Partial Deletion on head chains: discontinuous predicates in Cantonese*

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Abstract

This paper investigates linearization of movement chains through the lens of discontinuous predicates in Cantonese. In an array of constructions, a disyllabic verb may be "split" into two parts, and surface as a discontinuous string. We develop a formal account that combines (i) an affix-induced, morphological Syllable Subtraction rule on the higher copy, and (ii) subsequent Partial Copy Deletion (CD) on the lower copy. We argue that the apparent scattered pattern of deletion arises from the interplay of these two distinct operations. We propose the Chain-Faithfulness condition, which plays a critical role in regulating how CD applies. The idea is that CD must preserve the integrity of the input of the movement chain in its final output of linearization. Partial CD is forced as a last resort strategy to avoid violation of the Chain-Faithfulness condition. Our proposal has two implications on the precise nature of CD. First, Partial CD is not restricted to phrasal elements, but can also apply to heads, lending support to the idea that both head movement and phrasal movement are subject to the same linearization mechanism. Second, it suggests that discontinuous predicates are not derived by one "scattered/distributed" deletion; rather, it always involves two distinct operations, affecting different chain copies. The dual characterization of discontinuity explains why discontinuous predicates are not universally attested, and why they preserve a complementary character across languages.

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1 Introduction

1.1 Partial Copy Deletion

How movement chains are phonologically realized is a central issue in linearization of syntactic structures. The copy theory of movement (Chomsky 1995, *et seq.*) posits that movement of a syntactic object leaves copies instead of traces, and *Copy Deletion* (CD) is the mechanism held responsible for "erasing" the additional (typically lower) copies, as in (1).

(1) Standard CD on movement chains (where A and B belong to the same chain)
... [$_{\alpha_i}$ AB] ... [$_{\alpha_k}$ ~~AB~~] ... Full deletion of one copy

CD is commonly assumed to occur in the post-syntactic Phonological Form (PF) component (Nunes 1995, 2004; Bošković and Nunes 2007, *i.a.*). An important consequence of this conceived architecture of grammar is that linearization of a movement chain may interact with post-syntactic, morpho-phonological processes and yield non-standard copy realization. One prominent case is Partial Copy Deletion (henceforth Partial CD), which is typically realized in "scattered/distributed" fashion. It targets only a subpart of chain members, resulting in a discontinuous constituent, as illustrated in (2).[1]

(2) Partial CD in the form of "scattered/distributed" deletion on movement chains

a. ... [$_{\alpha_i}$ A~~B~~] ... [$_{\alpha_k}$ ~~A~~B] ...

b. ... [$_{\alpha_i}$ ~~A~~B] ... [$_{\alpha_k}$ A~~B~~] ...

Partial CD has been adopted to analyze phrasal chains in both verbal and nominal domains. One recent example comes from predicate fronting in English in (3), as discussed in Larson (2022). He argues that instead of deleting the lower *v*P, CD can apply in a partial fashion when the temporal adjunct is focused: it is deleted on the higher copy and realized on the lower copy. This possibility is regulated by considerations of stress assignment and stress alignment with intonational phrase boundaries.

(3) English: a VP is pulled apart in VP fronting cases
(John said he would give them the box in the garden, and)
[$_{vP}$ **give them the box in the garden** ~~on Tuesday~~], he did
[$_{vP}$ ~~give them the box in the garden~~ **on TUESday**]. (Larson 2022, p.13)

1. Other non-canonical CD includes deletion of the higher copy (i.e., pronouncing lower copies, Nunes 1995; Bošković 2002b; Bobaljik 2002), suspension of the deletion (i.e., resulting in multiple pronunciations, Nunes 1999, 2004; Landau 2006; Cheng and Vicente 2013; T. T.-M. Lee 2021), and pronouncing copies as resumptive pronouns (van Urk 2018; Scott 2021; Georgi and Amaechi 2023; Yip and Ahenkorah 2023; Yip and Yuan 2024). See Bošković and Nunes (2007) for an overview of the former two cases.

Similar patterns of Partial CD have also been found in predicate fronting in a number of other languages (Bentzen 2007; van Urk 2024), split DPs/PPs in Germanic and Slavic languages and beyond (Hinterhölzl 2000, 2002; Fanselow and Ćavar 2002; Pereltsvaig 2008; Ott 2009; Bošković 2015; Bondarenko and Davis 2023; see Murphy and Wilson 2024 for Iquito (Zaparoan)), and extraposition in Dutch, English, and German (Wilder 1995; Sheehan 2010).

Partial CD has also proved useful in resolving complex head chains, such as clitic placement in Bulgarian (Bošković 2001; Franks and Bošković 2001). In (4), the complex head formed by auxiliary and pronominal clitics with the participle *si mu gi dal* moves to the interrogative complementizer *li* and left-adjoins to it. Crucially, *si*, *mu*, and *gi* are enclitics and cannot be pronounced on the higher copy. Partial CD thus applies and deletes only the heads *si mu gi* on the higher copy, with a subsequent complementary CD on the lower copy that targets the participle *dal*.

(4) Bulgarian: Clitic placement in polar questions involving *li*

[~~Si mu gi~~ **dal**] li [**si** **mu** **gi** ~~dal~~] parite? (Bulgarian)
given Q are him.DAT them.ACC the.money
'Have you given him the money?' (Bošković 2001, p.205)

Against this backdrop, there are two theoretical issues that deserve more attention before Partial CD can fit squarely into the theory of linearization. The first one concerns the level of units on which (Partial) CD operates. It is widely assumed that CD operates on constituents (e.g., Nunes 1995:279) and targets syntactic phrases or heads as in the above cases (schematized in (5a-b)), but it is largely unknown whether CD may apply to sub-constituents and target part of a head as in (5c). If we assume that CD is a (post-syntactic) PF operation, and that heads are bundles of features rather than grammatical primitives (e.g., Chomsky 1993, 1995, 2000), it is logically possible that CD targets sub-head phonological units (e.g., syllables). This leads us to expect "discontinuous heads" in natural language. To the best of our knowledge, such a possibility, however, remains unattested so far.

(5) "Scattered/distributed" partial deletion on different levels

a. *Partial CD on the phrasal level* (e.g., phrasal chains)
... [$_{ZP}$ XP ~~YP~~] ... [$_{ZP}$ ~~XP~~ YP] ...

b. *Partial CD on the head level* (e.g., clitic/complex head chains)
... [$_{Z}$ ~~X~~ -Y-Z] ... [$_{X}$ X-~~Y~~] ...

c. *Partial CD on the **sub-head** level* (unattested so far)
... [$_{Z}$ X_{A}-~~B~~-Z] ... [$_{X}$ X_{A}-~~B~~] ...

The second issue concerns the precise mechanism of "scattered/distributed" deletion, which involves two distinct deletion steps of heterogeneous nature. On one hand, "scattered/distributed" deletion is typically resulted from compromising economy for (chain-external) PF considerations (Nunes 1995; Fanselow and Ćavar 2001; Landau 2006; Bošković and Nunes 2007; van Urk 2024, *i.a.*). Such considerations often trigger deletion on one particular copy in the chain (e.g., the higher copies in (3) and (4); see Step I in (6)). On the other hand, the subsequent deletion on the other copy is motivated on different grounds. It is often assumed without discussions that this deletion targets the complementary part of the constituent (Ott 2009; van Urk 2024), as in Step II(i) in (6).

(6) Asymmetry in the deletion steps of "distributed" deletion

Step I.	... $[_{\alpha_i}$ A$\boxed{\text{B}}$] ... $[_{\alpha_k}$ AB] ...	Deletion triggered by "chain-external" PF force
Step II.	(i) ... $[_{\alpha_i}$ A~~B~~] ... $[_{\alpha_k}$ $\boxed{\text{A}}$B] ...	✔ Partial CD
	(ii)*... $[_{\alpha_i}$ A~~B~~] ... $[_{\alpha_k}$ AB] ...	✘ No CD
	(iii)*... $[_{\alpha_i}$ A~~B~~] ... $[_{\alpha_k}$ ~~AB~~] ...	✘ Full CD

There thus seems to be a conspiracy between the two deletion operations despite their heterogeneous nature: they jointly lead to *a minimal realization* of the chain members (i.e., "AB" in Step II(i) in (6)), but not more, nor less (see Step II(ii-iii) in (6)).[2] The asymmetry and conspiracy call for a more sophisticated theory on CD that addresses the nature and motivation of the complementary nature of the deletion that lacks chain-external triggers.

1.2 The goal and scope of this paper

This paper sets out to develop a restrictive theory of CD by addressing the above two issues. We draw evidence from various verbal constructions in Cantonese where a syntactic *head* can appear discontinuously, exemplified by the mono-morphemic verb *pisen* (a loanword from English *present*) in (7b). We refer to these cases as *discontinuous predicates*, also commonly known as *separable verbs* (Chan and Cheung 2020).[3]

2. "More" copies can only be pronounced if there are additional PF constraints on those positions (e.g., Stray Affix Filter, Lasnik 1981; Landau 2006). See also the references in footnote 1.

3. Discontinuous predicates are also attested in many other languages, including:

(i) a. Other Sinitic languages like Mandarin Chinese (Chao 1968; C.-T. J. Huang 1984; Her 1996; Packard 2000; Pan and Ye 2015; Guo 2017, *i.a.*);
b. Germanic languages like Dutch and German (Booij 1990; Stiebels and Wunderlich 1994; Zeller 2002; Dehé 2005, *i.a.*; for other Germanic languages, see Vikner 2017);
c. Uralic languages like Hungarian (Piñón 1992; Forst et al. 2010) and Estonian (Ackerman and Lesourd 1997);
d. Slavic languages like Russian (Ackerman and Lesourd 1997); and

(7) Discontinuous predicates in Cantonese

a. Ni-pin man, Aaming **pisen**-zo saam-ci. (AB-SUFFIX-FREQ)
this-CL paper Ming present-PFV three-time
'As for this paper, Ming presented for three times.'

b. Ni-pin man, Aaming **pi**-zo saam-ci **-sen**. (A-SUFFIX-FREQ-B)
this-CL paper Ming present-PFV three-time present
'As for this paper, Ming presented for three times.'

In response to the first issue, we argue that discontinuous predicates involves syntactic head movement chains where sub-head elements (i.e., syllables) are realized due to Partial CD. We suggest that the minimal operative level of CD is *features*, instead of constituents (*contra* Nunes 1995, 2004) or larger syntactic domains (*contra* van Urk 2018; Georgi and Amaechi 2023). As such, CD may target units smaller than a syntactic head (e.g., syllables). Our proposal implicates that Partial CD does not exclusively apply to phrasal chains, but can also target head chains (cf. Bošković 2001; Franks and Bošković 2001). In other words, both head movement and phrasal movement are subject to the same linearization mechanism, echoing recent pursuits of the unity of movement (Vicente 2007; Funakoshi 2014; Harizanov and Gribanova 2019; T. T.-M. Lee 2021; 2022; 2024, among others).

In response to the second issue, we advocate for a restrictive theory where Partial CD is a last resort operation triggered by chain-*internal* force. This theory is a development of Landau (2006) and van Urk (2018) 's economy-based approach to CD with two novel components. First, we argue that the two deletion operations in discontinuous predicates should be conceptually distinguished, and indeed are empirically distinguishable. Cantonese discontinuous predicates are derived, as we argue, as follows: a sub-part of the higher copy is deleted by a morphophonological *Syllable Subtraction* process triggered by affixes in the PF, *prior to* CD (that applies to the lower copy). The above-mentioned asymmetry thus boils down to two distinct operations. Second, we formulate a revised version of Landau (2006)'s P-Recoverability, dubbed the CHAIN-FAITHFULNESS condition:

(8) CHAIN-FAITHFULNESS (CH-FAITH, as a condition on Copy Deletion, informal version)
The final output of linearization of a movement chain must preserve the integrity (≠ contiguity) of the input (i.e., the output cannot contain only a sub-part of the input).

e. Niger–Congo languages like Yorùbá (Parrish and Feldscher 2019).

It is not the purpose of this paper to provide a unified theory on discontinuous predicates across languages (but see Sect. 6 for discussions).

This condition, combined with Economy of Pronunciation (Landau 2006), dictates that in a movement chain, CD should apply whenever possible, and Partial CD would be preferred over Full CD in cases that violate Chain Faithfulness. In our proposal, discontinuous predicates in Cantonese such as (7b) have the following derivation in (9).

(9) A schematic representation of the proposal

a. [$_{XP}$ **V$_{AB}$**-x [YP ... [$_{VP}$ **V$_{AB}$** ...]]] (head movement of verbs) Narrow syntax

b. [$_{XP}$ **V$_{A}$**~~B~~-x [YP ... [$_{VP}$ **V$_{AB}$** ...]]] (Syllable Subtraction) PF: Morphology

c. [$_{XP}$ **V$_{A}$**~~B~~-x [YP ... [$_{VP}$ **V**~~A~~**B** ...]]] (Partial CD) PF: Linearization

d. Final output: **A**-x ... **B** ...

Under this view, the choice between Full CD and Partial CD is contingent on the form of other copies in the same chain, an internal force in chain resolution. Partial CD is a variant of Full CD, rather than a distinct deletion operation. It represents yet another case on how CD may "compromise" when confronted with principles governing the linearization process, following the general spirit in works by Nunes (1995, 2004), Landau (2006), and T. T.-M. Lee (2021), among many others. Crucially, CD does not (directly) interact with grammatical requirements *external* to the chain (*contra*, e.g., Bošković 2001; Fanselow and Ćavar 2002). Rather, these external requirements are manifested as independent operations that disrupt the integrity of one of the copies. As a broader consequence, the cross-linguistic preference for minimal realization ("not less") of the chain follows from such an internal force in chain realization.

Furthermore, we offer a novel argument in support of the *last resort* nature of Partial CD (Franks 1998; Nunes 1999, 2004; Bošković 2001), which involves other available repair strategies. Discontinuous predicates in Cantonese become unavailable in the so-called Verb Copying constructions, where an additional verb copy is pronounced when there are two post-verbal constituents as in (10) (C.-T. J. Huang 1982, 2022; Gouguet 2006; Cheng 2007; Bartos 2019; Meadows and Yan 2023, *i.a.*). We suggest that the Chain Faithfulness violation is alternatively "repaired" by the additional copy, and Full CD applies over Partial CD to the lowest copy, as forced by Economy of Pronunciation. This again derives the preference for minimal realization ("not more", lowest copy concerned) of a chain.

(10) Interaction between discontinuous predicates and Verb Copying constructions

a. *Aaming **pisen** ni-bin man **pi**-zo saam-ci **-sen**.
Ming present this-CL paper present-PFV three.time present

b. Aaming **pisen** ni-bin man **pi**-zo saam-ci.
Ming present this-CL paper present-PFV three.time
'Ming presented this paper for three times.'

The rest of this paper is organized as follows. In Sect. 2, we first provide a basic description on various constructions that give rise to discontinuous predicates in Cantonese. In Sect. 3, we argue that discontinuous predicates in Cantonese are underlyingly head chains formed by syntactic head movement. It is shown that the verbal wordhood of discontinuous predicates is retained throughout the derivation and the individual syllables do not acquire independent wordhood, hence they are reduced copies of a syntactic head rather than a reanalyzed head/phrase. In Sect. 4, we propose a restrictive theory of Partial CD that distinguishes between operations triggered by chain-external and chain-internal force, and develop an account of discontinuous predicates. Discontinuous predicates are derived by (i) Syllable Subtraction on the higher copy, which is independently motivated and attested in Cantonese (e.g., in reduplication), and (ii) Partial CD that applies on the sub-head level on the lower copy in compliance with CHAIN FAITHFULNESS. We explicate the last resort nature of Partial CD in Sect. 5 with an in-depth discussion on how the form of CD (Full vs. Partial vs. No CD) is determined based on the interaction between discontinuous predicates and verb doubling constructions. In Sect. 6, we extend our theory to discontinuous predicates in other languages including German and Yorùbá. Lastly, Sect. 7 concludes the paper.

2 Discontinuous predicates in Cantonese

2.1 Core cases

In a number of contexts, a (bi-syllabic) verb in Cantonese can appear in a discontinuous form, as illustrated in (11) and (12).[4] In (11a) and (11b), the verbal suffix *-zo* and the *wh*-expression *matje* 'what' intervene the two syllables of a bi-syllabic verb, respectively (Chan and Cheung 2020; Tsai 2021; S.-W. Tang 2022). In (12a) and (12b), the bi-syllabic verbs are split into two parts in *lin-* 'even' focus constructions (cf. T. T.-M. Lee 2022, 2024).[5] Following the terminology in Fanselow and Ćavar (2002), we refer to cases like (11) as *pull split* cases (order preserving) and the ones in (12) as *inverted split* cases (order reversing).

4. A discontinuous form serve as an additional, alternative way to realize a predicate. It is always optional, and does not alter the truth-conditional or information structural meaning of the predicates. They arise, as far as we can tell, for pure stylistic reasons.
5. See also discussions on the Mandarin counterparts of the *lian* 'even' focus constructions in Shyu (1995), Badan (2007), and Cheng and Vicente (2013), among many others.

(11) Pull splits: Intervention by verbal suffixes or *wh*-expressions

a. Aaming gamci haausi **fei**-zo-**lou**. (A-SUFFIX-B, *feilou* 'fail')
Ming this.time exam fail-PFV-fail
'Ming failed the exam this time.'

b. Nei **so**- matje -**wi** aa3? ngo jau m-hai naau nei.(A-WH-B, *sowi* 'sorry')
2SG sorry what sorry SFP 1SG again not-be scold YOU
'Why on earth do you apologize? I'm not really scolding you.'

(12) Inverted splits: Focus constructions (with *lin* 'even')

a. Lin-**sen** Aaming dou m-soeng **pi**-, keoi zanhai hou laan.
even-present Ming also not-want present 3SG really very lazy
'Ming doesn't want to even present. He's quite laid-back.'
(FOC-B...A, *pisen* 'present')

b. Aaming jigaa lin-**sau** dou **zi**-maai laa, zung soeng keoi dim?
Ming now even-confess also confess-ADD SFP more want 3SG how
'Ming has even turned himself in. What else do you want from him?'
(FOC-B...A, *zisau* 'confess')

These two types are schematically represented in (13). We adopt *A* and *B* to represent the two syllables of a bi-syllabic verb, and *x* to represent the trigger of the discontinuous predicates.[6]

(13) Two types of discontinuous predicates in Cantonese, based on their relative order

a. *Pull splits* : AB → ... A-x ... B ... e.g., (11)

b. *Inverted splits*: AB → ... x-B ... A ... e.g., (12)

2.2 Morpho-syntactic properties

Discontinuous predicates in Cantonese exhibit a considerable degree of flexibility. They can be formed from verbs with (i) different internal morphological relations, (ii) different number of morphemes, and (iii) different syllabicity.

To begin with, *compound verbs* appearing in discontinuous forms are exemplified in the sentences in (14).[7] No particular morphological structure is forbidden in taking discontinuous

6. Whether a predicate can appear in a discontinuous form exhibits a considerable degree of idiosyncrasies. Not all bi-syllabic verbs freely allow discontinuous forms. For the purpose of this paper, we focus on the properties and derivation of the admissible cases. Interested readers may refer to Chan and Cheung (2020) for factors that affect verb separability in Cantonese. Discontinuous predicates in other languages also exhibit similar idiosyncratic properties. For example, the separability of German affixed-verbs depends on the choice of the affixes (see the discussion and references in Sect. 6).

7. The examples in (14) are accessed on 2022-6-29 with hyperlinks of the sources embedded.

forms. Possibles structures include verb-object (VO, 14a-14b), verb-verb coordination (VV, 14c-14d), verb-resultative complement (VR, 14e), modifier-verb (MV, 14f), and subject-verb (SV, 14g) (see Chan and Cheung 2020 for more examples). Both pull split cases and inverted split cases are observed.

(14) Examples of discontinuous compound verbs (of different types)

a. Verb-object (VO): *ceot1baan2* 'release + plate' (A-SUFFIX-B; Social media)
Daiseikei jiging **ceot**-zo-**baan** laa!
fourth.issue already publish-PFV-publish SFP
'The fourth issue (of *Resonate Cantonese*) has been published!'

b. Verb-object (VO): *sat1jip6* 'lose + career' (A-SUFFIX-DUR-B; Forum)
Sat-zo hounoi **-jip** ngo gokdak hou gui
unemployed-PFV long.time -unemployed 1SG feel very tired
'Being unemployed for a long time worn me out.'

c. Verb-verb coordination (VV): *wui4gwai1* 'back + back' (A-WH-B; Social media)
Wui- mat **-gwai**, dou mou jan sik ngo
return- what -return, at.all no person know 1SG
'Returning for what? No one knows me anymore.'

d. Verb-verb coordination (VV): *zong1sau1* 'install + repair' (FOC-B...A-; Social media)
Gam keoidei jihau zau lin-**sau** dou m-sai **zong**-
then 3PL later then even-furnish also not-need furnish
'Then they don't even need to furnish it from now on.'

e. Verb-resultative complement (VR): *laai1coeng4* 'pull + long' (A-SUFFIX-B; Forum)
Laai-faan-**coeng** tiu sin tai
lengthen-AGAIN-lengthen CL line see
'Lengthen the line to see (the whole picture).'

f. Modifier-verb (MV): *siu2sik1* 'small + rest' (A-SUFFIX-B; Forum)
Keoi jauci **siu**-gan-**sik** faan-maai wai
3SG once break-PROG-break return-ADD seat
'S/he once returned to the seat while having the break.'

g. Subject-verb (SV): *tou5ngo6* 'tummy + hungry' (A-SUFFIX-B; Social media)
Daaigaa **tou**-zyu-**ngo** dang-zo seng-go zung jisoeng
everyone hungry-CONT-hungry wait-PFV whole-CL hour above
'Everyone has waited on an empty stomach for more than one hour.'

Note that (14b) represents an interesting case where duration phrases *hounoi* 'for a long time' can also serve as an intervening element (following the suffix *-zo*).[8]

Here, we shall clarify that compound verbs, in particular *VO compound verbs*, should not be conflated with *verb-object phrases*, despite their surface similarities. We adopt the operational definition in (15) to distinguish compound verbs from verb phrases.

(15) An operational definition of compound verbs and verb phrases
(Compound) verbs can be followed by a suffix, but verb phrases cannot.

The assumption behind (15) is that verbal suffixes attach to heads but not phrases. In effect, under (15), the VO string *sik faan* 'eat rice' in (16) is regarded as a verb phrase rather than a compound verb, since the progressive suffix *-gan* can only occur immediately after the verb *sik* (but not after the object *faan*). The same applies to the VO string *fan gaau* 'sleep nap' in (17). While *fan gaau* is traditionally perceived as a compound verb, we suggest instead that it is a verb taking a cognate object, similar to *dream a (beautiful) dream* in English. We do not regard these cases as discontinuous predicates.

(16) a. * **sik faan**-gan
eat rice-PROG

b. **sik**-gan **faan**
eat-PROG rice
'Eating rice'

(17) a. * **fan gaau**-zo
sleep nap-PFV

b. **fan**-zo **gaau**
sleep-PFV nap
Lit.: 'Slept a nap'

In contrast to verb phrases, compound verbs discussed above allow (ordinary) suffixation. For example, the VO compound *satjip* 'unemployed' can be followed by the perfective suffix *-zo* and duration phrase in (18) (cf. a minimal pair with (14b)).[9]

(18) Ngo biudai jiging **satjip**-zo hounoi. (AB-SUFFIX-DUR; Social media)
1SG cousin already unemployed-PFV long.time
'My cousin has been unemployed for a while.'

8. In addition to duration phrases, frequency phrases and affectees may also intervene, as shown in (i) below with the mono-morphemic verb *feilou* 'fail'.

(i) Ni fo lousi **fei**-zo Aaming saamci **-lou**. (A-SUFFIX-AFFECTEE-FREQ-B)
this course teacher fail-PFV Ming three.times fail
'The teacher failed Ming three times in this course.'

9. Both examples in (18) and (19a) are accessed on 2022-6-29 with hyperlinks of the sources embedded.

The contrast with verb phrases extends to pull split cases with *wh*-elements: *matje* 'what' can only occur after the verb, but not the whole verb phrase. This is illustrated in the contrast between (19a) and (19b).[10]

(19) a. Jatzik dou hai-dou, **wuigwai** matje? (AB-WH, cf. (14c); Forum)
all.the.time all at-here return what
'I've been here all the time. How could I return?'

b. *__Wui seon__ matje aa1?! (cf. [OK]__wui__ matje __seon__ aa1?!) (*VP-WH)
back letter what SFP back what letter SFP
'What the hell do I reply the letter for?!'

As such, we limit our discussions to genuine cases of discontinuous predicates, where words (instead of phrases) optionally allow both ordinary suffixation and suffix intervention. Predicates may alternate between the non-intervened forms and discontinuous forms.

We now move on to *mono-morphemic predicates*, which may also occur in discontinuous forms (see Chan and Cheung 2020). These cases show that discontinuity can occur not only at *morpheme* boundaries, but also at *syllable* boundaries. Apart from *feilou* 'fail', *sowi* 'sorry,' and *pisen* 'present' in Sect. 2.1, additional examples are given in (20).[11] Again, the patterns are attested for both pull splits and inverted splits.

(20) Examples of discontinuous mono-morphemic verbs

a. Loanword *ou1kei1* 'approve' from English *okay* (A-SUFFIX-B; Forum)
Keoidei jau sango zau **ou**-saai-**kei**.
3PL have new.song then okay-ALL-okay
'I would say yes as long as they have new songs.'

b. Loanword *baai1baai3* 'say goodbye' from English *bye* (A-WH-B; Forum)
Mingming zung jau-dak bo, **baai1**- mat-gwai **-baai3**?
clearly still can stream bye what-INT bye
'Clearly they are still streaming, bye for what?!'

c. Loanword *kit1si4* 'kiss' from English *kiss* (FOC-B ... A-; *Eight Taels of Gold* (1989))
Mdaanzi mei me-gwo-wi, lin-**si** dou mei **kit**-gwo.
not.only not.yet marry-EXP-marry, even-kiss also not.yet kiss-EXP
'Not only I haven't been married, but I also haven't even kissed someone ever before.'

10. Anticipating the discussions in Sect. 4.3, we suggest that *matje* is indeed a suffix, and behaves similarly to other verbal suffixes (cf. S.-W. Tang 2022).
11. The examples in (20) are accessed on 2022-6-29 with hyperlinks of the sources embedded.

d. Native word *oi2mui6* 'flirt/have chemistry' (A-SUFFIX-B; Forum)
Ceoifei nei jiging **oi**-gan-**mui** or paak-gan to.
unless 2SG already flirt-PROG-flirt or have-PROG relationship
'Unless you're already flirting with someone or you're having a relationship.'

Note that most of the mono-morphemic bi-syllabic verbs in Cantonese are loanwords from English, but there are also native discontinuous mono-morphemic verbs, such as (20d).

Last but not least, certain *tri-syllabic* predicates can also appear in a discontinuous form, such as the mono-morphemic *in1ta4fiu4* 'interview' and the bi-morphemic *stek6kei1seon4* '(have) staycation'. Both are loanwords from English. An example of each is given in (21).[12] [13]

(21) Tri-syllabic predicates

a. Zicin AL-cin bou-zo. **In**-maai-**tafiu** (A-SUFFIX-BC; Forum)
earlier.on AL-before apply-PFV interview-ADD-interview
'Earlier on I've applied it before the A-Level exam, and did the interview.'

b. **stek**-gan-**keiseon** ze1 (A-SUFFIX-BC; Social media)
staycation-PROG-staycation SFP
'(Joshua Wong) is just having staycation.'

The intervention, however, can only occur in between the first syllable and the rest of the predicate (i.e., ^{OK}A-x...BC), but not between the first two syllables and the last syllable (i.e., *AB-x...C). The discontinuous strings in (22) are ill-formed.

(22) Illicit suffix intervention in tri-syllabic predicates (*AB-SUFFIX-C)

a. ***inta**-maai-**fiu** b. ***stekkei**-gan-**seon**

3 Discontinuous predicates as head chains

In this section, we argue that discontinuous predicates are underlying *head* chains formed by syntactic verb movement, as schematized in (23a) (as in pull splits). They are not, for example, underlyingly verb-object phrases followed by verb movement in a way depicted in (23b).[14] In

12. The examples in (21) is accessed on 2022-6-29 with the hyperlink of the source embedded.
13. Other acceptable examples include *hom1o1fis4* 'home office, i.e., work from home' and *fu1kam1bou2* '(achieve) full combo (in a game).'
14. The phrasal approach is a predominant one for separable verbs in other languages (Mandarin Chinese: Chao 1968; C.-T. J. Huang 1984; Her 1996; Packard 2000; Pan and Ye 2015; Huang, Zhuang, and Feng 2017; see also similar proposals in German and Dutch, e.g. Zeller 2002). Apart from the empirical challenges presented in this section, the phrasal approach also faces non-trivial conceptual difficulties with *mono-morphemic* discontinuous predicates, which are unlikely to be (re)analyzed as a phrase.

other words, we suggest that no part of a discontinuous predicate qualifies as a *phrase*, i.e., they remain to be part of the same *head*. Furthermore, we argue against a subextraction alternative in (23c), where the two discontinuous parts are regarded as heads of a complex head.[15] We suggest instead that the discontinuous parts (syllables) are reduced verb copies of a movement chain, and no stand-alone syllable acquires independent wordhood.

(23) a. [$_{XP}$ **V$_{A}$**~~**B**~~-x [$_{VP}$ YP ... [~~**V$_{A}$B**~~ ...]]] (Syntactic head movement)

b. [$_{XP}$ **V$_{A}$**-x [$_{VP}$ YP ... [~~**V$_{A}$**~~ **DP$_{B}$** ...]]] (*to be rejected:* Verb-object phrase)

c. [$_{XP}$ **V$_{A}$**-x [$_{VP}$ YP ... [$_{V*}$ ~~**V$_{A}$**~~ **V$_{B}$**] ...]] (*to be rejected:* Subextraction from a complex head)

To achieve this end, we first show that the second syllable in a discontinuous predicate lacks nominal properties in Sect. 3.1.1, challenging the VO-phrase analysis. Then, we reveal in Sect. 3.1.2 that it is the whole discontinuous predicate, rather than the first syllable, functions like a verb, speaking against both the VO-phrase and subextraction analyses. Finally, we offer evidence for syntactic head movement in Sect. 3.2.

3.1 Separated syllables do not acquire independent wordhood

3.1.1 The second syllable lacks nominal properties

Zooming in on the second syllable of discontinuous predicates, we observe that it does not serve as a nominal or an object. This suggests that the second syllable does not acquire nominal wordhood, and it is still part of the verb when appearing in a discontinuous form. We adopt the following three diagnostic tests to illustrate this point.[16]

(24) The second syllable does not show nominal/object properties

(i) *Individual classifiers: *__A__-x CL -__B__

(ii) *Object fronting: *[$_{vP}$ -__B__ ... __A__-x ~~-B~~]

(iii) *Object relativization: *[$_{RC}$ ... __A__-x ~~-B~~ ...] MOD -__B__

First, while nominal objects in VO phrases can be preceded by individual classifiers (=25a), the second syllable *lou* of the discontinuous predicate *feilou* 'fail' in (25b).

15. Such possibility is discussed in Neeleman and Weerman (1993), Stiebels and Wunderlich (1994), and Vikner (2005) for Germanic particle verbs.

16. This property differentiates Cantonese discontinuous predicates from Mandarin ones. In Mandarin separable verbs, the second syllable does show robust nominal properties, passing the three diagnostic tests adopted here. For more nominal diagnostics, see Pan and Ye (2015).

(25) Individual classifiers

a. keoi **tai**-zo saam-bun **syu** (VO phrases)
3SG watch-PERF three-CL book
'He read three books.'

b. *keoi **fei**-zo saam-go **lou** (Discontinuous predicates)
3SG fail-PERF three-CL fail
Int.: 'He made three failures.'

Second, (26a) shows that the object in a VO phrase may be fronted to a *v*P-internal position in a disposal construction marked by *zoeng* (comparable to Mandarin *ba*-constructions). This contrasts with the second syllable *baan* of the VO compound *ceotbaan* 'publish, (lit.) release + plate' in (26b), which cannot be fronted.

(26) Object fronting

a. keoi [$_{vP}$ [zoeng (bun) **siusyut**] **ceot**-zo ~~siusyut~~ hai mong soengmin]
3SG DISP CL novel release-PERF at Internet above
'S/he released the book online.' (VO phrases)

b. *keoi [$_{vP}$ [zoeng (go) **-baan**] **ceot**-zo~~-baan~~ (hai mong soengmin)]
3SG DISP CL plate release-PFV at Internet above
Int: 'S/he published the book (lit. released the plate) online.' (Discont. pred.)

Third, the object in a VO phrase can be relativized and serve as the head noun of a relative clause, as illustrated by the congate object in (27a).[17] In contrast, the second syllable of discontinuous predicates cannot be relativized, as shown in (27b).

(27) Object relativization

a. [$_{RC}$ Keoi **fan** ~~gaau~~] ge [**gaau**] hai battungfaanhoeng-dei coeng.
3SG sleep MOD nap be extraordinary-ly long
Lit.: 'The nap that she sleeps is extraordinarily long.' (VO phrases, Social media)

b. *[$_{RC}$ Jigaa **siu**-gan~~-sik~~] ge [**-sik**] hai battungfaanhoeng-dei coeng.
now small-PROG MOD rest be extraordinary-ly long
Int.: 'The break that we're having now is extraordinarily long.' (Discont. pred.)

Combining the results of the three tests, we obtain the generalization in (28). In other words, the second syllable does not acquire nominal wordhood nor object phrasehood due to separation. Rather, it retains its verbal status even in a discontinuous form.

17. The example in (27a) is accessed on 2022-6-29 with the hyperlink of the source embedded.

(28) Generalization on the syntactic properties of the second syllable
The second syllable of a discontinuous predicate cannot be preceded by an adnominal element or take part in constructions that target objects and/or nominal phrases.

3.1.2 The verbal nature of discontinuous predicates

We argue in this section that discontinuous predicates as a whole maintain their wordhood as one verb as if they are not separated. In other words, the first syllable does not constitute a verb to the exclusion of the second syllable. It is both the first and the second syllable that constitutes a full verb.[18] This can be shown in constructions that specifically target verbs. We employ two tests that involve verb displacement or doubling in support of this suggestion, as previewed in (29):

(29) The first syllable cannot be displaced/doubled on its own
(i) *ATB verb movement: ***A**-X ... [~~A~~-**B** AND ~~A~~-**C**]
(ii) *Focus verb doubling: **lin*-**A**- ... [**A**-X ... -**B**]

First, when two VP conjuncts contain the same verb, the verb in the second conjunct may be omitted in Cantonese, giving rise to a gapping(-like) configuration in (30). S.-W. Tang (2001) argues that sentences like (30) are derived by ATB (across-the-board) movement of the verb (from V-to-*v*). In (30), both *daa laang* 'eat Teochew food' and *daa binlou* 'eat hotpot' are lexicalized expressions in colloquial Cantonese, where the meaning of *daa* has been bleached from 'hit' to 'do' (cf. Tsou and Yip 2020).

(30) VO phrases: ^{OK}ATB verb movement

Keoi	zunggung	**daa**-gwo	[$_{VP}$	loeng-ci	~~daa~~	laang	]	tung	[$_{VP}$	saam-ci
3SG	total	hit-EXP		two-time		Teochew.food		and		three-time
~~daa~~	binlou]									
	hotpot									

'S/he had Teochew food twice and hotpots for three times in total.'

Unlike verbs in VO phrases, similar gapping(-like) constructions are disallowed for the first syllable of discontinuous predicates. To construct a relevant example, we adopt the MV compound verbs *zisaat* 'commit suicide' and *zisau* 'confess.' They have the same first morpheme *zi* 'self'. However, as shown in the contrast in (31), *zi* in the second conjunct cannot

18. Whether the first syllable on its own is a verb is particularly relevant when we consider loanwords, which are often truncated into one syllable when they were adapted in Cantonese, e.g., *sowi* 'sorry' may alternate with *so* in non-intervened forms, and *feilou* 'fail' with *fei* as well (cf. Luke and Lau 2008). However, not all discontinuous loanwords have additional truncated forms, e.g. **kit* is not attested for *kitsi* 'kiss', nor **ou* for *oukei* 'okay' or *outi* 'work overtime'. Native verbs in general do not have a truncated form, e.g. **zong* for *zongsau* 'furnish'.

be omitted, suggesting that ATB verb movement is unavailable. We attribute the failure of ATB movement of *zi* to the fact that *zi* in both conjuncts does *not* constitute an independent verb. Instead, it still part of their corresponding compound verb, and thus ATB movement is unavailable because there are no two identical words to start with.

(31) Discontinuous (bi-morphemic) predicates: *ATB verb movement

a. *Keoi zunggung **zi**-gwo [$_{VP}$ loeng-ci ~~zi~~-**saat**] tung [$_{VP}$ saam-ci ~~zi~~-**sau**]
3SG total self-EXP two-time kill and three-time inform

b. Keoi zunggung [$_{\nu P}$ **zi**-gwo loeng-ci ~~zi~~-**saat**] tung [$_{\nu P}$ **zi**-gwo saam-ci
3SG total self-EXP two-time kill and self-EXP three-time
~~zi~~-**sau**]
inform

'S/he attempted suicide twice and turned her/himself in for three times.'

The same argument can be replicated with the pair of loanwords *oukei* '(say) okay' and *outi* '(work) overtime.' Likewise, they have the same (non-morphemic) first syllable *ou*, but ATB verb movement is disallowed, as can be told by the unacceptability of (32).

(32) Discontinuous (mono-morphemic) predicates: *ATB verb movement

Lousai camjat **ou**-zo [$_{VP}$ loeng-ci ~~ou~~-**kei**] tung *(**ou**-zo) [$_{VP}$ saam-go
boss yesterday okay-PFV two-time okay and overtime-PFV three-CL
zung ~~ou~~-**ti**].
hour OT

'The boss gave approval twice and worked overtime for three hours yesterday.'

The second test concerns focus verb doubling as in *lin-* 'even' focus constructions. In Cantonese, the verb can be focused by the prefixal element *lin-* and it must be doubled in its bare form, as in (33) (Cheng and Vicente 2013; T. T.-M. Lee 2022, 2024).[19]

(33) VO phrases: ^{OK}Focus verb doubling

Lin-**ling** [ngo dou *(**ling**)-maai bun syu bei nei] laa3 wo3!
even-bring 1SG also bring-ADD CL book to 2SG SFP SFP

'I even BROUGHT this book for you!'

Similar verb doubling effects, howeever, are impossible for the first syllable of discontinuous predicates, such as *ou* (in *outi* 'OT/overtime') in (34). Instead, the whole verb *outi* must be doubled when targeted by *lin-*.

19. An apparent exception to the doubling requirement concerns inverted split cases (e.g., (12) in Sect. 1), where the fronting of the second syllable leaves the first syllable stranded (i.e., *lin*-B...A). We will discuss the interaction between the doubling requirement and Partial CD in inverted splits in Sect. 4.4.

(34) Discontinuous predicates: *Focus verb doubling

lin-**ou**-*(**ti**) ngo dou jiging **ou**-maai-**ti** bei nei laa3 wo3, zung lai?
even-OT 1SG also already OT-ADD-OT to 2SG SFP SFP more come
'I've even already worked overtime for you! Not again!'

The results of all the above tests are generalized in (35) below. We conclude that the first syllable is not an full-fledged verb on its own, but a sub-part of it.

(35) Generalization on the syntactic properties of the first syllable

In constructions that require verb displacement or doubling, a discontinuous predicate must be displaced or doubled as a whole. Displacing or doubling a sub-part of a discontinuous predicate, i.e., the first syllable, leads to unacceptability.

To sum up, neither the second syllable of discontinuous predicates shows nominal properties, nor the first syllable shows full-fledged verbhood. It can be concluded that the discontinuous sub-parts, on their own, do not acquire independent wordhood/phrasehood. Discontinuous predicates as a whole function like a verb rather than a verb-object phrase or a sub-extracted complex head.

3.2 Syntactic head movement

We argue that *all* discontinuous predicates involve syntactic head movement in their derivation. Substantially, the pull split cases involve Short Head Movement (SHM), whereas the invert split cases involve Long Head Movement (LHM). The idea is schematically represented in (36). SHM is essentially the head movement proposed in works by Travis (1984), Koopman (1984), and Baker (1985), which is achieved via head-head adjunction and obeys the Head Movement Constraint. On the other hand, LHM is characterized in works by Lema and Rivero (1990), Rivero (1991), and Borsley, Rivero, and Stephens (1996), and more recently in works by Vicente (2007), Cheng and Vicente (2013), Harizanov (2019), and T. T.-M. Lee (2022). LHM can be regarded as the head counterpart of A'-movement.

(36) a. $[_{XP}\ \mathbf{V_{A}}\text{-}\mathbf{B}\text{-x}\ [_{VP}\ YP_{adjunct}\ \ldots\ [\ \mathbf{V}_{\text{-}\mathbf{B}}\ \ldots\ ]\ ]\ ]$ (SHM in pull splits)

b. $[_{FocP}\ \text{x-}\mathbf{V}_{\text{-}\mathbf{B}}\ \ldots\ [_{\nu P}\ \ldots\ [_{VP}\ YP_{adjunct}\ \ldots\ [\ \mathbf{V_{A}}\text{-}\mathbf{B}\ \ldots\ ]\ ]\ ]\ ]$ (LHM in inverted splits)

We present major arguments that have been discussed in previous works in support of head movement in these cases. For SHM, we argue that verbal suffixation is achieved via syntactic verb movement to the suffix (S.-W. Tang 2003; Tsai 2008; C.-T. J. Huang 2008). One

piece of evidence comes from the possibility of ATB head movement of the verb from within VP conjuncts, as already illustrated in (30) above. Another piece of evidence comes from the Mirror-Principle effects (Baker 1985, 1988), where the verb picks up verbal suffixes in an order that mirrors their syntactic position. In (37), the universal quantificational suffix *-saai* takes scope over and is syntactically higher than the experiential aspectual suffix *-gwo*, mirroring the linear order V-*gwo*-*saai* (S.-W. Tang 2003; P. P.-l. Lee 2012). We follow S.-W. Tang (2003) and take this to be a "snowball" effect of successive cyclic SHM passing through two suffixal heads.

(37) Mirror-Principle effects of SHM (adapted from S.-W. Tang 2003:259,261)

a. Keoidei heoi-**gwo**-**saai** Meigwok. (∀ > EXP; *EXP > ∀)
3PL go-EXP-ALL America
'All of them have been to America before';
NOT: 'There was once all of them went to America together.'

b. [$_{\text{QuantP}}$ **V**-Asp$_{\text{gwo}}$-Quant$_{\text{saai}}$ [$_{\text{AspP}}$ **V**-Asp$_{\text{gwo}}$ [$_{\text{VP}}$ ... [**V** ...]]]] ("snowball" SHM)

As for the intervening *wh*-expression *matje* in discontinuous predicates, we assume that it is also a suffix heading a projection higher than VP. It triggers verb movement in a similar way to verbal suffixes. This assumption combines the idea in S.-W. Tang (2022) that such usage of *matje* is affixal, and the idea in Tsai (2011, 2021) that verb movement is involved in the relevant *wh*-constructions.

For LHM, we suggest that the verb moves to the left periphery for focus interpretation (Cheng and Vicente 2013; T. T.-M. Lee 2022). For a precise derivation of verb movement cases in Cantonese, see T. T.-M. Lee (2022, Chapter 3). We replicate two pieces of evidence in support of head movement. The first one comes from the locality profile of the verb in *lin*-focus constructions. The two examples in (38) show that the two identical verbs cannot be separated by (complex NP) island boundaries, but can tolerate finite clause boundaries.

(38) The focused verbs cannot span across island boundaries, but finite clause boundaries

a. *Lin-**zau** ngo gamjat dou tingdou [$_{\text{NP}}$ [$_{\text{CP}}$ Aaming **zau**-dak maan-gwo
even-leave 1SG today also hear Aaming leave-RES slow-than
jan] ge siusik].
person MOD rumor
Int.: 'Today I hear that rumor that Aaming is slower than others even in LEAVING.'
(T. T.-M. Lee 2022, p.80)

b. Lin-**maai** ngo gu [$_{CP}$ Aaming dou mei **maai** ni-bun syu.]
even-buy 1SG guess Aaming also not.yet buy this-CL book
'I guess Aaming has not even BOUGHT this book.' (T. T.-M. Lee 2022, p.82)

Also, it is observed that the focused verbs in *lin*-focus constructions have to be *lexically* identical to the verb in the base position. In (39), the base verb is *kip* 'keep', a loanword from English *keep*. Its semantically identical native counterpart, *bougun* 'keep' is unacceptable in the left periphery. The observed Lexical Identity Effect can be taken as evidence against a base generation analysis (cf. Cable 2004), but it follows naturally from a movement analysis.

(39) Lexical Identity Effect in *lin*-focus constructions
Lin- {**kip**/ *bougun} Aaming dou m soeng **kip**. (T. T.-M. Lee 2022, p.77)
even- keep keep Aaming also NEG want keep
'Aaming doesn't even want to KEEP (it).'

4 Discontinuous predicates as Partial Copy Deletion

In this section, we develop a restrictive theory of Partial CD to account for discontinuous predicates in Cantonese. The empirical desiderata of such a theory include the followings:

(40) a. **Level of units**: A verb copy is reduced to a sub-head level syllable.
b. **Direction of splitting**: Pull splits come with suffixes on the higher copy, whereas inverted splits come with prefixes on the higher copy.
c. **Minimal realization**: The deletion on the lower copy is complementary to the deletion on the higher copy, such that the two verb copies jointly realize the whole verb.

We propose two novel refinements to existing versions of copy theory of movement (e.g., Nunes 2004; Landau 2006; van Urk 2018). First, we reformulate CD to operate on the featural level instead of the constituent level (Sect. 4.1). Second, we argue that the so-called "distributed/scattered" deletion involves two operations of distinct nature (Sect. 4.2). The first one is an independent deletion operation triggered by chain-external forces, which we attribute to a morphological process Syllable Subtraction in Cantonese. The subsequent one is Partial CD that is triggered by, as we will propose, a chain-internal force that preserves the integrity of the chain. We will illustrate how (40) is captured in Sect. 4.3 and Sect. 4.4 for pull splits and inverted splits, respectively. Lastly, we show in Sect. 4.5 that Syllable Subtraction may apply without subsequent (Partial) CD in reduplication, instantiating further evidence for reconciling "distributed" deletion as two distinct operations.

4.1 Copy Deletion on the featural level

We start with making explicit two assumptions in the proposal. First, features are the primitives of the grammar, and lexical items are bundles of features, i.e., they are triplets of syntactic, semantic, and phonological features $<f, \lambda, \pi>$ (Chomsky and Lasnik 1993; Chomsky 1995, 2000). [20] Second, we assume with Nunes (1995) that CD is a PF operation, which is preceded by at least some morphological processes, as diagrammed below in (41).

(41) Narrow Syntax → $\underbrace{\text{Morphology} \rightarrow \text{Linearization (CD)} \rightarrow \text{Morpho-phonology}}_{\textit{Phonological Form (PF)}}$ → SM interface

Our proposal departs critically from a widely adopted assumption on CD, namely, CD, full or partial, operates on the *syntactic constituents* (i.e., heads and phrases) (Nunes 1995, 2004; Bošković 2001; Fanselow and Ćavar 2002, *i.a.*).[21] [22] We instead propose that CD targets grammatical primitives and operates on the *featural* level. Concretely, we suggest that CD, as an PF operation, renders phonological features on lexical items invisible to the Sensory-Motor (SM) interface (hence not pronounced), in a way defined in (42).[23]

(42) Copy Deletion (as a PF operation on linearizing chains)
In a given chain CH formed by a movement operation of a constituent X: {X_n, ..., X_1}, such that X consists of a bundle of phonological features π (and other syn-sem features) and that the linearization of CH yields an output Φ, render π of some X in Φ invisible to the SM interface.

As will be illustrated in greater details, this view critically captures cases of discontinuous *monomorphemic* verbs, where sub-lexical syllables are separated. This offers an approach that conforms to the Lexical Integrity Hypothesis, which dictates that syntactic operations do not

20. In other words, we assume that lexical items contains phonological features upon syntactic derivation. See Embick (2007, 2015) who argues that only functional words, but not lexical categories/roots, are Late Inserted. See also footnote 23 for discussion.

21. For example, Nunes (1995)'s formulation of CD ("Chain Reduction" in his terms) is the following:

(i) Chain Reduction (Nunes 1995:279, emphasis ours)
Delete the minimal number of ***constituents*** of a nontrivial chain CH that suffices for CH to be mapped into a linear order in accordance with the LCA.

22. Recent proposals suggest that CD only operates on larger syntactic domains like phases (van Urk 2018, but see Scott 2021 for counter-points) or the lowest functional projections of copies (limiting to Partial CD, Georgi and Amaechi 2023). We, however, depart from the these suggestions.

23. So far we only focus on lexical words/roots, which have phonological features entering the syntax (see Embick 2015). For functional categories, they may only possess SynSem features in syntax and undergo Vocabulary Insertion (VI) in the PF to be pronounced (Hale and Keyser 1993). If VI is ordered after CD, CD maybe understood as rendering their SynSem features invisible to VI under such a framework (van Urk 2018; see also Yip and Ahenkorah 2023 for a feature-based implementation).

apply to subparts of words (Siegel 1974; Williams 1981; Di Sciullo and Williams 1987). Under our view, discontinuous monomorphemic verbs are not resulted from syntactic movement, but from Partial CD, where only certain phonological features are deleted at PF.

4.2 Reconciling "distributed" deletion as two distinct operations

4.2.1 Partial CD under the economy-based approach

In the following, we develop a restrictive view on Partial CD that builds on the economy-based approach to CD advocated by Landau (2006) and van Urk (2018). According to them, CD is regulated by two principles with forces in opposite directions: P-recoverability in (43), which encourages copy pronunciation for phonetic/phonological considerations, and Economy of Pronunciation in (44), which minimizes the number of pronounced copies.

(43) P-recoverability
In a chain $<X_1, \ldots X_i, \ldots X_n>$, where some X_k is associated with phonetic content, X_k must be pronounced. X is associated with phonetic content iff:
a. X has phonetic content, or
b. X is in a position specified with some phonological requirement.

(44) Economy of Pronunciation
Delete all chain copies at PF up to P-recoverability.

Under such a view, there is a clear division of labor: Economy of Pronunciation represents the chain-internal motivation to apply *deletion*, whereas and phonological requirements enforce *pronunciation/non-deletion*.

However, in existing proposals of "distributed/scattered" deletion, various chain-external PF constraints have been invoked to motivate the first deletion step. These proposals share the general idea in (45).[24]

(45) Asymmetry in the deletion steps of "distributed" deletion (partly repeated from(6))

Step I.	... $[_{\alpha_i}$ A$\boxed{\text{B}}$] ... $[_{\alpha_k}$ AB] ...	Deletion triggered by "chain-external" PF force
Step II.	... $[_{\alpha_i}$ A~~B~~] ... $[_{\alpha_k}$ $\boxed{\text{A}}$B] ...	Subsequent "complementary" Partial CD

24. Examples include Bulgarian enclitic requirements in Bošković (2001), stress alignment in Larson (2022), Realize Goal in van Urk (2024) and similar PF constraints in Hinterhölzl (2000), Fanselow (2001), Fanselow and Ćavar (2002), and Bondarenko and Davis (2023), *i.a.*. Note that there are also PF constraints deemed responsible for exceptional deletion of the highest copies (with subsequent low copy pronunciation), such as the ban on consecutive homophonous *wh*-phrases in Romanian (Bošković 2002a) and PF adjacency for morphological merger in Scandinavian object shift (Bobaljik 2002).

Importantly, however, we note that the deletion as depicted in Step I is substantially different from Economy-driven CD by (44), in the sense the former involves chain-*external* forces but the latter only concerns the (non-)pronunciation of copies *within* a chain.

Upon closer scrutiny, P-recoverability also appears to conflate two motivations for copy pronunciation. (43a) ensures that at least one copy is realized. If a copy is already pronounced, other copies in the same chain must undergo CD given Economy of Pronunciation, as in (46a). In this sense, (43a) represents a chain-*internal* force to pronounce copies. (43b), in contrast, represents a chain-*external* PF force. It allows more than one copies to be pronounced, as long as their positions are all specified with phonological requirement (e.g., Stray Affix Filter in Lasnik 1981; Landau 2006), as in (46b). No reference to other copies in the same chain is needed for calculating the (non-)application of CD.

(46) In a chain $<X_i, X_j, X_k>$, ...

a. If none of the copies are in a position specified with phonological requirements:
$[X_i \dots [\not{X}_j \dots [\not{X}_k]]]$ no CD of X_i due to (43a)

b. If X_i and X_j are in a position specified with phonological requirements:
$[X_i \dots [X_j \dots [\not{X}_k]]]$ no CD of X_i and X_j due to (43b)

Against this understanding of CD, our core refinement involves separating the chain-internal forces from the chain-external forces, while maintaining the insights from Landau (2006) and van Urk (2018) that PF economy is the sole driving force of CD. In particular, we propose that the first deletion step in (45) is *not* triggered by CD, but by an independently motivated PF deletion operation. As with other proponents of "distributed" deletion, this step is language-specific, and we will address this issue in Cantonese more specifically in Sect. 4.2.2. Second, we propose a chain-internal constraint, Chain-Faithfulness (Ch-Faith), that requires CD to preserve the integrity of the input of the movement chain in its final output of linearization, as in (47). It is an elaborated version of the first part of P-recoverability (43a) in accord to our featural view of CD in (42).

(47) Chain-Faithfulness (Ch-Faith, as a condition on Copy Deletion)
In a movement chain CH: $\{X_n, \dots, X_1\}$, such that X consists of a bundle of phonological features π, and that the linearization of CH yields an output Φ, each member of π must be contained in Φ.

In more specific terms, (47) can be satisfied by multiple ways, for example, by pronouncing only one copy (Condition 1), or by multiple copy pronunciation (Condition 2). We suggest that "distributed" deletion with Partial CD is yet another way to achieve the same end (Condition 3).

(48) Ch-Faith compliance (Input: π = {A,B})

a. Condition 1: Full pronunciation of only one copy
[AB ... ~~AB~~] or [~~AB~~ ... AB] : Φ = {A,B}

b. Condition 2: Multiple copy pronunciation/doubling
[AB ... AB] : Φ = {A_1,B_1,A_2,B_2}

c. Condition 3: Partial/"distributed" deletion
[A~~B~~ ... ~~A~~B] or [~~A~~B ... A~~B~~] : Φ = {A,B}

On the other hand, (47) is violated if all the copies are deleted (Condition 4), or not all subparts of the copies are pronounced at least once (Condition 5):

(49) Ch-Faith violation (Input: π = {A,B})

a. Condition 4: Deletion of all copies
[*~~AB~~ ... ~~AB~~]: $\Phi = \varnothing$ (i.e., A $\notin \Phi$, B $\notin \Phi$)

b. Condition 5: Incomplete pronunciation of copies
[*A~~B~~ ... ~~AB~~] or [*A~~B~~ ... A~~B~~] : Φ = {A} (i.e., B $\notin \Phi$)

For concreteness, we also update the Economy of Pronunciation in (44) accordingly as Chain-Economy (Ch-Econ), given in (50). It motivates deletion of copies in a chain *modulo* Ch-Faith and the second part of P-recoverability.

(50) Chain-Economy (Ch-Econ, as a condition on Copy Deletion)
Delete all chain copies at PF unless the deletion results in violation of Chain-Faithfulness or other PF requirements.

As a final bit of the proposal, we suggest that CD applies sequentially in a bottom-up fashion in (51) (see also Fujii 2007). In effect, a canonical chain always realizes only its highest copy *in the absence of other PF forces* (i.e., [X_i ... [~~X_j~~ ... [~~X_k~~]]]; but see footnote 24).[25]

(51) CD applies from the lowest copy to the highest copy in a chain.

As such, Partial CD on the lower copy is a necessary result when part of the higher copy has been deleted by independent operations, as illustrated in (52).

(52) Partial CD as a result of Ch-Faith and Ch-Econ

Step I.	... [$_{\alpha_i}$ A[~~B~~]] ... [$_{\alpha_k}$ AB] ...	Non-CD deletion by chain-external force
Step II.	... [$_{\alpha_i}$ A~~B~~] ... [$_{\alpha_k}$ [~~A~~]B] ...	✔ **Partial CD: complying with Ch-Faith**
	*... [$_{\alpha_i}$ A~~B~~] ... [$_{\alpha_k}$ AB] ...	✘ No CD: violating Ch-Econ
	*... [$_{\alpha_i}$ A~~B~~] ... [$_{\alpha_k}$ ~~AB~~] ...	✘ Full CD: violating Ch-Faith

25. (51) may be "parameterized" as bottom-up vs. top-down settings to capture cases where the lowest copy is pronounced by default, such as covert movement (See Reintges 2007 for variations in the pronunciation sites of *wh*-movement, and van Urk 2018:977-978 for variations in pronoun copying).

In the second step, CD is supposed to apply on the lower copy, as enforced by Ch-Econ with the absence of other PF requirements. Yet, applying Full CD leads to Ch-Faith violation because B is not contained in the output (*cf.* Condition 5 above). Hence, Partial CD that deletes only A serves as a last resort option to satisfy Ch-Faith modulo Ch-Econ. This view consequently captures the apparent conspiracy that the two deletion operations jointly minimally realize a whole copy is captured. In the following, we instantiate the first deletion step as a subtractive morphological process in Cantonese.

4.2.2 Syllable Subtraction as the chain-external force

We propose that Cantonese verbal affixes may trigger *Syllable Subtraction* on the adjacent syllable of their host, given in (53). It is assumed to be a morphological process that occurs in the PF *before* CD. For current purposes, we only state (53) descriptively and focus on its consequences on CD, without going into the theoretical discussions on how subtractive morphology is formalized (see, e.g., the procedural approach in Kurisu 2001 and the affixation approach in Trommer and Zimmermann 2014).

(53) Syllable Subtraction in Cantonese
Affixes may trigger deletion on the adjacent syllable of their host to form a foot.

Note that the process is subject to idiosyncratic properties of the affixes. Certain verbal suffixes in Cantonese have a stronger preference for a monosyllabic host, such as *-ngaang* 'must', as in (54) (S.-W. Tang 2003, see also Luke and Lau 2008; Li et al. 2016 for a general monosyllabic preference on verbs in Cantonese).[26] This suggests that (53) is obligatory for *-ngaang*. For other suffixes that allows for polysyllabic hosts and discontinuous predicates (e.g., perfective *-zo*), we suggest that (53) is optional.

(54) Gammaaan keoi {??**outi**-ngaang/ OK**ou**-ngaang **-ti**}.
tonight 3sg OT-must OT-must OT
'Tonight s/he will definitely work overtime.'

Since the position of the host is different for suffixes and prefixes, Syllable Subtraction may lead to different forms of the host: suffixes delete the *preceding* syllable, whereas prefixes delete the *following* syllable. The precise pattern is illustrated in (55).

26. Additional support comes from the possible discontinuous form of trisyllabic predicates, as mentioned in (21). Only the form A-x-BC is licit, where the suffix is attached to a monosyllabic host. In contrast, the form AB-x-C is illicit, where the host is disyllabic.

(55) Two possibilities of Syllable Subtraction

a. Suffix-induced Syllable Subtraction: ... A~~B~~-SUFFIX ...

b. Prefix-induced Syllable Subtraction: ... PREFIX-~~A~~B ...

As we will see shortly, (55) derives the sensitivity of affix directionality in discontinuous predicates: the pull split cases involve *suffix*-induced Syllable Subtraction, whereas the inverted split cases involve *prefix*-induced Syllable Subtraction.

4.3 Deriving pull splits

Let us illustrate the proposal with the pull split case in (56). The example comes with both an intervening verbal suffix and an intervening frequency phrase.

(56) Discontinuous predicates, intervened by a verbal suffix and a frequency phrase

(Ngo) **ou**-zo houdo-ci **-ti**. (A-SUFFIX-FREQ-B)

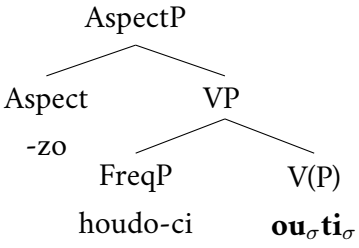
1SG OT-PERF many-time OT

'(I) worked overtime many times.'

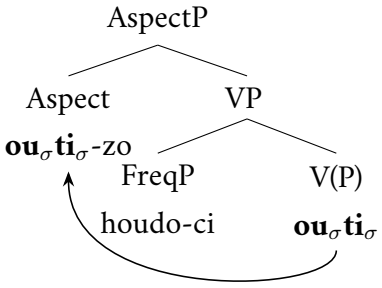
The sentence in (56) is derived as follows. First, in the syntactic component, after the verbal suffix *-zo* is merged in (57a),[27] it triggers head movement of the verb *outi* (Travis 1984; Baker 1985), creating two copies of *outi* in the structure, as in (57b) (with the subject abstracted over).

(57) The derivational steps of (56) in the syntactic component

a. Building of the AspectP



b. Verb movement to Aspect head



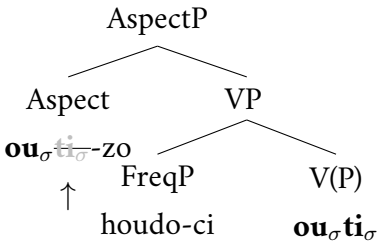
Then, the structure in (57b) is Spelled-Out. In the PF, the suffix *-zo* induces Syllable Subtraction on its host, deleting the adjacent syllable *-ti* on the higher copy of *outi*, as in (58a). Subsequently, CD applies to the lower copy. In accord to CH-FAITH, Partial CD is chosen over Full CD to avoid partial realization of the input *outi* as only *ou-* in the final output. Hence,

27. We assume that they are syntactic heads of an aspect projection above VP (S.-W. Tang 1998, *contra* Gu 1993; Huang, Li, and Li 2009).

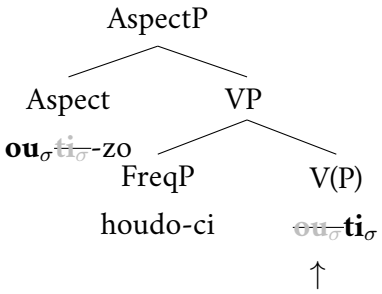
only *ou-* on the lower copy is deleted, pronouncing -ti, as illustrated in (58b). This derives the attested discontinuous form in (56).

(58) The derivational steps of (56) in the post-syntactic component

a. Suffix-induced Syllable Subtraction



b. Partial CD



c. CH-FAITH compliance of the verb chain (Condition 3):
π: {ou$_\sigma$, ti$_\sigma$} → Φ: {ou$_\sigma$, ti$_\sigma$}

Note that if Syllable Subtraction does not apply in (58a), CD applies in its full form on the lower copy. This would result in *outi-zo houdo-ci*, which would also give a well-formed sentence.

Our proposal also desirably rules out other unattested forms of discontinuous predicates. Relevant forms are given in Table 1, where only (a) and (e) are possible.[28]

Surface form	**Schema**	(i) **Syllable Subtraction**	(ii) **Copy Deletion**
a. ^{OK}**ou**-zo **ti**	A~~B~~-x ~~A~~B	✓ preceding syllable	✓ Partial
b. ***ou**-zo **ou**	A~~B~~-x A*~~B~~	✓ preceding syllable	✗ *CH-FAITH
c. ***ou**-zo	A~~B~~-x *~~AB~~	✓ preceding syllable	✗ *CH-FAITH
d. ***ou**-zo **outi**	A~~B~~-x *AB	✓ preceding syllable	✗ *CH-ECON
e. ^{OK}**outi**-zo	AB-x ~~AB~~	N/A	✓ Full
f. ***outi**-zo **outi**	AB-x AB	N/A	✗ *CH-ECON
g. ***ti**-zo **ou**	*~~A~~B-x A~~B~~	✗ non-adjacent deletion	✓ Partial

Table 1: Licit and illicit forms of discontinuous predicates - pull splits, part 1

In a similar vein, pull split cases with an intervening *wh*-expression can be derived under the proposal. Recall the case in (11b), partly repeated below in (59).

28. Some verbs like *feilou* have a truncated, monosyllabic variant, e.g. *fei*. In such cases, the surface form in Row (c) of *feilou* would be identical to Row (e) with the monosyllabic variant (i.e. both being *fei*-x). See also the discussion in footnote 18.

(59) Discontinuous predicates, intervened by a *wh*-expression — Cf. (11b)

Nei **so-** mat **-wi** aa3? — (A-WH-B)

2SG sorry what sorry SFP

'Why on earth do you apologize?'

A simplified derivation is given in (60). We omit the subject and the sentence-final particle for their irrelevance. The derivation is basically the same as the one given in (57) through (58).

(60) Derivation of the pull split case in (59), with *wh*-intervention

a. $[_{XP}$ -mat $[_{VP}$ **so**$_\sigma$**wi**$_\sigma$$]$ $]$ — (base structure)

b. $[_{XP}$ **so**$_\sigma$**wi**$_\sigma$-mat $[_{VP}$ **so**$_\sigma$**wi**$_\sigma$$]$ $]$ — (verb movement)

c. $[_{XP}$ **so**$_\sigma$~~**wi**$_\sigma$~~-mat $[_{VP}$ **so**$_\sigma$**wi**$_\sigma$$]$ — (Suffix-induced Syllable Subtraction)

d. $[_{XP}$ **so**$_\sigma$~~**wi**$_\sigma$~~-mat $[_{VP}$ ~~**so**$_\sigma$~~**wi**$_\sigma$$]$ $]$ — (Partial CD)

e. Final output: **so**-mat-**wi**

f. CH-FAITH compliance of the verb chain (Condition 3):

π: {so$_\sigma$, wi$_\sigma$} → Φ: {so$_\sigma$, wi$_\sigma$}

4.4 Deriving inverted splits

Turning to the inverted split cases in focus constructions, let us first repeat the relevant example from (12a) in (61).

(61) *Lin*-focus constructions — (Cf. (12a))

lin-**sen** Aaming dou m soeng **pi-**. — (FOC-B...A-)

even-present Ming also NEG want present

'Ming even doesn't want to PRESENT.'

The derivation of (61) is given below in (62). In (62c), we suggest that the focus particle *lin-* is a prefix, and it can trigger Syllable Subtraction, deleting the first syllable of the higher copy (i..e, *pi-*). To avoid CH-FAITHFUL violation, subsequent Partial CD targets the complementary part of the lower copy (i.e., *-sen*), as illustrated in (62d). This gives rise to an invert split case in the final output of linearization.

(62) Derivation of the inverted split case in (61)

a. $[_{VP}$ ... $[_{V}$ **pi**$_\sigma$**sen**$_\sigma$ $]$ ... $]$ — (base VP structure)

b. $[_{FocP}$ *lin-***pi**$_\sigma$**sen**$_\sigma$ ... $[_{VP}$ ... **pi**$_\sigma$**sen**$_\sigma$ ... $]$ $]$ — (verb movement for focus interpretation)

c. $[_{FocP}$ *lin-*~~**pi**$_\sigma$~~**sen**$_\sigma$ ... $[_{VP}$ ... **pi**$_\sigma$**sen**$_\sigma$ ... $]$ $]$ — (Prefix-induced Syllable Subtraction)

d. [$_{\text{FocP}}$ *lin-*~~**pi**$_\sigma$~~**sen**$_\sigma$ ... [$_{\text{VP}}$ ... **pi**$_\sigma$~~**sen**$_\sigma$~~ ...]] (Partial CD)

e. Final output: *lin-***sen** ... **pi** ...

f. Ch-Faith compliance of the verb chain (Condition 3):
π: {pi$_\sigma$, sen$_\sigma$} → Φ: {sen$_\sigma$, pi$_\sigma$}

It should be noted that if the prefix *lin-* does not trigger Syllable Subtraction, CD does not apply to the lower copy (i.e., it is suspended), resulting in verb doubling, as in (63). The non-application of CD is consistent with the Ch-Faith condition (cf. Condition 2 in 48b).

(63) Verb doubling (Cheng and Vicente 2013; T. T.-M. Lee 2022)
lin-**pisen** Aaming dou m soeng **pisen**
even-present Aaming also neg want present
'Aaming even doesn't want to PRESENT.'

Admittedly, it is a non-trivial question as to why CD is inapplicable or suspended, instead of applies in a full fashion, given Ch-Econ. There are several possibilities. In Cheng and Vicente (2013)'s proposal, one copy undergoes morphological fusion with null affixes, yielding multiple CD pronunciation (along the lines of Nunes 1995, 2004). Alternatively, T. T.-M. Lee (2021) argues that CD is independently ruled out to avoid violating other phonological requirement, namely ordering statements under a Cyclic Linearization framework (*cf.* Fox and Pesetsky 2005). . Since the focus of this paper is not to derive the doubling effects, we do not further elaborate on this point.

4.5 Syllable Subtraction without subsequent (Partial) CD

If what is held responsible for "distributed" deletion is indeed two distinct PF operations, we predict that the two operations involved do not always go hand in hand. This is borne out in two reduplication cases in Cantonese. In these cases, Syllable Subtraction applies in the absence of (Partial) CD.

The first case is *V-not-V reduplication*, a productive way of forming polarity questions in Chinese (C.-T. J. Huang 1991; R.-h. R. Huang 2008; Tseng 2009). In (64), the negation morpheme *m* is sandwiched by two exponences of the same predicate. However, the preceding predicate preferably appears in an incomplete, or reduced, form, i.e., only the first syllable of the predicate is pronounced.

(64) V-not-V reduplication

nei {**so/??sowi**}-m-**sowi** aa3?
you sorry-NEG-sorry SFP
'Will you (say) sorry?'

The second case concerns *V-one-V reduplication*, largely similar to V-not-V reduplication in terms of its surface form. Two examples are given in (65). Such a construction gives rise to readings of tentative, brief occurrences of events (Lam 2020).[29]

(65) V-one-V reduplication

a. {**gaai**/***gaaisik**}-jat **gaaisik** go-gin si (Lam 2020:176)
explain-one explain that-CL matter
'to quickly explain that matter'

b. {**so**/***sowi**}-jat **sowi** m sai sei ge
sorry-one sorry NEG need die SFP
'It won't hurt to say sorry.'

Schematically, we obtain a new pattern of discontinuous predicate, illustrated in (66). Descriptively, a (disyllabic) predicate is split, but the split is "incomplete". For this reason, we refer to this pattern as *incomplete splits*.

(66) A third type of discontinuous predicates in Cantonese

Incomplete splits: AB → ... A-x-AB ... e.g., (64) and (65)

We argue that this pattern falls out from the proposed Syllable Subtraction rule, if we make the plausible assumption that *m* 'not' and *jat* 'one' are verbal suffixes. Crucially, they may trigger Syllable Subtraction, on a par with other verbal suffixes and *wh*-suffixes. To see how this works, we assume with C.-T. J. Huang (1991), R.-h. R. Huang (2008), and Tseng (2009) that V-not-V formation is resulted from post-syntactic reduplication. There is a reduplication operator that duplicates phonological features of neighboring elements. Then, we suggest that V-not-V formation involves the following steps depicted in (67).

(67) V-not-V reduplication in the post-syntactic component

a. Step 1: The negation *m* carries a reduplication operator RED
[m_{RED} AB] Narrow Syntax

29. Different from the V-not-V case, the V-one-V case imposes a stricter requirement on the preceding predicate: it must appear in an incomplete form, i.e., only its first syllable survives. Anticipating the discussions on the suffixal nature of *m* and *jat*, this may be rooted in some idiosyncratic property of suffixes on the (non-)optionality of Syllable Subtraction.

b. Step 2: RED duplicates its neighboring verb
[AB-m_{RED} AB] PF: Morphology

c. Step 3: The suffixal m_{RED} triggers Syllable Subtraction on its host (preferred)
[A~~B~~-m_{RED} AB] PF: Morphology

The derivation for V-one-V reduplication case is the same, except that Syllable Subtraction is obligatorily triggered by *jat* 'one'.[30] It should be remarked that, in these cases, the second predicate, (i.e., AB in the schema A-x AB) is not affected by CD, and it remains in its full form. This follows from the nature of CD: it only applies to copies created in a movement chain. If there is no movement at all, CD does not apply. Since the two predicates in reduplication cases are *not* created via syntactic movement, CD is irrelevant. Table 2 summarizes the licit and illicit forms of V-not-V reduplication, and their derivation under our proposal.[31]

Surface form		**Schema**	(i) **Syll. Subtraction**	(ii) **CD**
a. OK**so**-m **sowi**	OK**gaai**-jat **gaaisik**	A~~B~~-x AB	✓ preceding syllable	N/A
b. ??**sowi**-m **sowi**	***gaaisik**-jat **gaaisik**	??/*AB-x AB	✗ fail to apply	N/A
c. ***wi**-m **sowi**	***sik**-jat **gaaisik**	*~~A~~B-x *AB	✗ non-adjacent syllable	N/A
d. ***so**-m **wi**	***gaai**-jat **sik**	A~~B~~-x *~~A~~B	✓ preceding syllable	✗ non-mvt. chain

Table 2: Licit and illicit forms of discontinuous predicates - incomplete splits

To sum up, the cases relating to incomplete splits (different from pull and inverted splits) show that Syllable Subtraction can apply independently of CD, and thus they are two distinct operations. As proposed, Syllable Subtraction is a morphological rule associated with affixes (with varying potentials to trigger Syllable Subtraction; see footnote 29). In contrast, (Partial) CD hinges on syntactic movement, and is motivated by a economy constraint on pronouncing chains.

5 Partial CD as a last resort strategy in compliance with Ch-Faithfulness

As pointed out in Sect. 4.2, the Ch-Faith condition can be satisfied under a number of conditions, with Partial CD being one of the possible strategies, repeated from (48) below.

30. Lam (2020) suggests that V-one-V reduplication involves a syntactic operation, but as far as we can see, there is no compelling evidence for the syntactic nature of reduplication.
31. The forms in (b) are degraded because both *-m* and *-jat* favor or require Syllable Subtraction.

(68) Ch-Faith compliance (Input: π = {A,B})

a. Condition 1: Full pronunciation of only one copy
[AB ... ~~AB~~] or [~~AB~~ ... AB] : Φ = {A,B}, where A $\leq_\Phi$ B

b. Condition 2: Multiple copy pronunciation/doubling
[AB ... AB] : Φ = {A_1,B_1,A_2,B_2}, where $A_1 \leq_\Phi B_1 \leq_\Phi A_2 \leq_\Phi B_2$

c. Condition 3: Partial/"distributed" deletion
[A~~B~~ ... ~~A~~B] or [~~A~~B ... A~~B~~] : Φ = {A,B}, where A $\leq_\Phi$ B or B $\leq_\Phi$ A

We suggested in Sect. 4.2 how Partial CD *can* be employed as a way to avoid Ch-Faith violation, and we show further that Partial CD is restricted such that it can only be applied as the last resort in avoidance to such a violation. In the following two subsections, we discuss cases where Partial CD fails to apply. In Sect. 5.1, we shall see that when there is no Syllable Subtraction (hence no violation to Ch-Faith), Partial CD cannot apply. In Sect. 5.2, we work on a different case: when there is Syllable Subtraction but the Ch-Faith violation is avoided by an alternative repair of pronouncing an additional copy, Partial CD also cannot apply. Finally, in Sect. 5.3 we address the asymmetry in (non-)minimal chain realization between verb doubling and discontinuous predicates, and suggest that both patterns are predicted by Chain Faithfulness.

5.1 Full copy pronunciation vs. Partial CD

Recall that Syllable Subtraction is optionally triggered by (at least some) affixes. There are two cases where Syllable Subtraction does not apply: (i) the relevant affixes do not trigger Syllable Subtraction, and (ii) no affix is present to trigger Syllable Subtraction. If a movement chain is not affected by Syllable Subtraction, the all copies in the chain would remain intact. There would be no Ch-Faith violation when Full CD applies by default to the lower copy. We expect to see that Partial CD, as a last resort, is unmotivated in these cases and thus cannot substitute Full CD. This prediction is borne in both cases.

Let us consider the first case. In (69), the suffix *-zo* does not trigger Syllable Subtraction. In such case, Full CD applies to the lower copy, and there is *no* Ch-Faith violation.

(69) No Ch-Faith violation in the absence of Syllable Subtraction

keoi	**zongsau/feilou**-zo	houdo-ci	~~zongsau/feilou~~	(Full CD, ^{OK}AB-x)
3sg	furnish/fail-pfv	many-time		

'S/he furnished it/failed many times.'

Importantly, Partial CD (of any form) on the lower copy is disallowed, as shown in (70). We suggest that this is because it is unmotivated: Partial CD would not avoid any Ch-Faith violation as there is none in the first place.

(70) Illicit Partial CD in the absence of Syllable Subtraction in suffixation cases

a. *keoi **zongsau**-zo houdo-ci ~~zong~~**sau** (Partial CD, *AB-x ... B)
3sg furnish-pfv many-time furnish
'S/he furnished it many times.'

b. *keoi **feilou**-zo houdo-ci **fei**~~lou~~ (Partial CD, *AB-x ... A)
3sg fail-pfv many-time fail
'S/he failed for multiple times'

The above paradigms supplement our previous summary on the licit and illicit forms of pull splits in Table 1, given below in Table 3.

Surface form	**Schema**	(i) **Syllable Subtraction**	(ii) **Copy Deletion**
h. ***zongsau**-zo **sau**	AB-x ~~A~~B	N/A	✗*Last Resort
i. ***feilou**-zo **fei**	AB-x A~~B~~	N/A	✗*Last Resort

Table 3: Licit and illicit forms of discontinuous predicates - pull splits, part 2

Additional support for this analysis comes from two *verb doubling* constructions other than *lin*-focus constructions, namely, verb topicalization and right dislocation (RD) of verbs, as exemplified in (71). The signature property of the former is the presence of a bare verb in the left periphery,[32] and the copula at the left edge of VP, whereas RD of verbs is characterized by a bare verb appearing in the right periphery (cf. T. T.-M. Lee 2022). What is relevant here is that there are no affixal elements comparable to the prefixal *lin-* 'even' or verbal suffixes in these two constructions.

(71) Two verb doubling cases in Cantonese

a. **sik**, Aaming hai soeng **sik** faan (Verb topicalization, Cheng and Vicente 2013)
eat Aaming cop want eat rice
'As for (whether he wants to) eat, Aaming did want to eat rice (, but ...)'

b. Aaming waa **maai** saam-gaa ce aa3 **maai** (RD of verbs, T. T.-M. Lee 2017)
Aaming say buy three-cl car sfp buy
'Aaming said (he will) BUY three cars (not SELL three cars).'

32. There can be an optional topic marker *ne1* following the verb. *Ne1* however is not an affixal element and may standalone as an interjection.

Importantly, the verbs in these cases cannot appear in discontinuous form, as in (72). This is unsurprising, given the lack of affixes that trigger Syllable Subtraction. The verb in the base position cannot be reduced.

(72) Illicit Syllable Subtraction in the absence of affixal triggers in verb doubling cases

a. *~~Gu~~**gou**, Aaming hai soeng **gu**~~gou~~ (*B ... A, Verb topicalization)
google Ming COP want google
Int.: 'As for googling, Aaming wants to GOOGLE.'

b. *Keoi mou honang **ou**~~ti~~ gei-go zung gaa3 ~~ou~~**ti** (*A ... B, RD of verbs)
s/he NEG be.possible OT several-CL hour SFP OT
Int.: 'It is impossible that s/he works overtime for a several hours.'

Even if the sentences are free from the lack of trigger issue, and the higher copy remain unreduced, incomplete splits in any form, as attempted in (73), are unacceptable.

(73) Illicit Partial CD in the absence of Syllable Subtraction in verb doubling cases

a. *__Gugou__, Aaming hai soeng **gu**~~gou~~ (*AB ... B, Verb topicalization)
google Aaming COP want google

b. *Keoi mou honang **ou**~~ti~~ gei-go zung gaa3 **outi** (*A ... AB, RD of Vs)
s/he NEG be.possible OT several-CL hour SFP OT

This follows naturally if Partial CD is a last resort strategy to avoid CH-FAITH violation. Again, there is no such violation in (73), and thus forbidding Partial CD in these cases.

We remark that the licit counterparts of the sentences in (72) and (73) come with verb doubling. That is to say Full CD does not apply to them either, for independent reasons (see discussions in Sect. 4.4). These sentences are given below in (74).

(74) Licit full doubling in verb doubling cases

a. **Gugou**, Aaming hai soeng **gugou** (AB ... AB, Verb topicalization)
google Aaming COP want google
'As for googling, Aaming wants to GOOGLE.'

b. Keoi mou honang **outi** gei-go zung gaa3 **outi** (AB ... AB, RD of Vs)
s/he NEG be.possible OT several-CL hour SFP OT
'It is impossible that s/he works overtime for a several hours.'

The paradigms of verb topicalization and RD of verbs discussed in this section are summarized in Table 4.

Taking stock, the two cases in (70) and (73) show that Partial CD cannot be applied without a proper motivation. In all the above cases, we have seen that Partial CD is motivated if a

Surface form	**Schema**	(i) **Syllable Subtraction**	(ii) **Copy Deletion**
a. ***gou** ... **gu**	~~A~~B ... A~~B~~	✗$_{\text{no trigger}}$	
b. ***gugou** ... **gu**	AB ... A~~B~~	N/A	✗$_{\text{*last resort}}$
c. $^{\text{OK}}$**gugou** ... **gugou**	AB ... AB	N/A	N/A

Table 4: Licit and illicit forms of verb doubling

prior operation, namely, Syllable Subtraction, prevents the application of Full CD *modulo* the Ch-Faith condition.

5.2 Multiple copy pronunciation vs. Partial CD

In this subsection, we argue that Partial CD cannot apply due to the availability of an alternative (chain-internal) "repair" that would preserve Ch-Faith, rendering Partial CD unnecessary. Specifically, we discuss head chains with more than two copies, and see how the additional copy bleeds Partial CD which would be otherwise possible. We first illustrate the core case in Sect. 5.2.1, and show in Sect. 5.2.2 that such effects must be attributed to chain-internal forces but not some notion of chain-external recoverability. Finally, we also discuss the evaluation of Ch-Faith in multiple Spell-Out cycles in Sect. 5.2.3.

5.2.1 Partial CD in Verb Copying constructions

The cases of interest involve the so-called *Verb Copying* constructions (henceforth VC constructions), where a verb in its bare form is "copied" when both an object and a (post-object) duration/frequency phrase are present in the sentence (C.-T. J. Huang 1982, 2022; Gouguet 2006; Cheng 2007; Bartos 2019; Meadows and Yan 2023). The construction is exemplified in (75).[33]

33. We make a careful distinction between *verb doubling* and *Verb Copying*. Verb doubling constructions refer to constructions closely related to predicate cleft or verbal fronting, which is attested cross-linguistically (see, for an overview, Hein 2018). Verb doubling in Cantonese involve a copy of the verb in the periphery position, and it comes with interpretive effects relating to information structure (see T. T.-M. Lee 2022, 2024 for extensive discussions). It is an umbrella term for focus verb doubling discussed in this subsection, as well as verb topicalization and right dislocation of verbs, discussed in Sect. 5.1. In contrast, we follow the Chinese linguistics tradition and reserve the term Verb Copying for a specific construction where a verb is copied when a duration/frequency phrase is present after the object.

(75) Verb Copying (VC) constructions (Full CD; AB ... AB-x)

Aabaa **zongsau** ni-gaan uk **zongsau**-zo houdo-ci ~~zongsau~~.
Dad furnish this-CL house furnish-PFV many-time
'Dad furnished the house multiple times.'

Note that the lowest copy of the verb *zongsau* 'furnish' undergoes Full CD as expected, since the suffixed verb (i.e. the second instance) remains intact and there is no CH-FAITH violation that motivates Partial CD.

To see how VC constructions interact with discontinuous predicates, let us consider cases where the suffix *-zo* triggers Syllable Subtraction on the host verb *zongsau* 'furnish'. In (76a), the lowest copy undergoes Full CD, just like (75)), whereas in (76b) it undergoes (an attempted application of) Partial CD. Importantly, only the former is acceptable.

(76) Syllable Subtraction in VC constructions

✓ *Full CD* (^{OK}*AB ... A-x) *vs.* ✗ *Partial CD* (*AB ... A-x ... -B)

Aabaa **zongsau** ni-gaan uk **zong**~~sau~~-zo houdo-ci {a. ^{OK}~~zongsau~~/ b.
Dad furnish this-CL house furnish-PFV many-time
*~~zong~~-**sau1**}
furnish
'Dad furnished the house many times.'

Intriguingly, the pattern in (75)-(76) mirrors the pattern of non-VC constructions. In non-VC cases, Partial CD must be chosen over Full CD when Syllable Subtraction applies (see Table 1 in Sect. 4). In other words, the availability of Partial vs. Full CD in VC constructions and non-VC constructions are flipped, as summarized in Table 5.

	VC constructions	**Non-VC constructions**
(i) Baseline	^{OK}[$_\alpha$ AB ... AB-x ... ~~AB~~]	^{OK}[$_\alpha$ AB-x ... ~~AB~~]
(ii) Syll. Subtraction + Full CD	^{OK}[$_\alpha$ AB ... A~~B~~-x ... ~~AB~~]	*[$_\alpha$ A~~B~~-x ... ~~AB~~]
(iii) Syll. Subtraction + Partial CD	*[$_\alpha$ AB ... A~~B~~-x ... ~~A~~B]	^{OK}[$_\alpha$ A~~B~~-x ... ~~A~~B]

Table 5: Availability of Partial CD in different constructions (to be expanded)

We suggest that the distinct patterns identified in VC constructions follow from the idea that the additional copy of the verb in VC-constructions plays an important role in the evaluation of the CH-FAITH condition, which in turn affects the application of Partial CD.

To substantiate our discussions, we briefly discuss an assumption on the syntactic derivation of VC constructions. While different analyses have been proposed for VC

constructions, a consensus among them is that the higher "copied" verb is derived by syntactic movement.[34] This suggests that the higher verb is part of the movement chain of the verb. We assume that the both pronounced copies in in (75) share the same "tail," which is targeted by CD by default (i.e., in the absence of Syllable Subtraction; *cf.* the baseline cases in (i)). A schematic derivation is given in (77).

(77) Multiple movement chains of verbs in VC constructions

$[_{XP}$ AB ... $[_{AspP}$ AB-x $[_{VP}$ ~~AB~~ ...]]]

To account for the contrast between (ii) and (iii) in Table 5, we suggest that the highest verb copy in VC constructions can "repair" the Ch-Faith violation induced by Full CD. This is because the highest copy belongs to the same movement chain as the lowest copy. The integrity of the input *zongsau* is preserved by the full realization of the highest copy such that all the syllables of *zongsau* are contained in the linearized output. As a result, Full CD on the lowest copy does not lead to Ch-Faith violation, unlike the non-VC cases. Consequently, Partial CD cannot be applied due to the availability of another "repair," which is precisely the additional, highest copy of the verb. Partial CD thus does not repair any violation and is unmotivated. Put differently, the highest copy in VC constructions blocks the application of Partial CD. The derivations are depicted in (78).

(78) Syllable Subtraction in VC constructions does not lead to Ch-Faith violation

a. $[_{XP}$ <**zongsau**> ... $[_{AspP}$ <**zong**~~sau~~>-zo $[_{VP}$ ... <~~zongsau~~>]]] (licit full CD)
π: {σ_{zong}, σ_{sau}} → Φ: {σ_{zong_1}, σ_{sau}, σ_{zong_2}} (Ch-Faith compliance)

b. *$[_{XP}$ <**zongsau**> ... $[_{AspP}$ <**zong**~~sau1~~>-zo $[_{VP}$ ... <~~zong1~~**sau**>]]] (unmotivated partial CD)
π: {σ_{zong}, σ_{sau}} → Φ: {σ_{zong_1}, σ_{sau_1}, σ_{zong_2}, σ_{sau_2}} (Not a last resort to (a))

5.2.2 Partial CD in base-generation cases

The chain-internal nature of Ch-Faith can be further appreciated by cases with a base-generated copy of the verb. If Partial CD were motivated by, for example, recoverability of a lexical item in the sentence/discourse, we expect Partial CD should also be bled in cases where the verb is recoverable in a chain-external position, say, a base-generated topic. We show that this is not the case: Partial CD is only regulated by chain-internal Ch-Faith but not

34. This movement is argued to be sideward movement in Cheng (2007) and Kuo (2015), but said to be VP movement in Gouguet (2006), Yu (2018), C.-T. J. Huang (2022), and Meadows and Yan (2023) and verb (head) movement in Paul (2002). We do not distinguish between these possibilities.

chain-external recoverability (*pace* Chomsky 1965; Pesetsky 1998; Fanselow 2001; see also Landau 2006 for arguments against their notion of recoverability).

This can be clearly shown in cases where a verb base-generated in a topic position: they behave differently from VC constructions. The former does not forbid the Partial CD, since it fails to "repair" the Ch-Faith violation. To begin with, observe that in Cantonese, a base-generated topic can be introduced by *gonghei ...* 'talking about ... '. An example is given below in (79a), and its derivation in (79b).

(79) Base-generated topics including a copy of the lower verb

a. [$_{\text{TopicP}}$ gonghei **zongsau** ni-gaan uk ne1], aabaa zau jiging **zongsau**-zo
talk furnish this-cl house top Dad then already furnish-pfv
houdo-ci ~~zongsau~~ laak3
many-time sfp
'As for furnishing this house, Dad has already furnished it for multiple times.'

b. [$_{\text{TopP}}$ ... AB ...] [$_{\text{AspP}}$ AB-x [$_{\text{VP}}$ ~~AB~~ ...]] (Base generation of V_{AB} in the topic position)

Crucially, when Syllable Subtraction applies in (79a), it is predicted that Full CD is illicit, as it violates Ch-Faith, but Partial CD is *allowed*, as it is the last resort to repair the Ch-Faith violation. This prediction is borne out in (80).

(80) Syllable Subtraction in constructions with base generated topics

✗ *Full CD* ($^{??}$[$_{Topic}$ *AB*] ... *A-x*) *vs.* ✓ *Partial CD* (^{OK}[$_{Topic}$ *AB*] ... *A-x-B*)

[$_{\text{TopP}}$ gonghei **zongsau** ni-gaan uk ne1], aabaa zau jiging **zong**-zo
talk furnish this-cl house top Dad then already furnish-pfv
houdo-ci {a. $^{??}$~~zongsau~~/ b. ^{OK}~~zong~~**sau**} laak3
many-time furnish sfp
Int.: 'As for furnishing this house, Dad has already furnished it for multiple times.'

The unacceptability of (80a) suggests that the verb in the base-generated topic does not "repair" the Ch-Faith violation triggered by Full CD on the lowest verb copy - even though both the meaning and phonological content can be "recovered." It is substantially different from the additional verb copy in VC constructions. On the other hand, the acceptability of (80b) suggests that Partial CD is motivated, precisely because there is no alternative "repair" in the sentence, as schematized in (81).

(81) Syllable Subtraction with base-generated topics leads to Ch-Faith violation

a. *[$_{\text{TopP}}$ ... zongsau ...] [$_{\text{AspP}}$ <**zong**~~sau~~>-zo [$_{\text{VP}}$ ... <~~zongsau~~>]]] (Illicit Full CD)
π: {σ_{zong}, σ_{sau}} → Φ: {σ_{zong}} (TopP not in the chain; Ch-Faith violation)

b. [$_{\text{TopP}}$ ... zongsau ...] [$_{\text{AspP}}$ <**zong**~~sau~~>-zo [$_{\text{VP}}$ ... <~~zong~~**sau**>]]] (Licit Partial CD)
π: {σ_{zong}, σ_{sau}} → Φ: {σ_{zong}, σ_{sau}} (Repairs (a))

More generally, the patterns in (79) through (80), integrated in Table 6, substantiate our discussions on VC constructions: they suggest that movement chains are crucial in the evaluation on Ch-Faith (i.e., the calculation of integrity of the chain input). Moreover, it shows that the apparent recoverability of the verb (which has undergone Syllable Subtraction) has no effect on the form of CD (*pace*, e.g. Chomsky 1965), resonating with Landau (2006).

	VC constructions	**Non-VC constr.**	**Base-generated topics**
(i) Baseline (w/o SS)	$^{\text{OK}}$[$_\alpha$ AB ... AB-x ... ~~AB~~]	$^{\text{OK}}$[$_\alpha$ AB-x ... ~~AB~~]	$^{\text{OK}}$[$_\alpha$ [$_{\text{Topic}}$ AB] ... AB-x ... ~~AB~~]
(ii) SS + Full CD	$^{\text{OK}}$[$_\alpha$ AB ... A~~B~~-x ... ~~AB~~]	*[$_\alpha$ A~~B~~-x ... ~~AB~~]	??[$_\alpha$ [$_{\text{Topic}}$ AB] ... A~~B~~-x ... ~~AB~~]
(iii) SS + Partial CD	*[$_\alpha$ AB ... A~~B~~-x ... ~~A~~B]	$^{\text{OK}}$[$_\alpha$ A~~B~~-x ... ~~A~~B]	$^{\text{OK}}$[$_\alpha$ [$_{\text{Topic}}$ AB] ... A~~B~~-x ... ~~A~~B]

Table 6: Availability of Partial CD in different constructions (final)

5.2.3 Cyclic evaluation of Ch-Faith

While it is clear that the Ch-Faith condition is the driving force of Partial CD in a given movement chain, we have not yet discussed how it is evaluated when the chain spans over different syntactic domains, such as crossing a clausal boundary. This is particularly relevant under the assumed Minimalist architecture of grammar: the Spell Out process to PF is cyclic (Uriagereka 1999), or, phase-by-phase in Phase-Theoretic terms (Chomsky 2000, 2001; Fox and Pesetsky 2005). To the best of our knowledge, there is no relevant discussion in the literature about the effect of Spell-Out domains on Partial CD. This subsection addresses this issue by examining cases where Partial CD may appear as the last resort in a *local* domain, but not so across domains, schematized below:

(82) [$_\beta$ AB ... [$_{\text{CP}}$ ... [$_\alpha$ A~~B~~-x [$_{\text{VP}}$ $^{\text{OK}/*/?}$~~A~~B ...]]]]

Logically, there are three possibilities regarding the evaluation of Ch-Faith: (i) in the local domain at α, allowing Partial CD; (ii) globally at β, banning Partial CD; (iii) at the end of each Spell-Out cycle (first α, then β), yielding conflicting results. We suggest that the third one is

the case: Ch-Faith is evaluated cycle-by-cycle, and the conflicting results amount to marginal acceptability of Partial CD.

To begin with, the copied verb (and its object) in VC constructions can alternatively appear in a pre-subject position, instead of the post-subject position in (76) (C.-C. J. Tang 1990; see also Meadows and Yan 2023 for arguments for movement). It can move across CP clauses, illustrated in (83).

(83) Long-distance VC constructions

Zongsau ni gaan uk, ngo zidou [Aabaa **zongsau**-zo houdo-ci ~~zongsau~~
furnish this CL house 1SG know Dad furnish-PFV many-time
dou mei gaaudim]
still not finish
'I know that Dad furnished the house for multiple times, but it's still not finished.'

Schematically, we are interested in the following configuration, where β and α belong to different syntactic domains.

(84) The derivation of long-distance VC constructions

$[_{\beta}$ AB ... $[_{CP}$ ... $[_{\alpha}$ AB-x $[_{VP}$ ~~AB~~ ...]]]]

When Syllable Subtraction applies to (83) and yields *A~~B~~-x*, a local Ch-Faith violation would be induced if Full CD still applies to the lowest copy. The concerning question is whether the highest copy, belonging to a different domain from the reduced copy, may "rescue" the Ch-Faith violation. If Ch-Faith is evaluated locally at α, the VC repair should fail and Partial CD on the lowest copy would be allowed as a last resort. If Ch-Faith is evaluated globally at β, the VC repair should be successful and Partial CD would be banned, and Full CD applies. Neither predictions, however, are borne out. Instead of complete acceptability or unacceptability, Partial CD is marginally acceptable, as shown in (85). Importantly, Full CD is also grammatical. This is at odds with the complementary distribution between Partial CD and Full CD discussed in the previous sections.

(85) Long-distance VC constructions and Partial CD

✓ *Full CD* (^{OK} *AB ... [A-x]*) *vs.* **?** *Partial CD* ($^{?}$ *AB ... [A-x-B]*)

Zongsau ni-gaan uk, ngo zidou [Aabaa **zong**~~sau~~-zo houdo-ci {a. ^{OK}~~zongsau~~/
furnish this-CL house 1SG know Dad furnish-PFV many-time

b. $^{?}$~~zong~~**sau**} dou mei gaaudim]
furnish still not finish

'I know that Dad furnished the house for multiple times, but it's still not finished.'

We suggest that marginality is due to conflicting evaluation results of Ch-Faith. Given that Ch-Faith is a condition on CD, and that CD is subject to syntactic cycles (Fox and Pesetsky 2005), it then follows that the evaluation of Ch-Faith is also subject to syntactic cycles. In other words, there are multiple points (i.e., whenever CD applies) where Ch-Faith is evaluated. This amounts to the suggestion that Ch-Faith is not *representationally* evaluated, but *derivationally* evaluated. This suggestion predicts that, in sentences like (83), Partial CD should be licit in the earlier cycle (i.e., the α domain), but illicit in the later cycle (i.e., the β domain). Combining the two syntactic cycles, the derivation appears to give conflicting evaluation on whether Partial CD is legitimate, which we take to be the source of the marginality witnessed in (85).

(86) a. Baseline: after Syllable Subtraction but before CD
$[_{\alpha}$ A~~B~~-x $[_{VP}$ AB ...]]

b. When CD applies and Ch-Faith is evaluated in α
$[_{\alpha}$ A~~B~~-x $[_{VP}$ ^{OK}~~A~~B ...]] α as the first evaluation point

c. Conflicting evaluation of Partial CD in different domains
$[_{\beta}$ AB ... $[_{CP}$ ... $[_{\alpha}$ A~~B~~-x $[_{VP}$ $^{\{OK/*\}\rightarrow ?}$~~A~~B ...]]]] β as the second evaluation point

In sum, the evaluation of the Ch-Faith condition hinges on the syntactic position of the potential "repair". In other words, whether Partial CD is regarded as the last resort is subject to syntactic cycles that are under evaluation. Even if it is so in a local domain, a later, non-local evaluation may give contradicting evaluation.

It should be noted that the pattern illustrated in (83) and (85) is by no means specific to VC constructions. An identical pattern is observed with *even-* focus constructions as well. It has been observed that the focus element associated with *lin-* 'even' can appear in pre-subject position as in (87), in addition to the post-subject position (Shyu 1995; Badan 2007; Cheung 2008, 2015). In (87), the potential "repair" *lin*-phrase appear at a distance from its associate in the other clause. In such cases, Partial CD on the lowest copy is again not strictly ruled out.

(87) Long-distance *lin*-constructions and Partial CD

✓ *Full CD ([OK] lin-AB ... [A-x]) vs. ? Partial CD ([?] lin-AB ... [A-x-B])*

Lin-**outi** ngo tenggong [Aaming dou jiging **ou**~~ti~~-maai {a. [OK]~~outi~~/ b. [?]~~ou~~**ti**} bei
even-OT 1SG hear Ming already OT-ADD OT for
nei laa3] wo3
2SG SFP SFP

'I heard that Ming even worked overtime for you.'

To sum up, we have seen that the position of the alternative "repair" is correlated with the availability of Partial CD in two different constructions, which in turn reflects the cyclic nature of CH-FAITH evaluation. The shared observation is that, informally speaking, if the "repair" is "close" enough to the lower copy of the verb , then Partial CD is not allowed, as it is not the last resort for CH-FAITH. In contrast, if the "repair" is too "far away" from the lower copy of the verb, then Partial CD becomes marginally acceptable. We take the marginality as a result of the conflicting evaluation of CH-FAITH at different Spell-Out cycles.

5.3 Non-minimal chain realization

In our discussion so far, we have set aside an issue relating to multiple copy pronunciation: why the output may contain more materials than it is required by CH-FAITH. While non-minimal realization of a chain is consistent with CH-FAITH, the question is why Partial CD does not apply in such cases to yield a minimal realization. In VC constructions and verb doubling constructions, when a copy is reduced due to Syllable Subtraction, another copy (the higher copy) cannot undergo Partial CD; rather, the higher copy is fully realized. This pattern diverges from the minimal realization in discontinuous predicates. This is illustrated by the VC constructions in (88a) and verb topicalization in (88b) (with the lowest copy fully deleted).

(88) No partial CD on the higher copy in verb doubling

✓ *No CD ([OK]AB ... A-x) vs. ✗ Partial CD (*B ... A-x)*

a. Aabaa {a. [OK]**zongsau**/ b. *~~zong~~**-sau1**} ni-gaan uk **zong**~~sau~~-zo houdo-ci
Dad furnish furnish this-CL house furnish-PFV many-time
'Dad furnished the house many times.'

b. {a. [OK]**gugou**/ b. *~~gu~~**gou**}, Aaming hai **gu**~~gou~~-zo ge3
google google Aaming COP google-PFV SFP
'As for googling, Aaming has googled.'

The other side of the question is why the same pattern is not attested in discontinuous predicates. For example, in the pull split case in (89), Partial CD is obligatory.

(89) Obligatory Partial CD in discontinuous predicates
*✗ No CD (*A-x ... AB) vs. ✓ Partial CD (^{OK}A-x ... B)*
keoi **zong**~~sau~~-zo houdo-ci {a. ***zongsau**/ b. ^{OK}~~zong~~**sau**}
3SG furnish-PFV many-time furnish furnish
'S/he furnished it many times.'

At first glance, this seems to be puzzling, since, no matter Partial CD applies or not, all the potential forms in (88) and in (89) (i.e., *[AB ... A]*, *[A ... AB]* and *[A ... B]*) satisfy CH-FAITH. Recall that CH-FAITH only sets a lower bound on chain realization, and it does not regulate the upper bound. This suggests that what regulates the form of discontinuity must lie elsewhere other than CH-FAITH.

We suggest that the pattern above is indeed regulated by the mechanism that determines *where* CD applies (but not, e.g., *how* it applies). Recall that Partial CD is only an alternative to Full CD to repair potential CH-FAITH violation, but it is agnostic on the calculation of which copy should be subject to CD. In other words, Partial CD is *not* an alternative to non-application of CD. Whether CD applies, Full or Partial, is subject to independent considerations. We suggest that the asymmetry between (88) and in (89) lies on the position of the non-highest copies, schematized in (90): in (88), a lower copy undergoes Syllable Subtraction, and the highest copy *resists* Partial CD. However, in (89), the highest copy undergoes Syllable Subtraction, and the lower copy *requires* Partial CD. This follows from the standard assumption that CD applies to non-highest/lower copies by default (Chomsky 1995; Nunes 2004).

(90)

		VC/Verb doubling in (88)	Discontinuous predicates in (89)	
	PF			
	Morphology	[AB ... [**A**~~B~~**-x** ...]]	[**A**~~B~~**-x** ... [AB ...]]	(Syllable Subtraction)
	Linearization	[**AB** ... [A~~B~~-x ...]]	[A~~B~~-x ... [~~A~~**B** ...]]	(No CD vs. Partial CD)

In the absence of Syllable Subtraction, the lower copy in (88) exceptionally survives CD due to chain-external forces such as Stray Affix Filter (Landau 2006) (or ordering statement conflicts, cf. T. T.-M. Lee 2021). In contrast, the lower copy in (89) is subject to CD. Partial CD is unmotivated, and thus Full CD applies.

(91)

		VC/Verb doubling in (88)	Discontinuous predicates in (89)	
	PF			
	Morphology	[AB ... [**AB-x** ...]]	[**AB-x** ... [AB ...]]	(No Syllable Subtraction)
	Linearization	[**AB** ... [AB-x ...]]	[AB-x ... [~~AB~~ ...]]	(No CD vs. Full CD)

We stress that the calculation of which copy is subject to CD and whether CD can apply or not is handled by a distinct set of considerations on how CD is applied (Full vs. Partial CD). Under our view, minimal realization is strictly enforced by the proposed Ch-Faith condition, but non-minimal or even maximal realization is more or less tolerated in the grammar, as long as if it is sufficiently motivated by considerations that overrides/outranks Economy.

6 Discontinuous predicates in other languages

Before concluding this paper, we show that our account readily extends to discontinuous predicates in other typologically unrelated languages, such as German and Yoruba. Note that we do not claim that all discontinuous predicates should receive a unified account. Instead, what we attempt to show is that while languages differ in the independent operations triggering the first deletion, they employ the same subsequent Partial CD mechanism.

6.1 German particle verbs

In German (and other Germanic languages), some particle verbs are separable (Booij 1990, 2002; Neeleman and Weerman 1993; Stiebels and Wunderlich 1994; Zeller 2002; Dehé 2005; Vikner 2005, 2017, *i.a.*). As exemplified in (92), the prefixal particle *ab-* 'off', which may receive stress independently (Dehé 2005), must be stranded when the verbal stem *sagten* 'said' undergoes movement to the V2 position.

(92) Separable particle verbs in German (as a case of inverted splits)

a. ... dass sie das Konzert **absagten**. (embedded, non-V2: **AB**)
that they the concert off.said
'...that they called off the concert.' (Dehé 2005:187)

b. Sie **sagten** das Konzert **ab**. (matrix finite, V2: **B**...**A**)
they said the concert off
'They called off the concert.' (Dehé 2005:187)

Following a complex head analysis of the particle verbs (Neeleman and Weerman 1993; Stiebels and Wunderlich 1994; van Marle 2002; Dehé 2005), the movement in (92b) apparently involves a subpart of a complex head and is thus inconsistent with the Lexical Integrity Hypothesis.[35] One solution is to move the whole particle verb in the syntax, followed by

35. For phrasal analyses, see Booij (1990, 2002) and Müller (2002), among others. Nevertheless, our proposal does not hinge on the head-phrase status debate and is compatible with both approaches.

Partial CD in the PF, as proposed by Fanselow and Ćavar (2001). According to them, the deletion on the higher copy is triggered by a PF constraint that prohibits more than one prosodic word (ω) in the V2 position, as stated in (93) (see Tokizaki 2021 for an explanation based on initial-weak prosody). Since the prefixal particles may receive stress and form another prosodic word, they are deleted to satisfy (93).

(93) OnePROSODICWORD (OPW) (Fanselow and Ćavar 2001:138)
The second position of the clause may host a single prosodic word only.

We suggest that when the chain is linearized, Partial CD is chosen over Full CD on the lower copy to avoid violations of CH-FAITH, resulting in the discontinuous string *sagten...ab* in a way similar to Cantonese inverted split cases. The derivation is shown in (94) below.

(94) Derivation of the German separable particle verb in (92b)

a. $[_{VP}$ ... $[_{V}$ **ab**$_\omega$**sagten**$_\omega$ $]$ ... $]$ (base VP structure)

b. $[_{CP}$ ... $[_{C'}$ C$_\varnothing$-**ab**$_\omega$**sagten**$_\omega$ ... $[_{VP}$ ... **ab**$_\omega$**sagten**$_\omega$ ... $]$ $]$ (V(-to-T)-to-C mvt. for V2)

c. $[_{CP}$ ... $[_{C'}$ C$_\varnothing$-~~**ab**$_\omega$~~**sagten**$_\omega$ ... $[_{VP}$ ... **ab**$_\omega$**sagten**$_\omega$ $]$ $]$ (deletion induced by (93))

d. $[_{CP}$ ... $[_{C'}$ C$_\varnothing$-~~**ab**$_\omega$~~**sagten**$_\omega$ ... $[_{VP}$ ... **ab**$_\omega$~~**sagten**$_\omega$~~ ... $]$ $]$ (Partial CD)

e. Final output: **sagten** ... **ab** ...

f. CH-FAITH compliance of the verb chain (Condition 3):
π: {ab$_\omega$, sagten$_\omega$} → Φ: {sagten$_\omega$, ab$_\omega$}

Note that unlike Syllable Subtraction triggered by some Cantonese affixes (see §4.2.2), the deletion in V2 position is obligatory, as shown in (95).

(95) *Sie **absagten/sagten ab** das Konzert. (matrix finite, V2: ***AB**)
They off.said/said.off the concert
Int.: 'They called off the concert.' (German, Dehé 2005:187)

It should be noted that, on independent grounds, verb doubling options are unavailable in German to repair CH-FAITH violations, unlike verb doubling in Cantonese, cf. T. T.-M. Lee (2021).

(96) *Sie **absagten/sagten ab** das Konzert **absagten/sagten ab**. (***AB**...**AB**)
They off.said/said.off the concert off.said/said.off
Int.: 'They called off the concert.' (German

In other words, Partial CD on the head chain in (94d) serves the last resort to obey CH-FAITH, thus resulting in separable verbs.

6.2 Yoruba splitting verbs

Turning to Yoruba (Benue-Congo), some verbs have been reported to "split" into discontinuous strings when used transitively (Bamgbose 1966; Awobuluyi 1967, 1971; Bode 2000; Ilọri 2016; Parrish and Feldscher 2019; Adedeji 2024), as shown in (97). The verb *bàjẹ́* 'spoil, destroy' cannot be further decomposed: neither *bà* nor *jẹ́* can be a verb (Parrish and Feldscher 2019:27-28). *Bàjẹ́* is thus best analyzed as a single V head (Awobuluyi 1967, 1971; Ilọri 2016).[36]

(97) Splitting verbs in Yoruba (as a case of pull splits)

a. Àga Tádé **bàjẹ́** (Intransitive: **AB**)
chair Tade spoil
'Tade's chair got spoilt.' (Ilọri 2016, ex. 3aii)

b. Akín **ba** àga Tádé **jẹ́**. (Transitive: **A**-OBJ-**B**)
Akin spoil chair Tade spoil
'Akin spoilt Tade's chair.' (Ilọri 2016, ex. 3ai)

We suggest that the transitive construction in (97b) involves verb movement to a functional head. Note that the low tone *bà* changes into the mid tone *ba* in the splitting verb constructions. Note further that when an overt aspectual marker *tún* (see Parrish and Feldscher 2019 for arguments) is present, the verb stays low and does not "split", retaining a low tone on *bà*, as in (98).

(98) Akín **tún** àga Tádé **bàjẹ́**. (Transitive: TUN-OBJ-**AB**)
Akin TUN chair Tade spoil
'Akin spoilt Tade's chair again.' (Yoruba; p.c. Olabode Adedeji)

We propose that Yoruba splitting verbs can be analyzed in the same vein as Cantonese pull split cases with verbal suffixes using Partial CD (see Adedeji 2024 for a similar idea). The difference is that the verb movement in Yoruba is not triggered by a segmental suffix, but a floating high tone at AspP.[37] We suggest that the high tone is suffixal and triggers deletion of the adjacent syllable on the higher copy (i.e., *jẹ́*). It will dock onto the remaining syllable after linearization, resulting in a mid-tone *ba*. As for the second deletion, Partial CD applies to the lower copy and deletes only *bà* instead of the whole verb to avoid CH-FAITH violations, giving

36. But see Bamgbose (1966), Bode (2000), and Parrish and Feldscher (2019) for alternative phrasal analyses. Again, our proposal is compatible with both head and phrasal approaches.
37. There are also other grammatical tones in Yoruba, such as the High Tone morpheme for subject marking (Bisang and Sonaiya 1999; Akinlabi and Liberman 2001).

rise to the discontinuous/splitting verb *ba...jẹ́*. The derivation is shown in (99), with the object at SpecVP.

(99) Derivation of the Yoruba splitting verb in (92b)

a. $[_{VP}$ Obj $[_{V'} [_{V}$ **bà**$_\sigma$**jẹ́**$_\sigma$ $]$ t_{Obj} $]$ (base VP structure)

b. $[_{AspP} [_{Asp'}$ **bà**$_\sigma$**jẹ́**$_\sigma$-H ... $[_{VP}$ Obj ... **bà**$_\sigma$**jẹ́**$_\sigma$ ... $]$ $]$ (V-to-Asp movement)

c. $[_{AspP} [_{Asp'}$ **bà**$_\sigma$~~**jẹ́**$_\sigma$~~-H ... $[_{VP}$ Obj ... **bà**$_\sigma$**jẹ́**$_\sigma$ ... $]$ $]$ (deletion induced by floating H)

d. $[_{AspP} [_{Asp'}$ **bà**$_\sigma$~~**jẹ́**$_\sigma$~~-H ... $[_{VP}$ Obj ... ~~**bà**$_\sigma$~~**jẹ́**$_\sigma$ ... $]$ $]$ (Partial CD)

e. Linearized output: **bà**-H ... **jẹ́** ...

f. Pronounced output: **ba** ... **jẹ́** ... (floating H docked on *bà*)

g. Ch-Faith compliance of the verb chain (Condition 3):
π: {bà$_\sigma$, jẹ́$_\sigma$} → Φ: {bà$_\sigma$, jẹ́$_\sigma$}

7 Conclusions

In an incremental fashion, we have developed an analysis in this paper that is empirically expressive enough while restrictive enough to derive different surface verb forms when head chains are linearized in Cantonese. While these verb forms are involved in various constructions, we argued that they fall out from a more articulated theory of Copy Deletion (Chomsky 1995, *et seq.*). For ease of comparison, we summarized the primary cases of discontinuous predicates and related forms in Cantonese discussed so far in Table 7.

Type	Construction	Movement	Syll. Sub. trigger	Surface form
Pull split	Verbal suffixation	V → AspectP	verbal suffixes	**A**-SUFFIX ... **B**
	Wh-intervention	V → *Wh*P	*wh*-suffixes	**A**-*wh*-**B**
Inverted split	*Even*-focus	V → FocusP	prefixal *lin*	*lin*-**B** ... **A** ...
Incomplete split	V-not-V	✗$_{\text{(reduplication)}}$	suffixal m_{RED}	**A**-*m*-AB
	V-one-V	✗$_{\text{(reduplication)}}$	suffixal jat_{RED}	**A**-*jat*-AB
Verb doubling	Verbal topic	V → TopicP	✗	**AB** ... **AB**
	Verb RD	V → DefocusP	✗	**AB** ... **AB**
	Verb Copying	V → XP	✗	**AB** ... **AB**
Non-minimal copies	VC + Suffix	V → AspectP & V → XP	verbal suffixes	**AB** ... **A**-SUFFIX ... (**B**)
	Even + Suffix	V → AspectP & V → FocusP	verbal suffixes	*lin*-**AB** ... **A**-SUFFIX ... (**B**)

Table 7: The forms of discontinuous predicates and related forms in Cantonese

We have argued that discontinuous predicates (i.e., pull splits and inverted splits) in Cantonese uniformly involve verb movement in syntax, whose chain copies are affected by

two subsequent, distinct operations in the PF (cf. Nunes (1995), Fanselow (2001), Landau (2006), Bošković and Nunes (2007), and van Urk (2024)) . The first one is a language-specific deletion rule, namely, Syllable Subtraction, triggered by certain affixes, repeated below in (100).

(100) Syllable Subtraction in Cantonese

Affixes may trigger deletion on the adjacent syllable of their host to form a foot.

The second one is Copy Deletion, which applies by default to movement chains. Crucially, we suggest that the application of (100) critically affects how subsequent CD should apply, i.e., it triggers a non-canonical application of CD due to a violation of a PF requirement, namely, Chain-Faithfulness, repeated below in (101).

(101) Chain-Faithfulness (Ch-Faith, as a condition on Copy Deletion)

a. Informal version:
The final output of linearization of a movement chain must preserve the integrity ($\neq$ contiguity) of the input (i.e., the output cannot contain only a sub-part of the input).

b. Formal version:
In a movement chain CH: $\{X_n, ..., X_1\}$, such that X consists of a bundle of phonological features π, and that the linearization of CH yields an output Φ, each member of π must be contained in Φ.

It is primarily because of Ch-Faith that CD applies in a partial fashion, i.e., Partial CD, giving rise to a complementary deletion of the chain copies (hence an apparent "scattered/distributed" deletion), an important property of Copy Deletion that is usually assumed, but not precisely formulated, so far in the literature on Partial CD (cf. Fanselow and Ćavar (2002), *et seq.*). Ch-Faith represents a more precise and elaborated formulation of P-recoverability and the like as discussed in Landau (2006) and van Urk (2018).

We have further shown that Syllable Subtraction is independently motivated in Cantonese and its application is directly related affixes, as in cases of incomplete split and verb doubling. It echoes a general monosyllabic preference on verbs in Cantonese (Luke and Lau 2008; Li et al. 2016). Also, Ch-Faith is not tailor-made for discontinuous predicate, since its effects can be seen in cases with non-minimal copies. These cases also illustrate the last resort nature of Partial CD, which partly accounts for why discontinuous predicates or constituents are way less common than Full CD, even in languages like Cantonese that allow for discontinuity (Franks 1998; Nunes 2004).

As for broader implications on the study of discontinuous predicates, the dual characterization of discontinuity advocated in this paper comes with two desirable consequences. On one hand, whether a language allow discontinuous predicates/constituents is contingent on whether the language possesses some post-syntactic, *language-specific* operations that may affect a copy in a movement chain (such as Syllable Subtraction in Cantonese and OneProsodicWord in German). This explains why discontinuous predicates do not appear across all languages. On the other hand, for languages with such an operation, it is now unsurprising why discontinuous predicates across languages tend to surface in similar, complementary forms, in both pull split cases and inverted split cases. This is because Copy Deletion is subject to the *language-general* restriction, i.e., Ch-Faith. From this perspective, discontinuous predicates thus reveal both language variations as well as universal property of human languages.

As for theoretical relevance to syntactic theories, through the study of discontinuous predicates in Cantonese, we have revealed two substantial aspects of the mechanism of Copy Deletion. First, the smallest level on which it operates is on featural level, rather than, e.g., constituent level. Given that features are primitives, there is no *a priori* reason to rule out CD operating on a featural level (Chomsky and Lasnik 1993; Chomsky 1995, 2000). Consequently, Partial CD is not exclusively applied to phrases, but also heads, revealing yet another similarity between head chains and phrasal chains (Vicente 2007; Funakoshi 2014; Harizanov and Gribanova 2019; T. T.-M. Lee 2021, 2022, 2024). Second, CD reveals a "compromising" nature when interacting with other PF requirements. By default, Full CD should apply, unless it would otherwise violate PF requirement such as Ch-Faith, an idea along the line of Nunes (1995, 2004), Landau (2006), and T. T.-M. Lee (2021). The "compromising" character of CD revealed in different empirical domains calls for systematic and comparative study of constraints on CD, and also the precise algorithmic computation of linearization in the PF component.

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