Inner and outer aspect in Cantonese

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1 Introduction

Chinese languages have a rich aspectual system, including post-verbal aspectual markers and a variety of other indicators. There is a large literature on Mandarin Chinese, but less on other varieties such as Cantonese (see Yip 2025 for a recent discussion). In this abstract, we first briefly summarize the literature (needless to say, it would not be exhaustive), then we sketch an analysis for Cantonese. Our goal is to have a preliminary analysis suitable for implementation in a broad computational grammar. We are using the DELPH-IN framework (Uszkoreit 2002) for the grammars, with Minimal Recursion Semantics for the meaning representation (Copestake et al. 2005).

The notion of aspect can be divided into two kinds: viewpoint aspect and situation aspect. Viewpoint aspect is concerned with the temporal perspective of the event. It encodes how much of a situation is made visible grammatically (Smith 1994): perfective and imperfective viewpoints. Situation aspect (lexical aspect or aktionsart) is concerned with the internal structure of the situation. There are five situation types: State, Accomplishment, Achievement, Activity, and Semelfactive, expressed in term of binary feature composition (+/-telic, +/-durative, +/-static) (Smith 2019).

states	'know'	−telic,	+durative,	+static
activities	'run'	−telic	+durative,	−static
accomplishments	'build a house'	+telic,	+durative,	−static
achievements	'die'	+telic,	−durative,	−static
semelfactives	'cough'	-telic,	-durative,	-static

It has been claimed that there are no mono-morphemic verbs in Mandarin that express accomplishments or achievements: mono-morphemic verbs in Mandarin express either states or activities, accomplishments and achievements are derived syntactically (Sybesma 1997, Lin 2004). This is not without exceptions: there are also verbs like 死 sǐ 'die', which arguably are +telic, −durative, −static. However, most accomplishments and achievements are produced syntactically. For example, 看 kàn 'look' in Mandarin Chinese is an activity verb (-telic, +durative,−static), while 看到 kàn-dào "see" (lit. 'look-arrive') is an achievement verb (telic, −durative, −static). The post-verbal particle 到 dào adds an end point to the activity of looking (changing the event from -telic to +telic) and making the internal structure of the event inaccessible (changing the event from +durative to -durative). For examples of accomplishments, in Cantonese 擦乾 caat3gon1 'wipe-dry' is an accomplishment (+telic, +durative, −static). 擦 caat3 'wipe' is an activity and the result 乾 gon1 'dry' makes the event into an accomplishment; it is compatible with the progressive particle 緊 gan2 (Lu et al. 2019).

In Chinese, there are different kinds of post-verbal particles that are related to aspectual properties. Some particles can shift the situation aspect (as shown in the previous paragraph). Structurally they are referred to as inner aspectual particles (Sybesma 2017), as they occupy the inner most aspectual layer (closer to the root verb). There are, at least, two kinds of inner aspectual particles (relating to situation aspect): resultative particles and phase complements (Sybesma 2017). Resultative particles have lexical meaning, can be used as predicates on their own, and also provide an endpoint to the action encoded by the verb (e.g. the Mandarin 飽 bǎo 'satiated' as in 吃飽 chī-bǎo 'eat-satiated'). Such endpoints (e.g., 'satiated') also encode a thematic relation either to the subject or the object (e.g., the subject is satiated in an event of 'eat-satiated'). Phase complements (Chao 1965) are

particles that are semantically bleached (e.g., 到 dào ‘arrive’ in 看到 kàn-dào ‘see’, lit. ‘look-arrive’), they provide an endpoint to the event. For both types of inner aspectual particles, in addition to adding an end-point, they also make the internal structure of the event inaccessible (creating an achievement predicate). Resultative particles and phase complements do not co-occur. Viewpoint aspect is normally marked by outer aspectual particles, they signal whether the event has reached its endpoint or not (e.g., the perfective marker 了 le in Mandarin). Viewpoint aspectual particles appear to the right-hand side of inner aspectual particles. We will refer to them as outer aspectual particles.

Yip (2025) identifies 14 inner aspectual particles in Cantonese based on the following criteria: (i) A morpheme following the verbal root; (ii) Contributes to aspectual meaning; (iii) Can be followed by the perfective suffix 咗 -zo2; and (≠ outer aspect); (iv) Cannot undergo verb doubling alone. Due to (iv), he treats 飽 baau2 ‘satiated’ in 食飽 sik6-baau2 ‘eat-satiated’ in Cantonese as a resultative verbal complement (RVC), while 完 jyun4 ‘finish’ in 食完 sik6-jyun4 ‘eat-finish’ as an inner aspectual particle.

(1) Cantonese (yue)

a. 飽 ， 佢 係 已經 食飽 咗 嘅
baau2 , keoi5 hai6 ji5ging1 sik6baau2 zo2 ge2
full , 3SG BE already eat-satiated PERF SFP

‘As for becoming full, s/he has already eaten and become full.’

b. *完 ， 佢 係 已經 食完 嗰 碗 飯 嘅
jyun4 , keoi5 hai6 ji5ging1 sik6jyun4 go2 wun2 faan6 ge2
full , 3SG BE already eat-finish that CL rice SFP

‘As for eating, s/he has finished eaten that bowl of rice.’

We concur that there is a distinction between elements like 飽 baau2 ‘satiated’ and 完 jyun4 ‘finish’ when appearing after the verbal root (as the contrast in the above examples show), but in both cases, such elements provide an endpoint to the event and the whole event, after the addition of such element, becomes an achievement. We will adopt the following definition for inner aspectual particles: (i) A monosyllabic morpheme following the verbal root; (ii) Contributes to situation aspectual meaning; (iii) Can be followed by aspectual particles denoting viewpoint aspect; (iv) changes the event into an achievement. Note that this means, with our definition, we exclude cases like 乾 gon1 ’dry’ in 擦乾 caat3gon1 ’wipe-dry’ in Cantonese as an inner aspectual particle, because the resulted event is an accomplishment. We do not discuss cases like 乾 gon1 ’dry’ in 擦乾 caat3gon1 ’wipe-dry’ in this paper. This however suggests that a line has to drawn between what is considered an inner aspectual particle and what is considered simply a monosyllabic resultative adjective. As of now, we consider an element as an inner aspecual particle if it fulfils our 4 criteria.

In Zhong (Fan 2019), inner aspectual particles are treated as part of the verb, following the Penn Treebank segmentation, but it is not an ideal treatment due to their productivity. Most HPSG discussions of aspect and implemented grammars deal only with outer aspect (Muller & Lipenkova 2013, Fan 2019, Da Costa 2021). In this paper, we propose an HPSG implementation of both inner and outer aspectual particles for Cantonese. The analysis is implemented in an open-source Cantonese HPSG.[1]

2 Data

Cantonese has a rich inventory of aspectual particles. Outer aspectual particles include: 咗 zo2 (perfective), 緊 gan2 (progressive), 過 gwo3 (experiential), zyu6 (continuous activity or state without change), ha5 (delimitative) (Matthews & Yip 2013). Inner aspectual particles, as mentioned earlier on, are of two kinds: resultative particles and phase complements (Sybesma 2017). The general understanding is that resultative particles carry lexical meanings, predicative of the subject or the object and denote the end-point of events. In contrast, phase complements are particles that are generally semantically bleached and do not contain any predicative meaning. However, a closer look at a range of Cantonese inner aspectual post-verbal particles show that the clear dichotomy is not without problems. For instance, the post-verbal particle 親 can1, when added to an activity verbs like 撞 zong6

[1]The implementation, using the DELPH-IN tools, is available at ⟨https://github.com/neosome/yue⟩.

'bump into', denotes an unspecified degree of bodily harm to either the subject or the object (depending on factors such as animacy of the arguments) (Sio 2020). However, it cannot be used as an independent predicate. It can only be used in the post-verbal position as a particle. In contrast, the post-verbal particle 完 jyun4 'finish' has a clear lexical meaning, can be used as an independent predicate, and yet it is not predicative of either the subject or the object when added to an activity verb like 油 jau4 'paint', it simply adds an end-point to the event of painting. This suggests that the dichotomy, as defined above, might not represent the correct division.

In this paper, we look at three kinds of Cantonese post-verbal particles: (OAP) outer apectual particles and inner aspectual particles that provide an end-point to the event: (IAPi) those that are predicative of an individual; (IAPe) those that are only linked to an event. We give examples of these in Table (1).

We will only be incorporating a subset of all the aspectual particles into the Cantonese HPSG grammar for this paper, which would be sufficient to be illustrative of OAP, IAPi and IAPe, but not exhaustively:

- OAP: 咗 zo2 (perfective), 緊 gan2 (progressive), 過 gwo3 (experiential), 住 zyu6 (continuous activity or state without change), 吓 ha5 (delimitative: 'do . . . for a while')
- IAPi: 飽 baau2 'satiated', 死 sei2 'die', 親 can1 'hurt to a non-specific degree'
- IAPe: 完 jyun4 'finish', 好 hou2 'good', 到 dou2 'complete' (lit. 'arrive'), 掂 dim6 'fixed'

The ordering of post-verbal particles in the verbal cluster is always V-IAP-OAP and IAPi and IAPe do not co-occur.

(2) Cantonese (yue)

a. 我 食 咗/緊 麵
ngo5 sik6 zo2/gan2 min6
1SG eat PERF/PROG noodles

'I have eaten noodles'/ 'I am eating noodles' V-OAP

b. 我 食飽 *(咗)* 麵
ngo5 sik6baau2 zo2 min6
1SG eat-satiated PERF noodles

'I have eaten noodles to the point that I am full' V-IAPi-OAP

c. 我 食完 *(咗)* 麵
ngo5 sik6jyun4 zo2 min6
1SG eat-finish PERF noodles

'I have finished eating noodles' V-IAPe-OAP

There are selectional criteria between the event (situation type) and the OAP. Regarding our selected set of inner aspectual particles, when they are added to the root verb, the event becomes an achievement, and is consequently incompatible with any imperfective viewpoint aspect (e.g., progressive, experiential, etc.). The OAP 吓 ha5 (delimitative) is only compatible with activities, and thus are not compatible with events that contain any IAP (which always provide an end-point, making the event +telic). Such idiosyncrasies among the different requirements of individual particles will also be taken into account.

Particle		Meaning	type	zo2	gwo3	gan2	zyu6	ha5
飽	baau2	full	x	+	+	-	-	-
死	sei2	die	x	+	+	-	-	-
親	can1	hurt	x	+	+	-	-	-
完	jyun4	finish	e	+	+	-	-	-
好	hou2	good	e	+	+	-	-	-
到	dou2	complete	e	+	+	-	-	-
掂	dim6	fixed	e	+	+	-	-	-

Table 1: Co-occurrence of Inner and Outer Aspect Particles

3 Analysis

Here we give the main points of our analysis. The descriptions given are only partial, we omit information not relevant to the discussion at hand. We are trying, as far as possible, to keep our analyses similar to those implemented for Mandarin in Zhong (Fan 2019) so we can compare them easily.

3.1 Outer Aspect

This is the most commonly marked aspect, the majority of sentences have some outer aspect marker. We list the markers in Table 2.

Particle		Aspect	Comment
zo2	咗	perfective	
gwo3	過	experiential	
gan2	緊	progressive	- stative (dynamic)
zyu6	住	continuous	activity or state without change
ha5	吓	delimitative	

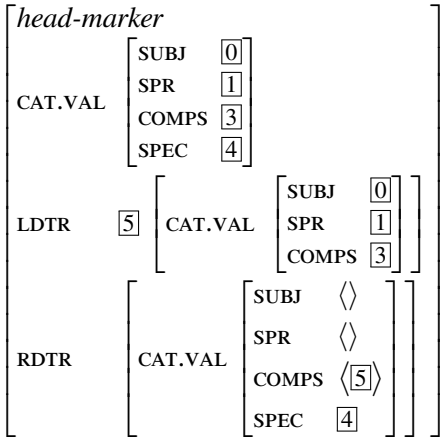
Table 2: Outer Aspect

Because the outer aspectual markers only change the aspect of the verb they attach to, we chose to model then as markers.

The SPEC feature on the mother will be determined by the marker. We enable aspect-markers to constrain their complement to be SPEC non-empty (notionally compatible with combining with a marker), but stamp SPEC empty on the mother to block iteration of marker attachments. Then aspect markers propagate the SPEC value of their complement. with the head being the verb and the marker being the aspectual particle. We show the aspect marker lexical type in (4).[2]

This is broadly similar to the treatment for Mandarin Chinese implemented in the grammar Zhong (Fan et al. 2015), although the use of SPEC is new, they used a headed rule, and a special feature *marked* to block iteration. We only instantiate a version of the rule where the marker comes on the left (after the verb).

(3) Head marker construction



The outer aspectual particles (aspect markers) are markers and require their complement's head to be a verb or adjective (+*vj*). The value of SPEC of the mother is set to the SPEC value of their complement. Further, the complement is of type *lex-synsem* and thus must be non-phrasal and can not be modified.

[2]We also treat sentence final particles as markers: sentence and aspect markers share a common supertype (*verbal-marker*).

(4) Marker lexical type

$$\begin{bmatrix} \textit{aspect-marker-lex} \\ \textsc{cat} \ \left[\textsc{head} \ \textit{marker}\right] \\ \textsc{val} \ \begin{bmatrix} \textsc{comps} \ \left\langle \begin{bmatrix} \textit{lex-synsem} \\ \textsc{cat.head} \ +\textit{vj} \\ \textsc{modified} \ \textit{notmod} \\ \textsc{val.spec} \ \boxed{0} \end{bmatrix} \right\rangle \\ \textsc{spec} \ \ \boxed{0} \end{bmatrix} \end{bmatrix}$$

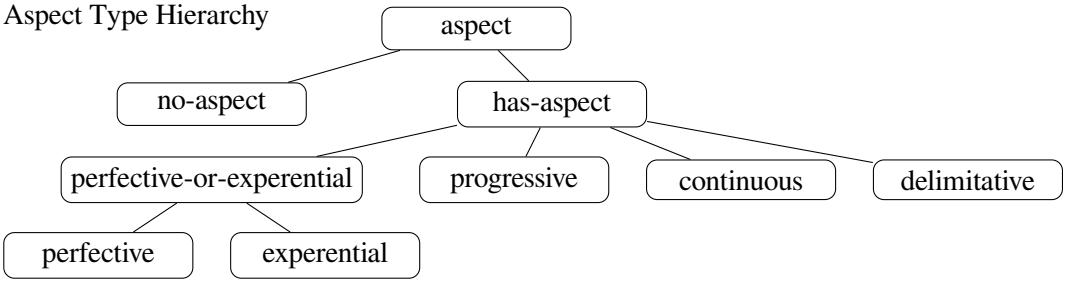
Individual markers inherit from *aspect-marker-lex* and set the value of the aspect. We show the perfective marker in (5).

(5) Marker lexical type

$$\begin{bmatrix} \textit{pfv-marker-lex} \\ \textsc{val.comps} \ \left\langle \left[\textsc{hook.index.e.aspect} \ \textit{perfective}\right] \right\rangle \end{bmatrix}$$

The possible values we distingusish for aspect are shown in (6). We do not decompose aspect here.

(6) Aspect Type Hierarchy



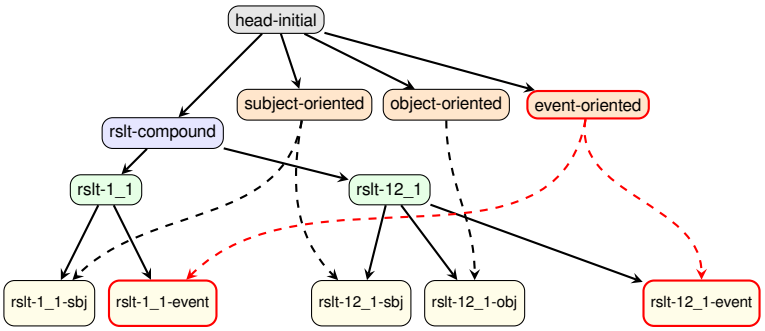
3.2 Inner Aspect

Inner aspect markers differ from outer markers in two ways: they always introduce a predicate and this predicate must link to an argument. We therefore treat inner aspect markers as (defective) resultative verbs with three special properties:

1. We create a new kind of resultative verb whose predicate takes the predicate of the first verb as an argument (not the ARG1 or 2 of the head verb): this is for IAPe.
2. Both IAPe and IAPi change the aspect of the head verb to *perfective-or-experential*. We do not model the lexical aspect directly, so cannot just change telic $-$ to $+$, but this ensures that the outer aspect will be compatible (e.g. not progressive, continuous or delimitive).
3. We constrain these lexical entries so that they can not appear as main verbs.

Our initial analysis of resultative constructions is based on that for Mandarin in Zhong (Song et al. 2015) which in turn was based on Li (1990) and Lee (2013). We omit some of the rarer types (inverse-oriented and no-share) for simplicity. We have extended it to add event-oriented resultatives (such as 掂 *dim6*). Another popular approach to resultatives is to use a lexical rule (Müller 2002, Lu et al. 2023), we think the core ideas of analysis are compatible with this approach, but will not further investigate it.

(7) Extended Resultative Construction Types



The basic rslt-compound type is given in (8). The rslt element is constructionally introduced as an individual constraint (ICON: Song 2014) to show the relatedness of the two events. We use the value of SPEC to block aspect on the daughters, but allow it on the mother.

(8)
$$\begin{bmatrix} \textit{rslt-compound} \\ \text{VAL.SPEC} \ \langle\rangle \\ \text{HD} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{VAL.SPEC} & \langle [] \rangle \end{bmatrix} \\ \text{LIGHT} \ — \\ \text{HOOK.INDEX} \ \boxed{1} \end{bmatrix} \\ \text{NHD} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & +vj \\ \text{VAL.SPEC} & \langle [\text{HOOK.INDEX.E.ASPECT} \ \boxed{0}] \rangle \end{bmatrix} \\ \text{LIGHT} \ — \\ \text{HOOK.INDEX} \ \boxed{3} \end{bmatrix} \\ \text{C-CONT} \begin{bmatrix} \text{HOOK} \ [\text{INDEX.E.ASPECT} \ \boxed{0}] \\ \text{RELS} \ \left\langle \begin{bmatrix} \textit{rslt} \\ \text{ARG1} \ \boxed{1} \\ \text{ARG2} \ \boxed{2} \end{bmatrix} \right\rangle \\ \text{HCONS} \ \left\langle \begin{bmatrix} \text{HARG} \ \boxed{2} \\ \text{LARG} \ \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

This type is then inherited by the individual result types. We have extended it with one new type EVENT-ORIENTED (9) in which the first argument of marker is the index of the verb. This models the semantics of the IAPe particles, which predicate over the main verb.

(9)
$$\begin{bmatrix} \textit{event-oriented} \\ \text{HD.HOOK.INDEX} \ \boxed{0} \\ \text{NHD.HOOK.XARG} \ \boxed{0} \end{bmatrix}$$

We also exploit SPEC to allow the resultative daughter to stamp aspect on the result relation (which is the semantic head). Crucially, inner aspect markers will set the ASPECT of their SPEC to *perfective-or-experential*.

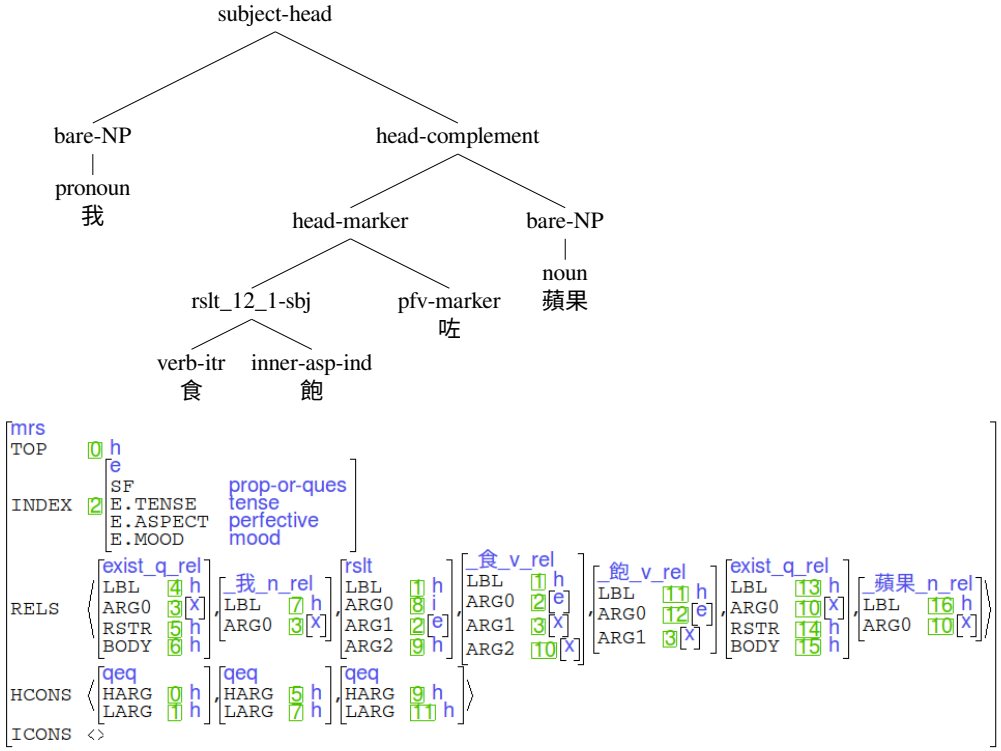
We show the lexical type for *inner-aspect-lex* below. It inherits from *lex-synsem*, so even though it is a verb with a saturated subject, it cannot head a sentence, which must be *phrase-synsem*.

(10)
$$\begin{bmatrix} \textit{inner-aspect-lex} \\ \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{SPEC} & \langle [\text{HOOK.INDEX.E.ASPECT} \ \textit{perfective-or-experential}] \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

This is further specified to two lexical types which differ as to whether the external argument is an event or a referential index.

3.3 Example parse

(11) Parse showing both innner and outer aspect particles. We have shortened the lexical type names for readability.



We also get a less likely reading where the apple is full, rather than the speaker being full.

4 Conclusion and Future Work

Aspect is a core part of Chinese verbs. This analysis covers the main types of aspect, modeling their semantics and constraining their combinations. An implementation will be released along with the full paper.

The resultative construction is currently quite unconstrained, and because many words in Cantonese are ambiguous as to whether they are noun or verb, has the potential to seriously increase ambiguity. Our next step will be to try to parse a corpus and see what ambiguity arises, and what we can use to restrict it. However, without aspect, we cannot parse most sentences. So first we start with an analysis that potentially over-generates.

There is a great deal of interaction between aspect and verbs. Some verbs can take only some particles due to their situation aspect. For instance, verbs like 知道 zi1dou3 'know', being a state, is not compatible with the progressive aspectual marker 緊 gan2 or the delimitative aspectual marker 下 haa5:

(12) Cantonese (yue)

*我	知道	緊/下	段	新聞
ngo5	zi1dou3	gan2/haa5	dyun6	san1man2
1SG	know	PROG/DELIMIT	CL	news

Intended reading: 'I am knowing/do a little knowing of the news'

We will deal with this by verbs setting constraints on their possible aspect, but this requires a long process of checking every verb.

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