Two Types of Temporal Adverbial Clauses in Cantonese

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1. Introduction

One major task in syntactic theory is to understand how adjuncts are related to the clausal architecture, among which adverbial clauses have drawn considerable interests because of their articulated internal structure and different degrees of integration into main clauses. Recently, accumulating evidence reveals that the *internal* structure of adverbial clauses shows remarkable correlation with their *external* relation to main clauses (Haegeman 2003, 2010, Endo & Haegeman 2019), a generalization that holds cross-linguistically in English (Haegeman 1991 *et seq*., Verstraete 2007), Akɔɔse (Zentz 2011), Bulgarian (Laskova 2012), French (Lahousse 2010), German (Frey 2012), Greek (Tsimpli, Papadopoulou & Mylonaki 2010), Japanese (Endo 2012), Mandarin Chinese (Lu 2003, Wei & Li 2018), Swedish (Müller 2017), etc. This generalization, which may be dubbed as *the internal-external correlation*, is exemplified in (1) (Haegeman 2009:399):

(1) [While$_{conc}$ this ongoing lawsuit <u>probably</u> won't stop the use of lethal injection],
it will certainly delay its use [while$_{temp}$ the Supreme Court decides what to do].

The first *while* clause carries a concessive meaning and the second one carries a temporal meaning. They are classified as peripheral adverbial clauses (PACs) and central adverbial clauses (CACs) respectively. In terms of external syntax, the *while$_{temp}$* clause is more integrated into the main clause (and hence "central"), whereas the *while$_{conc}$* clause is "peripheral" and less integrated in taking a wider scope over the *while$_{temp}$* clause. This correlates with their internal syntax: the *while$_{temp}$* clause has a "impoverished" structure and does not allow an epistemic adverb which may occur in the *while$_{conc}$* clause.

While previous studies have reached a general consensus that the split of CACs and PACs lies on their attachment sites to main clauses for the external syntax, different approaches have been proposed for the internal syntax. One prominent approach, developed in Haegeman (2003) and refined in Endo and Haegeman (2019), posits that adverbial clauses differ in their "richness" of internal structure, i.e. CACs lack peripheral structural layers as compared to PACs.[1] Another influential approach, as advocated in Haegeman (2009, 2010, 2012), argues that CACs also have an articulated peripheral structure, and the crucial difference with PACs is that CACs are derived by operator movement to the left periphery which blocks the presence of certain elements, but not PACs.

In this paper, I present novel evidence from temporal adverbial clauses (henceforth TACs) in Cantonese to motivate an approach that builds on the height of operators. While I adopt Haegeman (2010) in assuming that CACs also have a periphery, I show that TACs, often regarded as CACs, are not uniformly derived by operator movement, but they also involve *in-situ* operators. Concretely, a temporal operator may either (i) merge within TP, followed by movement to the specifier of CP; or (ii) directly merge at the highest CP without any movement. The merging site of the operator determines whether movement is needed. The first movement strategy forms TACs headed by a preposition *hai* 'at' in

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[1] Note that Endo and Haegeman (2019) go beyond the CAC-PAC dichotomy and propose a fine-grained gradient typology on six classes of Japanese adverbial clauses in terms of their structural "richness" and attachment sites.

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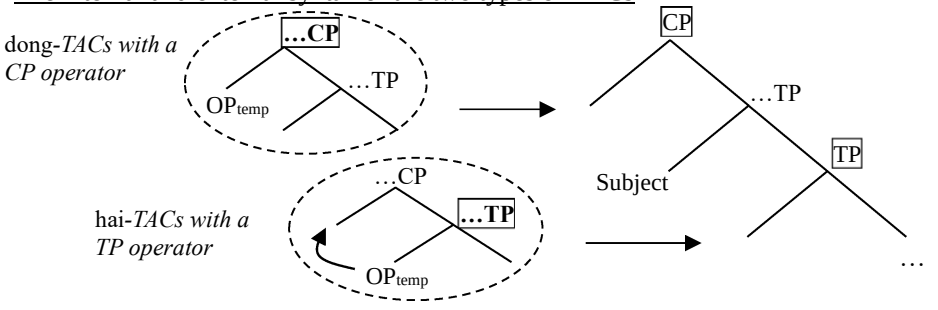
Cantonese, and the second in-situ strategy derives another type of TACs headed by a subordinator *dong* 'at, when, while'. Crucially, the merging site also determines the external syntax, following the insight of "matching condition" in Endo and Haegeman (2019). Specifically, a TAC derived by an operator merged within TP attaches lower to a TP (i.e. *hai*-TACs), and a TAC with a CP operator attaches higher to a CP (i.e. *dong*-TACs), showing a structural "matching" effect between the operator height and the attachment site to main clauses. The differences of the two types of TACs are schematized below:

(2) The internal and external syntax of the two types of TACs



In this way, both the internal syntax and external syntax can be accounted for by the height of operators. Consequently, this proposal lends support to the conception that the external syntax of adverbial clauses is reducible to their internal syntax.

This paper is organized as follows. Section 2 introduces the two types of TACs in Cantonese and how they behave differently in their internal syntax. Section 3 accounts for the internal syntax by proposing that a null temporal operator may merge at two different positions. Additional evidence supporting the existence of the null operator comes from a converbal marker *-haa* which agrees with a temporal operator. Section 4 shows how the two types of TACs differ in their external syntax, and furthermore, how these differences are related to the height of their operator merging sites under the labeling theory. Section 5 concludes.

Before proceeding, it should be noted that the findings in this paper may also apply to Mandarin Chinese, which largely patterns with Cantonese regarding the two types of TACs.

2. The internal syntax of the two types of TACs

In Cantonese, TACs with a simultaneous reading of the embedded event and the matrix event may be expressed by a preposition *hai* 'at' or a subordinator *dong* 'at, when, while'. To form a TAC, *hai* must occur with a head time noun phrase *gozan(si)* 'that time' (=(3)) or *sihau* 'time', whereas the head NP is optional for *dong* (=(4)).[2] In what follows, I will examine the internal syntax of *hai*-TACs and *dong*-TACs.

(3) [**Hai** Aafan haangceot munhau *(gozan)], Aaming zau dou-zo
HAI Fan walk.out door that.time Ming then arrive-PERF
'Ming arrived at the time when Fan walked outside the door.'

(4) [**Dong** Aafan haangceot munhau (gozan)], Aaming zau dou-zo
DONG Fan walk.out door that.time Ming then arrive-PERF
'Ming arrived (at the time) when Fan walked outside the door.'

2.1. High-low ambiguities and locality

To begin with, one well-known behavior of TACs is that they may show ambiguities between a "high" and a "low" reading, as in (5) where *when* may associate with the event time in the higher clause, or in the lower clause (Geis 1970, Larson 1987, 1990).

[2] Abbreviations: 1, 2, 3 = first, second, third person respectively; ADD = affixal additive quantifier; ALL = affixal universal quantifier; CL = classifier; IMP = imperative marker; MOD = modifier marker; NEG = negation; PASS = passive voice marker; PERF = perfective aspect marker; PL = plural; PROG = progressive aspect marker; SFP = sentence-final particle; SG = singular.

(5) John left [when [Sheila **said** [he should **leave**]]]

Cantonese *hai*-TACs also exhibit the high-low ambiguities. In (6), the (odd) high reading refers to that I have been living for thousands of years, and the low reading means that I am alive in 2012. Both readings are available and the low reading is favored.

(6) [Hai [Maangaajan **jyujin** [saigaai wui **waimit**]] gozan], ngo zung saangngaungau.
HAI Maya.people foretell world will destroy that.time 1SG still alive
High: #'I'm still alive at the time when Maya people made the apocalyptic prophecy.'
Low: 'I'm still alive at the time when Maya people predicted to be the end of the world.'

Furthermore, the high-low ambiguities are also sensitive to islands. The low reading is not available in complex NP islands, leading to the weird high reading:

(7) #[Hai [Maangaajan **gong** [NP [saigaai wui waimit] ge jyujin] gozan],
HAI Maya.people say world will destroy MOD prophecy that.time
ngo zung saangngaungau.
1SG still alive
High: #'I'm still alive at the time when Maya people made the apocalyptic prophecy.'
*Low: 'I'm still alive at the time when Maya people predicted to be the end of the world.'

Unlike *hai*-TACs, *dong*-TACs do not have the high-low ambiguities. (8) only has the odd high reading. This is reminiscent of English (temporal) *while*, which also lacks a low reading as in (9).

(8) #[Dong [Maangaajan **jyujin** [saigaai wui waimit]] gozan], ngo zung saangngaungau.
DONG Maya.people foretell world will destroy that.time 1SG still alive
High: #'I'm still alive at the time when Maya people made the apocalyptic prophecy.'
*Low: 'I'm still alive at the time when Maya people predicted to be the end of the world.'
(9) I didn't see Mary in New York [while [she **said** [she was there]]] (Larson 1990:174)

2.2. Quantificational elements

Another difference of the two TACs lies on whether they allow quantificational elements (Qu-elements) such as focus and modals. First, only *dong*-TACs, but not *hai*-TACs, may allow an exhaustive (subject) focus marked by *hai6* 'be' (in low level tone, ≠ *hai2* 'at' in high rising tone):

(10) [{a. *hai2 / b. dong} **hai6 Aaming** fangaau gozan], lousi zau faatnau.
HAI DONG be Ming sleep that.time teacher then mad
'The teacher became mad when it was MING (but not someone else) that fell asleep.'

Similarly, epistemic modals such as *jinggoi* 'should, probably' may occur naturally in *dong*-TACs but are degraded in *hai*-TACs.

(11) [{a. ??hai/ b. dong} Aaming **jinggoi**$^{\textbf{Epi}}$ zung hai ukkei gozan], jau gingcaat soeng keoi ukkei
HAI DONG Ming should still at home that.time have police go 3SG home
'The police came to Ming's house when he probably was still at home.'

Yet, not all Qu-elements are banned in *hai*-TACs. Specifically, Qu-elements that have a lower position at the clausal spine are allowed in *hai*-TACs, such as deontic *jinggoi* 'should, ought'. Following Tsai's (2015) cartographic approach to modals, deontic modals in Chinese are lower than TP and epistemic modals are higher than TP (*cf.* epistemic *jinggoi* in (11)).

(12) Camjat [{a. hai / b. dong} keoi **jinggoi**$^{\textbf{Deo}}$ zouje gozan], keoi jan zau mgin-zo
yesterday HAI DONG 3SG should work that.time 3SG body then disappear-PERF
'Yesterday at the time when he should work, he was just gone.'

Lin 'even'-focus may also occur in *hai*-TACs, as the (preposed) object focus in (13). Cheung (2015) analyzes *lin*-focus as lower than the exhaustive *hai*-focus in Cantonese. Interestingly, if the object focus further moves to a pre-subject position, *dong* is preferred over *hai* (=(14)).

(13) [{a. hai / b. dong} Aaming **lin** **souhok** dou caau-maai gozan], lousi zau faatnau.
HAI DONG Ming even math also fail-ADD that.time teacher then mad
'The teacher became mad when Ming even failed mathematics.'

(14) [{a. ??hai / b. dong} **lin** **go** **ziliu** **gong** **me** (nei) dou m-ming ge sihau], …
HAI DONG even CL data say what 2SG also NEG-understand MOD time
'When (you) don't even know what the data is about, …'
(https://www.chester6uofamily.com/tutor, accessed on 6/4/2021)

Hence, it can be concluded that Qu-elements that are lower than the canonical position of subjects (i.e. Spec,TP) are allowed in *hai*-TACs, but not those higher than TP, which are otherwise allowed in *dong*-TACs.

Moreover, Qu-elements also interact with the high-low ambiguities in *hai*-TACs. When there is a low Qu-element in the upper clause of *hai*-TACs, only low readings are available, such as (15):[3]

(15) #[**Hai** [Maangaajan **hoji**^{Deo} jyujin [saigaai wui waimit]] gozan], ngo zung saangngaungau.
HAI Maya.people can foretell world will destroy that.time 1SG still alive
High: #'I'm still alive at the time when Maya people could make the apocalyptic prophecy.'
*Low: 'I'm still alive at the time when Maya people could predict to be the end of the world.'

To summarize this section, the differences in internal syntax of *hai*- and *dong*- TACs are listed below:

(16) The asymmetries in internal syntax between the two types of TACs in Cantonese

	***hai*-TACs**	***dong*-TACs**
i. High-low ambiguities	YES	NO
ii. Low reading blocked by islands	YES	N/A
iii. Ban on high Qu-elements (e.g. modal^{Epi})	YES	NO
iv. Low reading blocked by low Qu-elements (e.g. modal^{Deo})	YES	N/A

3. Accounting for the internal syntax

3.1. Two merging sites of temporal operators

To account for the asymmetries in internal syntax between *hai*-TACs and *dong*-TACs, I propose that they are derived differently in terms of the merging site of temporal operators. Specifically, a null temporal operator is base-generated within TP in *hai*-TACs and then undergoes movement to the edge of CP (Spec,CP). This null operator is comparable to the temporal relative pronoun *when* in English, i.e. it forms a temporal relative clause. Since Chinese has no overt relative pronouns (e.g. in nominal relative clauses), the temporal operator is also null. In *dong*-TACs, instead of merging within a TP, the operator is base-generated in a higher position, namely the edge of the (highest) CP. Since it directly merges to Spec,CP, no further movement is required, as outlined below.

(17) a. *hai* [$_{CP}$ **OP$_{temp}$** … [$_{TP}$ … *t* …]]
↑ (operator movment)
b. *dong* [$_{CP}$ **OP$_{temp}$** … [$_{TP}$ …]] (in-situ operator)[4]

First, the difference in the high-low ambiguities can be explained straightforwardly. In *hai*-TACs, the operator may merge within the TP of the higher clause or the lower clause. In the former case, the operator relativizes the event time of the upper clause, and moves locally to Spec,CP to derive the high reading. In the latter case, the operator relativizes the event time of the lower clause, and undergoes successive cyclic movement to the upper Spec,CP, yielding the low reading. The movement may be

[3] I thank Zhuo Chen for drawing my attention to this point.
[4] *Dong* may also be analyzed as C which associates with the in-situ operator in its specifier.

blocked by islands, as in the complex NP island we have seen in Section 2.1. In *dong*-TACs, however, the operator directly merges to the highest CP, i.e. the CP of the upper clause. It does not merge in the lower clause and no operator movement occurs, and hence the lack of the low reading.[5]

(18) a. *hai* [$_{CP}$ **OP$_{temp}$** [$_{TP}$ **t$_{high}$** Maya people predicted [$_{CP}$ [$_{TP}$ **t$_{low}$** the world will end …
(high: local mvt.)
(low: successive cyclic mvt.)

b. *dong* [$_{CP}$ **OP$_{temp}$** [$_{TP}$ Maya people predicted [$_{CP}$ [$_{TP}$ the world will end ... (high: no mvt.)

Second, the distribution of quantificational elements can also be accounted for. Adopting Rizzi's (2001, 2004) feature-based Relativized Minimality, an element may induce minimality effects to a dependency formed by its kin. For instance, a Qu-element carrying a superfeature [Qu] (e.g. negation) may disrupt the dependency formed by another Qu-element (e.g. *wh*-operators). The set of Qu-elements is language-specific, e.g. (argumental) topics in English may block *wh*-movement but not in Italian (Rizzi 2004). In Chinese, typical Qu-elements include modals, focus and negation, which induce minimality effects in *why*-questions and A-not-A questions (Law 2001, Soh 2005, *i.a.*).

Against this theoretical backdrop, the ban on high Qu-elements (e.g. exhaustive focus) in *hai*-TACs can then be derived by Relativized Minimality with the assumption that the temporal operator is a *wh*-relative operator carrying a [Qu] feature. Any Qu-elements higher than TP will be on the movement path of the operator and disrupt the movement, as shown below. In contrast, the operator in *dong*-TACs merges directly to the highest CP without movement and thus no minimality effects would be triggered.[6]

(19) a. **hai* [$_{CP}$ **OP$_{temp[+Qu]}$** … Z$_{[+Qu]}$ [$_{TP}$ … ***t***$_{[+Qu]}$ …]]

b. *dong* [$_{CP}$ **OP$_{temp[+Qu]}$** … Z$_{[+Qu]}$ [$_{TP}$ …]]

While Qu-elements below TP (e.g. deontic modals) are too low to disrupt the operator movement in *hai*-TACs, they may trigger minimality effects to an operator that originates in the lower clause and moves across the Qu-elements. In effect, an operator must merge in the higher clause to avoid disruption, resulting in a high reading. This explains why low Qu-elements may block a low reading.

(20) *hai* [$_{CP}$ **OP$_{temp[+Qu]}$** … [$_{TP}$ *t$_{high}$*$_{[+Qu]}$ …Deontic Modal$_{[+Qu]}$ **[$_{CP}$ … *t$_{low}$*$_{[+Qu]}$]**]] (low reading blocked)

3.2. A converbal marker agreeing with temporal operators

Since the temporal operator is null, one may wonder whether it really exists in syntax, in particular in *dong*-TACs since the in-situ operator cannot be diagnosed by tests for movement dependencies. Below, I provide evidence from a converbal marker *-haa* which establishes an agreement dependency with the temporal operator. *-Haa2* (in high rising tone) is a progressive aspectual suffix that attaches to a reduplicated verb. It must occur in an adverbial clause, a defining property of converbs (Haspelmath 1995). It can only occur in TACs (including *hai* and *dong*), but not root clauses, argumental subordinate clauses, nor any other adverbial clauses. That is, adding a subordinator of condition (*jyugwo* 'if'), reason (*janwai* 'because'), or concession (*seoijin* 'although') would yield ungrammaticality.[7]

(21) [(Hai/ dong) Aafan fanfan-**haa** gaau (gozan)], *(Aaming lai wan keoi)
HAI DONG Fan RED.sleep-CONV nap that.time Ming come find 3SG
'Ming came find Fan while she was sleeping.'

I argue that the close link between *-haa* and TACs can be captured if *-haa* agrees with a temporal (relative) operator. Thus, *-haa* always occurs in a TAC formed by a temporal operator. The first argument comes from locality. *-Haa* cannot be embedded in a lower clause (=(22)), i.e. it cannot be too "far away"

[5] The in-situ operator may relativize the whole TP (the upper and lower clause) rather than relativizing a time variable within TP by creating a gap, in the sense of Lipták's (2005) *IP-relativization*.
[6] I leave whether minimality effects can be reduced to semantics (e.g. Beck effects) to future research.
[7] For an overview of converbs in Cantonese, see Tang (2018) and Yip (2019, 2021).

from the temporal operator (which ends up at the highest CP, regardless of whether movement occurs), obeying the Phase Impenetrability Condition (PIC, Chomsky 2001).

(22) (agreement blocked)
*[Hai/ dong **OP$_{temp}$** go go jan gong **[**$_{CP}$ zigei ge zai fanfan-**haa** gaau**]** gozan], …
HAI DONG that CL person say self MOD son sleep-CONV nap that.time
Int.: 'When that person told me that his/her son was sleeping, …'

The second argument is the "extra" minimality effects when *-haa* occurs in *hai*-TACs. Recall that the temporal operator merges within TP in *hai*-TACs. Notably, with the presence of *-haa*, low Qu-elements below TP (and above AspP) may also induce minimality effects, e.g. the negation in (23). The sentence would have been grammatical if *-haa* is replaced by another progressive suffix *-gan*. The "extra" minimality effects induced by the negation indicates that there is a syntactic dependency between the higher temporal operator and the lower *-haa*, which should be understood as agreement.

(23)
*[Hai **OP$_{temp}$**[$_{TP}$ Aafan ***t*** [**m-hai** fanfan-**haa** gaau]] gozan], Aaming lai wan keoi
HAI Fan NEG-be sleep-CONV nap that.time Ming come find 3SG
Int.: 'Ming came find Fan when she wasn't sleeping.'

Surprisingly, minimality effects are also found in *dong*-TACs when *-haa* is present as in (24). The unexpected minimality effects can be explained if *-haa* agrees with the null operator, which in turn supports the existence of (null) in-situ operators in *dong*-TACs.

(24)
*[Dong **OP$_{temp}$**[$_{TP}$ Aafan [**m-hai** fanfan-**haa** gaau]] gozan], Aaming lai wan keoi
DONG Fan NEG-be sleep-CONV nap that.time Ming come find 3SG
Int.: 'Ming came find Fan when she wasn't sleeping.' =(23)

In the next section, I will examine the external syntax of *hai*-TACs and *dong*-TACs, and then address how it is related to their internal syntax.

4. Internal syntax corelates with external syntax

4.1. The external syntax of the two types of TACs

Unlike English, certain types of adverbial clauses in Chinese may be integrated into the main clause following the matrix subject (Pan & Paul 2018). Interestingly, when we consider TACs, only *hai*-TACs allow such integration, but not *dong*-TACs, as shown in (25). This suggests that while *hai*-TACs may attach lower to main clauses below Spec,TP, *dong*-TACs must attach to a higher layer beyond TP.

(25) **Aaming** [{a. hai / b. *dong} Aafan fan-gan gaau gozan] lai wan keoi
Ming HAI DONG Fan sleep-PROG nap that.time come find 3SG
'Ming came find Fan while she was sleeping.'

Another contrast is found in local N(egative)P(olarity)I(tem)-licensing. Cantonese sentence-final particle *zyu* 'yet' is an NPI that needs to be licensed by a clausemate negation (Tang 2009):

(26) Ngo **(*m-)**zaansing [keoi ***(m-)**gong go daapon **zyu**]
1SG NEG-agree 3SG NEG-say CL answer yet
'I agree that he shouldn't tell the answer yet.' (Tang 2009:235)

A negation preceding *hai*-TACs may license *zyu*, but not for *dong*-TACs (=(27) a vs. b). This shows that the *hai*-TAC in (a), along with the negation, belongs to the local domain where *zyu* is licensed, i.e. it attaches lower to the main clause. The *dong*-TAC in (b), however, must occur outside that local domain, i.e. its attachment site is too high to be considered local, presumably at CP.

(27) **M-hou** [{a. hai / b. *dong} aamaa lai gozan] coeng go **zyu**!
NEG.IMP HAI DONG mum come that.time sing song yet
'Don't sing yet when Mum comes!'

In short, *hai*-TACs have a lower attachment site to main clauses below subjects in TP, whereas *dong*-TACs have a higher attachment site above subjects at CP, as summarized below:

(28) a. [$_{CP}$ … [$_{TP}$ Subj. [***hai*-TAC**] …]]
b. [$_{CP}$ [***dong*-TAC**] … [$_{TP}$ Subj. …]]

4.2. Determining attachment sites by operator sites

Taking stock, as for internal syntax, a temporal operator merges within TP in *hai*-TACs, and merges at (the highest) CP in *dong*-TACs; as for external syntax, *hai*-TACs attach to TP below matrix subjects, and *dong*-TACs attach to CP. Here, an internal-external correlation figures in a systematic way, i.e. the height of the operator merging site correlates with the attachment site of TACs to main clauses (TP operator → TACs attach to TP, CP operator → TACs attach to CP). In other words, the *label* of the phrase immediately dominating the operator matches with the phrase immediately dominating the TACs (i.e. TP for *hai*-TACs, CP for *dong*-TACs).

A similar correlation is also found in Japanese (Endo 2012, Endo & Haegeman 2019), which is even more sophisticated. Japanese adverbial clauses have six classes among which each class is derived by moving a designated functional head internally, and attaches to a phrase with the corresponding head. For example, an adverbial clause derived by Asp head movement will attach to AspP of the main clause.

To capture this correlation, Endo and Haegeman (2019) propose a featural matching condition on the clause typing feature of adverbial clauses and the feature of a functional head in main clauses, mediated by Mod(ification) head. The clause typing feature of adverbial clauses is determined by the moving head (say, [Asp]), and due to the matching condition, it must attach to a phrase carrying the corresponding feature, which is AspP. In this way, the external syntax is determined by the internal syntax: the moving head in an adverbal clause decides its attachment site to the main clause.

Despite the similar matching effect, Cantonese differs from Japanese in forming adverbial clauses by merging an operator (to a specifier) but not head movement. One possibility here is to recast Endo and Haegeman's idea within the labeling theory (Chomsky 2013). In the labeling theory, when two phrases merge {XP, YP}, there are two ways to determine the label: (i) either one moves out and the remaining one is the label; (ii) the two phrases agree and the shared feature is the label, e.g. <z,z>. The second option may be adopted to implement Endo and Haegeman's idea in Cantonese. Assume that the temporal operator in TACs agrees with the phrase that it merges with, and the shared feature determines the resulting label, e.g. OP_{temp} agrees with CP in *dong*-TACs with the resulting label as <tempC, tempC>. Then, the $TAC_{<tempC, tempC>}$ attaches to the main clause, and agrees with the phrase that it attaches to for successful labeling. Consequently, the attachment site has to be a CP which carries the corresponding feature, deriving the internal-external correlation.[8]

5. Conclusion

Providing novel evidence from Cantonese, this paper argues that TACs may be formed in two ways, depending on the merging site of temporal operators. A temporal operator may merge at TP and further moves to CP, as in *hai*-TACs. Alternatively, the temporal operator may also merge higher at CP without any movement, as in *dong*-TACs. Crucially, the operator merging sites correlate with the attachment site: *hai*-TACs with a TP operator attach to a TP, and *dong*-TACs with a CP operator attach to a CP. This internal-external correlation may be captured by recasting Endo and Haegeman's (2019) feature matching proposal under the labeling theory for Cantonese, where the operator merging sites determine the attachment sites through labeling by a shared feature. In conclusion, the two types of TACs in Cantonese not only call for a finer typology of TACs (e.g. Lipták 2005), but also lend support to the conception that the external syntax of adverbial clauses is reducible to their internal syntax.

[8] This suggestion departs from the current labeling theory where adjuncts do *not* involve in the labeling of the clausal spine, i.e. when an adjunct (pair-)merges with an XP, the label is always XP. I leave this issue to future research.

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