in the selection of either. Compared with the ASH, this verb class is expected to have a preference for 住 $-zyu^6$ with little variation, not an indifference to aspect selection as exhibited.

6. SYNTHESIZED DISCUSSION OF FINDINGS FROM ELICITATIONS AND EXPERIMENTAL DATA COLLECTION. By utilizing native speaker elicitations and two experimental studies, split intransitivity is evident in Cantonese, and the results only show partial support to each analysis—the UH and the ASH—as accounting for the phenomenon. The only consistent result was of the non-motional process verb class having significant interactions in both formal experiments. The diagnostics, the position of subject with respect to intransitive verbs and classifiers and aspect marker selection, were deemed statistically significant, and the data suggested a two-way split and a possible three-way split respectively, so is one theory more conclusive in terms of describing split intransitivity in Cantonese?

If we are looking at which analysis results in a better fit with their claims then the UH, claiming two distinct groupings of intransitive verbs, fares a bit better, if only because it makes a concrete argument. The results are more or less compatible with that characterization of split intransitivity, but noises within the unaccusative group from individual verbs like ‘come’ and ‘disappear’ make the analysis of one single split less confident. If the floating quantifier diagnostic had resulted in a binary split, then there would be more evidence supporting the UH, but because of issues with topicalization in the sentences, this diagnostic was incompatible.

The ASH, while the theory contends to apply cross-linguistically, however, does not claim to be the same hierarchy across all languages. Sorace (2000) clearly states that cutoff points of verb classes are different cross-linguistically and even verb classes may differ from those in the ASH. So the mapping that this research has conducted suggests sensitivity at two cutoff points among five verb classes, and possible core classes being change of state verbs (unaccusative) and non-motional process verbs (unergative).

I believe the most salient finding from this research suggests split intransitivity sensitivity at the lexical level instead of the combined properties of an entire class, fitting a *projectionist model* (Levin and Rappaport 1995, McFadden 2007). The variability among the verbs that are putatively recognized to be in

the same verb class raises questions. The projectionist view allows for behavioral exceptions to the standard, which is seen in the data represented here for Cantonese. For instance, an issue recurring in both experiments was the acceptability of sentences utilizing the verb ‘jump’. The results were in stark contrast to ‘dance’, the other verb in the motional process class. In Experiment 1, the pre-verbal structure for ‘jump’ was judged well below 1.0, lagging all the other verbs. In Experiment 2, both imperfective and perfective markers for ‘jump’ were judged negatively below the mean. Something about this verb was not conducive to the experiment, perhaps because directional elements (i.e. up, down, out) were omitted so as not to create unexpected effects on the meaning of the verb, though it may have improved the naturalness of the sentence.

During the elicitation the example sentence ‘The child is jumping’ was acceptable. In this sentence the progressive aspect marker 緊 -gan² was used. I suspect that ‘jump’ may be a special case where context may play a role, but it also may not fit into the class of intransitivity like those of Western European languages. As Liu (2007:193–194) reports, there are intransitive verbs in Mandarin, like ‘jump’, ‘run’, and ‘walk’, whose use is not uniform or even restricted, but it is not explicitly known why. Yiu (2013) has described syntactic and semantic characteristics of directional verbs and movement verbs in Cantonese, characterizing ‘jump’, ‘run’, and ‘walk’ as self-agentive motion events, whereas change of location verbs are agentive. This nuanced semantic differentiation and the complexities found in directional verbs may be an essential link in unlocking the behavior of intransitive verbs in Cantonese, which also supports the need for verb based investigation.

Some individual verbs and their interactions did reveal significance. From the elicitations, the uncontrolled process verb class seems to be a contender for the core unergative in the hierarchy, but only at an individual verb level due to semantic differences between ‘ache’ and ‘vomit’. However, these verbs are not tested in the formal experiments, due to issues with controlling for animacy of subjects. Instead, the experiments strongly suggest non-motional process verbs to be a core unergative class. Variability within the change of location class verbs ‘come’ and ‘go out’, as well as the stative class verbs ‘stay’ and ‘survive’, lead to inconclusive interpretations. Similar to the results of Laws and Yuan (2010), there is considerable variation at verb level, meaning any generalizations at the class level need to be verified at verb level.

While the previous research in Mandarin (Liu 2007; Laws and Yuan 2010), the most closely related language to Cantonese, has organized intransitive verbs into a hierarchy based on their selection of aspect markers, I cannot claim a concrete hierarchy in Cantonese. There are too many unpredictable behaviors with intransitive verbs to comfortably make any clear statements regarding their organization. The only explicit result is that Cantonese exhibits the phenomenon of split intransitivity.

A future investigation testing more verbs across all classes, through elicitations and experimental methods, would assist in potentially categorizing the verb classes and individual verbs into groupings for Cantonese. The two diagnostics utilized in this study, subject position and aspect marker, produced different results in terms of how verbs are grouped, which raises this question: if they both are indeed diagnostics of split intransitivity, why are the 10 experimental verbs categorized differently? Therefore, additional diagnostics of split intransitivity for Cantonese, like testing floating quantifiers within contexts, would benefit future inquiries.

7. CONCLUSION. In this paper, I investigated how the phenomenon of split intransitivity is manifested in two characteristics of Cantonese morphosyntax. First, using a syntactic approach, I am able to account for the differing behavior of intransitive verbs in Cantonese displaying a two-way split based on contrasting pre-and post-verbal subject positions. Second, the diagnostic of auxiliary selection supports a possible three-way gradient approach to intransitive verbs. The elicitations and experiments are not wholly conclusive on the accountability of the UH nor the ASH. Some individual verbs prove to be significant, indicating that more research is needed, and split intransitivity, at least for Cantonese, potentially requires a lexically based account.

Both theoretical approaches are of value in this paper and perhaps add to the discussion that verb distinction may be semantically determined and syntactically encoded, which could apply to the behavior seen in many of the world’s languages.

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jsou@hawaii.edu