Chain Reduction via Substitution: Evidence from Mayan

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Abstract We argue that deletion is not the only way that chain links created by A'-movement can be affected at PF. Chain links can also be substituted by a morpheme. This substitution delivers a linearizable output (in a manner parallel to deletion), creating overt "traces" on the surface. We demonstrate the virtues of our proposal through the empirical lens of adjunct extraction in two Mayan languages of the K'ichean branch: K'iche' and Kaqchikel. In these languages, extraction of low adjuncts triggers the appearance of a verbal enclitic *wi*. The distribution of the enclitic upon long distance extraction shows that it must be analyzed as a surface reflex of substitution of a chain link. Our proposal provides evidence that movement proceeds successive cyclically and has two theoretical consequences: (i) C^0 must be a phase (contra den Dikken 2009; 2017), (ii) v^0 cannot be a phase (in line with Keine 2017).

Keywords: cyclic movement, Chain Reduction, linearization, phases, Mayan, K'ichean

1 Introduction

In minimalism, displacement is usually seen as a by-product of *Internal Merge* (henceforth IM; Chomsky (2004), et seq). Adapting ideas from Chomsky (1995), Nunes (2004), a.o., we assume that IM results in multiple copies that are dealt with at the interfaces:

(1) a. Robin asked who Leslie saw.
b. (i) Robin asked [$_{CP}$ who [$_{IP}$ Leslie saw who]].
(ii) Robin asked [$_{CP}$ who [$_{IP}$ Leslie saw ~~who~~]]. *PF: Chain Reduction*

Typically, the lower copy is deleted at PF in such configurations. We assume that copy deletion occurs in order to avoid a linearization paradox that would arise from

the existence of two instances of the *wh*-element in two different positions (Nunes 2004).[1]

Here, however, we will argue that displacement is not limited to *IM + Deletion* at PF. The grammar also allows for copies resulting from IM to be *substituted* by a morpheme. This *IM + Substitution* procedure creates overt "traces" of movement that cannot be assimilated into any independent lexical category of a language. We will call the mechanism that creates these overt traces *Chain Reduction via Substitution*.

The empirical domain we will use to argue for our position is A'-extraction of low adjuncts in two closely-related Mayan languages of the K'ichean branch: K'iche' and Kaqchikel. It has been observed that low adjunct extraction in these languages, and across the K'ichean branch of the family, triggers the appearance of a verbal enclitic *wi* (England 1997; Dayley 1985 for Tz'utujil; Silberman 1995; Henderson 2008; González 2016 for Kaqchikel; Velleman 2014; Can Pixabaj 2015 for K'iche'; a.o.; see section 6). In the Mayanist literature, this enclitic is usually called a *fronting particle* (Spanish: *partícula de adelantamiento*) (e.g., García Matzar & Rodríguez Guaján 1997 for Kaqchikel).[2] We will use this terminology moving forward.[3] We will observe here that the fronting particle is obligatory in K'iche' and optional in Patzún Kaqchikel, the dialect of Kaqchikel that we describe here in depth.[4]

(2) *The fronting particle in K'iche'*
Jawi x-at-b'ee *(wi) iwiir?
where COM-B2S-go FP yesterday
'Where did you go yesterday?' (Adapted from Velleman 2014: 41-42)

(3) *The fronting particle in Patzún Kaqchikel*

[1] We will not discuss here how multiple copies are treated in the interpretive component. See Chomsky (1993), Fox (2002), a.o.

[2] While the fronting particle is spelled <wi>, the pronunciation of the vowel varies between being lax and tense in Kaqchikel, with speakers reducing it to schwa in fast speech. See Patal Majzul et al. 2000: 171 for a description of allophones of /w/ across Kaqchikel dialects.

[3] Glosses are as follows: ABS: absolutive; ACC: accusative; ACT: active; ADV: adverbial; APPL: applicative; AF: agent focus; AP: antipassive; ASP: aspect; CAUS: causative; CLF: classifier; COM: completive aspect; COMP: complementizer; DEM: demonstrative; DET: determiner; DIR: directional; EMPH: emphatic marker; ERG: ergative; EXS: existential; EXT: extraction; FOC: focus; FP: fronting particle; FUT: future; FV: final vowel; GEN: genitive; INC: incompletive; INST: instrumental; LER: left-edge resumptive; M: masculine; MOV: movement marker; NOM: nominative; P: plural; PASS: passive; PREP: preposition; PRF: perfective; PST: past; RN: relational noun; S: singular; SBJ: subject; SS: status sufix; SA: subject agreement; TR: transitive; VN: verbal noun. In the Bantu examples, number indicates noun class.

[4] The data come either from the literature or our own fieldwork in Guatemala (2016-2018).

Ankuchi x-a-b'e (wi)?
where COM-B2S-go FP
'Where did you go?'

We will argue that the fronting particle is an overt trace, here understood in terms of *Chain reduction via Substitution*.[5] We formulate Chain reduction in K'iche' and Kaqchikel as follows:

(4) *Chain Reduction*
Given a nontrivial chain CH = $\langle$ XP_1, XP_2, ... $\rangle$

a. *Substitute*
$XP_{[APPL(ICATIVE)]} \rightarrow$ *=wi*
(substitute XP bearing [APPL] feature by /=wi/)

b. *Delete*
XP $\rightarrow$ $\emptyset$ (*elsewhere*)
(delete XP)

c. *General conditions on (a) and (b):* Recoverability of deletion and economy (Nunes 2004)

(4b) instantiates Nunes (2004)'s *Chain Reduction*.[6] The novelty of our proposal comes from (4a), which allows chain links to undergo substitution, rather than deletion. The substitution here applies to low adjuncts, which we assume attach at the Appl(icative)P layer between VP and *v*P (Pylkkänen 2002; 2008). Via this assumption, we can delimit the types of phrases that trigger the fronting particle. We will return to the details of the structural position of the relevant adjuncts in section 2.

We will also argue for two other theoretical claims. First, C^0 must be a phase head (contra den Dikken 2009; 2017). Second, v^0 is not a phase head (contra Chomsky 2001, a.o.; see Keine 2017).[7] The data supporting these claims involve the behaviour of the fronting particle upon long-distance extraction. The generalization that arises was first discussed by Can Pixabaj (2015) and is the following:

[5] The idea that *wi* should be analyzed as a trace is already suggested in López Ixcoy (1997) and García Matzar & Rodríguez Guaján (1997).

[6] Nunes phrases Chain Reduction as follows: "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." Though we will follow Nunes's analysis closely, we do *not* adopt the Linear Correspondence Axiom (LCA; Kayne 1994; Chomsky 1995). For the sake of exposition, we will use a rewriting rule notation to illustrate Chain Reduction via Substitution. We also assume that recoverability of deletion holds in the case of substitution, since the original phonological content is removed via the procedure.

[7] This also echoes early treatments of locality of movement where the verb phrase was not taken to be a bounding node (Chomsky 1977, Lasnik & Saito 1992).

(5) **Fronting particle generalization:** In long distance extraction of low adjuncts, the presence of *wi* in the matrix clause is contingent on the presence of an overt complementizer introducing the embedded clause.

The claim that the fronting particle is an overt trace, alongside our defense that C^0 is the only phase, straightforwardly explains the otherwise puzzling distribution of the fronting particle in long-distance extraction.

This paper is divided into seven sections. Section 2 describes the phenomenon. Section 3 develops our analysis. Section 4 argues against four competing analyses, showing that none of them is tenable. Specifically, we show that the fronting particle is not (i) an applicative head, (ii) a resumptive pronoun, (iii) a movement trigger or an instance of *wh*-agreement, or (iv) an element akin to Agent Focus. Section 5 discusses the theoretical consequences of our analysis. Section 6 outlines avenues for future research. Section 7 concludes.

2 Empirical facts

K'iche' and Kaqchikel are closely related K'ichean Mayan languages that share several grammatical features, summarized below:[8]

(6) *Morphosyntax of K'iche' and Kaqchikel*

a. **Word order**: Basic word order is VOS (García Matzar & Rodríguez Guaján 1997 for Kaqchikel; López Ixcoy 1997; Can Pixabaj 2015, 2017 for K'iche'; England 1991; Clemens & Coon 2018 for word order across Mayan). Preverbal subjects are also common in discourse in both languages (see Can Pixabaj & England 2011, for discussion of SVO in K'iche').

b. **Morphological ergativity**: Transitive subjects control ergative agreement on the verb, while transitive objects and the sole argument of intransitive predicates control absolutive agreement (García Matzar & Rodríguez Guaján 1997; López Ixcoy 1997).[9]

c. **Syntactic ergativity**: The external argument of a transitive clause cannot be A'-extracted in the active voice. Instead, the Agent Focus or oblique antipassive voices are required (see Larsen & Norman 1979; Davies & Sam-Colop 1990; Aissen 2011; Coon et al. 2014; Assmann

[8] For overviews of the syntax of Mayan languages, we refer the reader to Coon (2016) and the articles in Aissen et al. (2017).

[9] We will follow the Mayanist convention of referring to ergative agreement as set A and absolutive agreement as set B. Since it is orthogonal to our purposes, we do not discuss the loci of agreement (see Coon 2016).

et al. 2015; Erlewine 2016; Polinsky 2016; Douglas et al. 2017; Aissen 2017b; Ranero 2019).

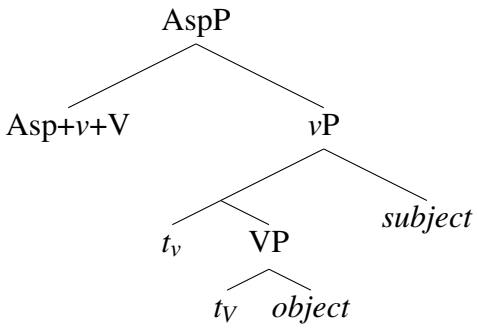
d. **Aspect**: Verbs inflect for aspect, not tense, and finiteness is aspect-driven (García Matzar & Rodríguez Guaján 1997; López Ixcoy 1997).

e. **Pro-drop**: Pro-drop of subject and object (García Matzar & Rodríguez Guaján 1997; López Ixcoy 1997).

f. **Relational nouns**: a Mayan-specific lexical class similar to adpositions in other languages; e.g., they describe spatial relations. They also introduce oblique arguments in passives and antipassives (García Matzar & Rodríguez Guaján 1997; López Ixcoy 1997).

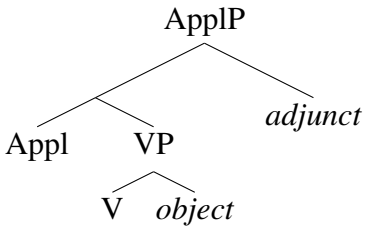
For the sake of simplicity, we will assume the following basic clause structure for VOS word order in both languages, based on (Aissen 1992):[10]

(7) *K'ichean clause structure*



A second assumption we will make is that the relevant adjuncts we discuss are introduced at the level of ApplP (Pylkkänen 2002; 2008) merged above VP (Pylkkänen's high applicative).[11]

(8)



[10] We are aware that VOS order could be derived via object shift above the subject (Douglas et al. 2017) or post-syntactically (Clemens & Coon 2018). Since the derivation of basic word order is not crucial here, we will follow (Aissen 1992). We use AspP here, but others use TP/IP. For ease of presentation, we also abstract away from a more articulated verbal domain including a VoiceP layer or additional layers.

[11] We assume that $Appl^0$ is null.

We are aware that the adjunct versus argument distinction is blurred by assuming that the phrases that trigger *wi* are introduced by an applicative. We will not add to the complex discussion regarding how to capture the asymmetry between arguments and adjuncts *in general*. Instead, our assumption about the position of the relevant adjuncts in the clause, as will become clear in the next section, allows us to group them as a *natural class*, which is necessary for *any* account of the phenomenon. There might be alternatives that are preferable upon closer scrutiny, but the proposal in (8) allows us to discuss the phenomenon without deviating into issues that are tangential to our main contribution. We therefore will assume (8), leaving possible refinements for the future.[12]

With these assumptions in place, let us turn to our empirical focus. In Kaqchikel and K'iche', A'-extraction (*wh*-movement, focus, relativization) of a class of low adjuncts (locatives, instrumentals, comitatives, indirect objects[13], etc.) triggers a verbal enclitic *wi*. For reasons of space, we present just two examples below from each language, focusing on *wh*-movement. The fronting particle is obligatory in K'iche', but optional in the Patzún dialect of Kaqchikel:[14]

(9) *K'iche': wi is obligatory*

a. Jawi x-at-b'ee *(wi) iwiir?
where COM-B2S-go FP yesterday
'Where did you go yesterday?' (Adapted from Velleman 2014: 41-42)

b. Jas r-uuk' x-Ø-ki-tij wi le ki-rikiil?
WH A3S-RN COM-B3S-A3P-eat FP DET A3P-food
'With what did they eat their food?'

(Adapted from Can Pixabaj 2015: 162)

(10) *Patzún Kaqchikel: wi is optional*

a. Ankuchi x-Ø-tzopin (wi) a Lu'?
where COM-B3S-jump FP CLF Pedro
'Where did Pedro jump?'

[12] Henderson 2008 assumes a similar analysis: "the adjunct counterparts of the high applicatives form the class of adjuncts that trigger wi under preposing."

[13] By indirect objects we mean oblique arguments introduced by relational nouns in prototypical di-transitive frames.

[14] The mere appearance of the adjunct in the left-periphery does not trigger *wi*. If an adjunct serves as a topic, the particle is not triggered (Can Pixabaj 2009). See England (2009); Can Pixabaj & England (2011) and Can Pixabaj (2017) for discussion of information structure and the left-periphery in K'iche', and Velleman (2014) and Yasavul (2017) for focus specifically. The same holds for Kaqchikel, although investigating the left-periphery in-depth is pending.

b. Achoj k'in x-Ø-u-qupij (wi) ru-wäch che' ri Ixchel?
WH RN COM-B3S-A3S-cut FP A3S-eye tree DET Ixchel
'What did Ixchel cut fruits with?'

The fronting particle is generally unavailable with an *in-situ* adjunct in either language (regardless of information structure, see 4.2):[15]

(11) *Patzún Kaqchikel: no wi with in-situ adjunct*
Ri a Lu' x-Ø-tzopin (*wi) chwa jay.
DET CLF Pedro COM-B3S-jump FP PREP.A3S.RN house
'Pedro jumped in the garden.'

Only low adjuncts trigger *wi*. Clausal adjuncts such as reason and temporal adverbs do not.

(12) *Temporal adjunct extraction in Kaqchikel*
a. N-Ø-a-bän ri qa-way pa toq'a.
INC-B3S-A2S-make DET A1P-food PREP night
'You make our food at night.'
b. *Pa toq'a n-Ø-a-bän wi ri qa-way.
PREP night INC-B3S-A2S-make FP DET A1P-food
'At night you make our food.' (Adapted from Henderson 2008)
c. Q: Jampe' x-Ø-a-tej knaq'?
when COM-B3S-A2S-eat beans
'When did you eat beans?'
d. A: [Iwir]F x-Ø-in-tej (*wi) knaq'.
yesterday COM-B3S-A1S-eat FP beans
'I ate beans [yesterday]F'

(13) *Temporal adjunct extraction in K'iche'*
a. *Context*: When did the mice eat the clothes?
b. [Chaq'ab']F x-Ø-ki-k'ux le atz'yaq.
PREP.night COM-B3S-A3P-eat DET clothes
'They ate the clothes [last night]F.'
(Adapted from Velleman 2014: 194)

(14) *Reason adjunct extraction in Patzún Kaqchikel*
a. Achike ru-ma x-Ø-samäj (*wi) ri a Juan?
what A3S-RN COM-B3S-work FP DET CLF Juan
'Why did Juan work?'

[15] See section 6 for discussion of other uses of *wi*.

What we observe, then, is that a class of adjuncts triggers the appearance of the fronting particle, whereas another class of adjuncts does not. An important issue is whether A' processes involving low adjuncts are the result of syntactic movement. In parallel fashion to A'-extraction of arguments, both K'iche' and Kaqchikel low-adjunct extraction is subject to island effects. We take this to mean that movement is implicated.[16]

(15) *Island effects in K'iche' low-adjunct A'-extraction*

a. K-in-chakun-ik r-eech k-at-wa' pa tijob'al.
INC-B1S-work-SS A3S-RN INC-B2S-eat PREP school
'I work so that you can eat at school (because I pay for it).'

b. *Jawi k-at-chakun-ik (wi) r-eech k-at-wa' (wi).
where INC-B2S-work-SS FP A3S-RN INC-B2S-eat FP
Intended:'What is the place such that you work so that you can eat in that place?'
(Adapted from Can Pixabaj 2015: 224 and T. Can Pixabaj p.c.)

(16) *Island effects in Kaqchikel adjunct A'-extraction*

a. *Ankuchi x-Ø-a-tz'ët ri achin ri x-Ø-tj-o wi
where COM-B3S-A2S-see DET man REL COM-B3S-eat-AF FP
jun aq?
a pig
Intended: 'Which is the place such that you saw the man that ate a pig at such a place?'

b. *Ankuchi x-Ø-a-tz'ët wi ri achin ri x-Ø-tj-o wi
where COM-B3S-A2S-see FP DET man REL COM-B3S-eat-AF FP
jun aq?
a pig
Intended: 'Which is the place such that you saw the man that ate a pig at such a place?'

Having established that movement is implicated when adjuncts are A'-extracted, let us turn to the behavior of the fronting particle upon long-distance extraction. The peculiarities and relevance of the fronting particle's distribution in this context were first established by Can Pixabaj (2015), so our work is an extension of her observations.[17] Consider first the examples below, where an overt complementizer

[16] Henderson 2008 provides evidence from crossover effects as well.

[17] See also Silberman (1995) for some discussion of the interaction of the fronting particle and long-distance extraction in Kaqchikel. We will note some microvariation in long-distance extraction in section 6.

introduces the embedded clause. In K'iche', the fronting particle must appear both in the matrix and embedded clause.

(17) *K'iche' extraction from embedded CP: multiple wi*
Jawi x-Ø-ki-b'iij *(wi) chi k-e-'e *(wi)?
where COM-B3S-A3S-say FP COMP INC-B3P-go FP
'Where did they say that they would go?'
(Adapted from Can Pixabaj 2015: 166-167)

In a parallel Kaqchikel example, the appearance of the particle in each of the two clauses is optional.

(18) *Kaqchikel extraction from embedded CP: multiple wi*
Ankuchi x-Ø-u-b'ij (wi) Maria chi x-Ø-u-tej (wi)
where COM-B3S-A3S-say FP Maria COMP COM-B3S-A3S-eat FP
knaq' Juan?
beans Juan
'Where did Maria say that Juan ate the beans?'

Let us move on now to long-distance extraction from reduced clauses, which we will call AspPs. The verbs in the examples shown below select for clauses that are not introduced by an overt complementizer. In this example type, the fronting particle appears only in the embedded clause. Here, once again, the particle is obligatory in K'iche' and optional in Kaqchikel:

(19) *K'iche' extraction from embedded AspP: wi in embedded clause*
Jas r-uuk' k-Ø-a-rayii-j (*wi) k-Ø-a-tij *(wi)
WH A3S-RN INC-B3S-A2S-desire-ACT FP INC-B3S-A2S-eat FP
le wa?
DET food
'With what do you desire to eat the food?'
(Adapted from (Can Pixabaj 2015): 163 and T. Can Pixabaj p.c.)

(20) *Kaqchikel extraction from embedded AspP: wi in embedded clause*

a. Ankuchi x-Ø-u-rayij (*wi) x-Ø-u-tzët (wi) xta
where COM-B3S-A3S-desire FP COM-B3S-A3S-see FP CLF
Ixchel?
Ixchel
'Where did he desire to see Ixchel?'

b. Achoj k'in x-Ø-a-tojtob'ej (*wi) x-Ø-a-löq' (wi) ri
WH RN COM-B3S-A2S-try FP COM-B3S-A2S-buy FP DET
kotz'i'j?
flowers
'Who did you try buying the flowers with?'

The empirical generalization so far is given below:

(21) **Fronting particle generalization:** In long distance extraction of low-adjuncts, the presence of *wi* in the matrix clause is contingent on the presence of an overt complementizer introducing the embedded clause.

(*repeated from (5)*)

This generalization will be the main driving force of our analytical claims in what follows.

Before we proceed, it is important to understand the structural differences between the two types of embedded clauses that we contrasted (CPs vs. AspPs; see Aissen 2017a for discussion across Mayan). Setting aside the distribution of the fronting particle, independent diagnostics show that embedded clauses without an overt complementizer are structurally smaller than embedded clauses with an overt complementizer. Several tests supporting this claim have been documented for both languages in the literature, and we were able to replicate these tests in our own field work on Patzún Kaqchikel (cf. Can Pixabaj 2015 and Ajsivinac Sian 2007 for discussion on K'iche' and Kaqchikel respectively). We will only present one of these diagnostics here. The clauses we have deemed AspPs cannot host sentential negation, showing that they are reduced in comparison to CPs:[18]

(22) *K'iche': CP complements can host sentence negation, AspP complements cannot*

a. Ka-ø-q-il-o [chi na k-oj-u-k'am taj].
INC-B3S-A1P-see-SS COMP NEG INC-B1P-A3S-receive IRR
'We realize that s/he would not receive us.' (Can Pixabaj 2015: 90)

b. *X-ø-in-xi'j w-iib' [na x-in-ch'aaw taj].
COM-B3S-A1S-be.afraid A1S-REF NEG COM-B1S-talk IRR
Intended: 'I was afraid to not talk.' (Can Pixabaj 2015: 98)

[18] Can Pixabaj 2015 notes that there is some variation of size within the complement clauses we have called AspPs. Some *are* able to host negation, even though they pattern identically to other AspPs regarding the long-distance extraction data. What is crucial for our purposes is that there is a class of reduced clauses which lacks the CP layer.

(23) *Kaqchikel: CP complements can host sentence negation, AspP complements cannot*

a. X-Ø-u-b'ij a Xwan chi man x-Ø-u-tz'ët ta
COM-B3S-A3S-say CLF Juan COMP NEG COM-B3S-A3S-see NEG
jun kuk.
a squirrel
'Juan said that he didn't see a squirrel.'
(Adapted from Ajsivinac Sian 2007)

b. *Ri ma Lu' x-Ø-u-rayij man x-Ø-u-tz'ët ta
DET CLF Pedro COM-B3S-A3S-desire NEG COM-B3S-A3S-see NEG
xta Ixchel.
CLF Ixchel
Intended: 'Pedro wanted to not see Ixchel.'

Five other diagnostics are the following: (i) AspPs cannot host topics in the left periphery, but CPs can (Can Pixabaj 2015, Ajsivinac Sian 2007, (ii) CPs can be extraposed, but AspPs cannot (Ajsivinac Sian 2007), (iii) AspPs cannot host focused phrases in the left-periphery, but CPs can (Can Pixabaj 2017), (iv) TAM must match between the matrix clause and an AspP complement, whereas TAM can mismatch between the matrix clause and a CP complement (Can Pixabaj 2017), and (v) the subject of a matrix clause and an AspP complement must be identical, whereas the subject of a matrix clause and a CP complement need not be (Can Pixabaj 2017; Ajsivinac Sian 2007).

It is crucial to note that, even though the embedded clause in the AspP examples is reduced and the verbal morphology on the embedded verb is parasitic on the matrix clause (see Can Pixabaj 2015), the matrix verb projects its own clausal structure and does not belong to the extended projection of the embedded verb, as proposed in some analyses of restructuring constructions (see Cinque 2006; Grano 2017, a.o.). In cases where the matrix verb can be incorporated into the extended projection of the embedded verb (as in Romance and German) the embedded verb typically receives infinitival morphology (see Wurmbrand 1998). The presence of inflectional morphology in both verbs in K'ichean indicates that they do not belong to the same clausal structure. Following Can Pixabaj (2015), we take the reduced clausal structure of the embedded clause in AspP examples to be governed by selectional properties of the matrix verb.

Moving forward, then, we will take embedded clauses with an overt complementizer to be CPs and embedded clauses without a complementizer to be AspPs.[19]

[19] The precise label of the reduced clauses is irrelevant. What is crucial is that reduced clauses lack a CP layer.

To summarize, we have established the behavior of the fronting particle in K'iche' and Patzún Kaqchikel. Most importantly, we discussed how the distribution of the fronting particle varies in long-distance extraction, depending on the size of the complement clause from which the extraction takes place. This latter observation will be crucial for assessing the consequences of our analysis, a matter we now turn to.

3 Chain Reduction via Deletion or Substitution

As stated in the introduction, we assume that internal merge (IM) results in multiple copies.

(24) a. Robin asked who Leslie saw.

b. (i) Robin asked [$_{CP}$ who [$_{IP}$ Leslie saw who]].

(ii) Robin asked [$_{CP}$ who [$_{IP}$ Leslie saw ~~who~~]].

For the sake of simplicity, we assume that phrase markers encode linear order.[20] To the extent that copies resulting from IM count as identical, IM in examples like (24) would create a linearization paradox at PF. Without affecting either copy, PF would need to output an order where *who* both follows and precedes *Mary saw*. The paradox in examples like the above is typically avoided by deleting the lower copy.[21]

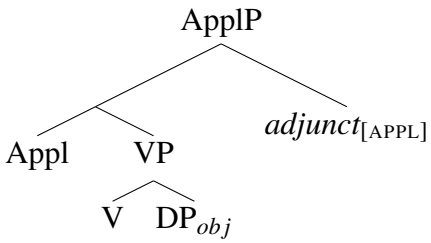
We attribute the appearance of the fronting particle in K'ichean to the application of Chain Reduction, a PF operation (Nunes 2004). We propose that there are two possible ways of applying Chain Reduction in K'iche' and Kaqchikel: (i) the unmarked case, via deletion and (ii) the more specific case, via substitution. In the latter case, the copy of the moved *wh*-phrase is replaced by *wi*. This operation performs the same function that deletion does (circumventing an ordering paradox).

[20] We depart from Nunes (2004) and do not adopt the LCA as the linearization algorithm, though the main point of our proposal is consistent with it. Adopting the idea that phrase markers encode linear order simplifies drastically the presentation of the material and reinforces the claim that our analysis is not contingent on any particular linearization algorithm. The key insight is that copies must be affected at the PF interface in order to avoid a linearization paradox, regardless of one's adoption of a specific linearization algorithm.

[21] The copy theory of movement receives support from cases where lower copies are activated either on the LF side (reconstruction effects; see Chomsky 1995, a.o.) or on the PF side (multiple copy pronunciation; see Nunes 2004; Kandybowicz 2008; Bastos-Gee 2009; Bošković & Nunes 2007). These phenomena are difficult to capture under trace theory. We will not discuss what the best way is to implement the preference for lower copy deletion on the PF side. One option is to assume that the lower copy is deleted because the WH-feature on C requires an overt specifier (Landau 2006). If the higher copy were deleted, this requirement would not be met.

Let us now illustrate the analysis step-by-step. We assume that low adjuncts inherit an [APPL(ICATIVE)] feature from the head introducing them. We take the mechanism responsible for this to be Feature Percolation (see Norris 2014 for a recent formulation of this mechanism). The result of Feature Percolation is that a feature on a head is transmitted to every element within that head's projection.

(25)

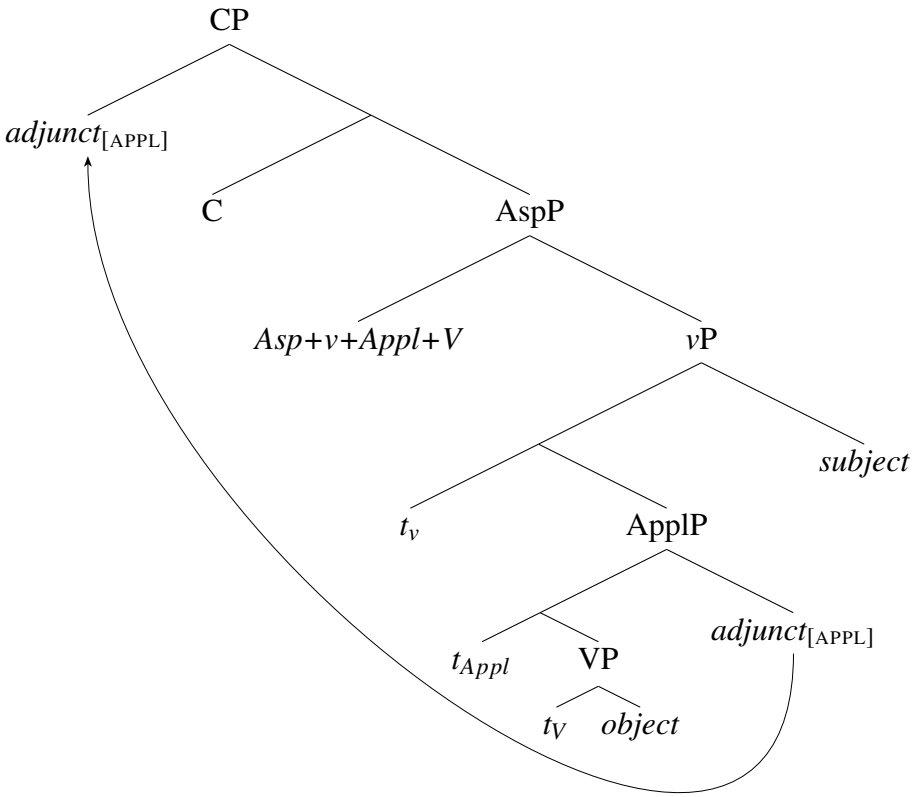


Recall a simple monoclausal example with adjunct extraction:

(26) *K'ichee' monotransitive adjunct extraction*
Jas r-uuk' x-Ø-ki-tij wi le ki-rikiil?
WH A3S-RN COM-B3S-A3P-eat FP DET A3S-food
'With what did they eat their food?' (Adapted from Can Pixabaj 2009)

Assuming that movement to Spec,CP is triggered by a WH-feature on $C^0_{[wh]}$, the underlying structure for this example would be as follows:

(27) *Adjunct IM*



IM delivers a copy of the adjunct in Spec,CP. As a result, the adjunct both follows and precedes the verbal complex, creating a linearization paradox. We assume that Chain Reduction in K'iche' and Kaqchikel applies to avoid the paradox and has the following format:[22]

(28) *Chain Reduction*
Given a nontrivial chain CH = ⟨ XP_1, XP_2, ... ⟩

a. *Substitute*
$XP_{[APPL(ICATIVE)]} \rightarrow$ *=wi*
(substitute XP bearing [APPL] feature by /=wi/)

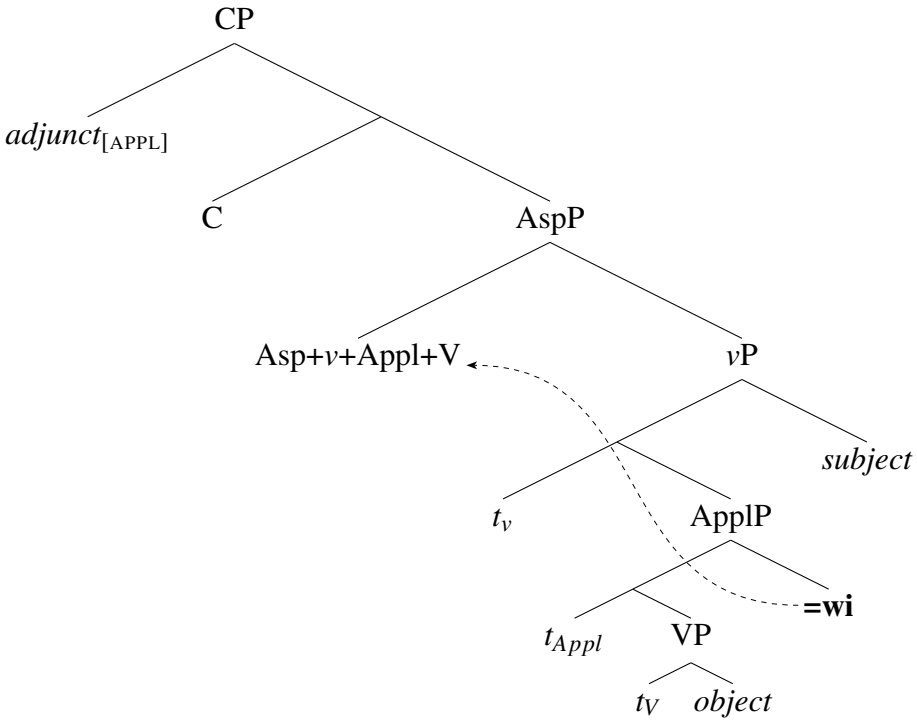
b. *Delete*
XP $\rightarrow \emptyset$ (*elsewhere*)
(delete XP)

c. *General conditions on (a) and (b):* Recoverability of deletion and economy (Nunes 2004)

[22] An economy condition prevents scattered deletion when the moved element is complex (but see Bošković & Nunes 2007).

In K'iche', where the fronting particle is obligatory, the choice between Chain Reduction via Deletion and Chain Reduction via Substitution is controlled by the Elsewhere Condition (Kiparsky 1973). Thus, when the links of the chain have an [APPL] feature, substitution applies. When the fronted element does not bear [APPL], deletion (the Elsewhere procedure) applies. In the monotransitive example above, then, the lower copy of the adjunct is replaced by *=wi*, which cliticizes to the verb complex in the morphophonological component.[23]

(29) *K'iche': Chain Reduction via Substitution and subsequent cliticization*



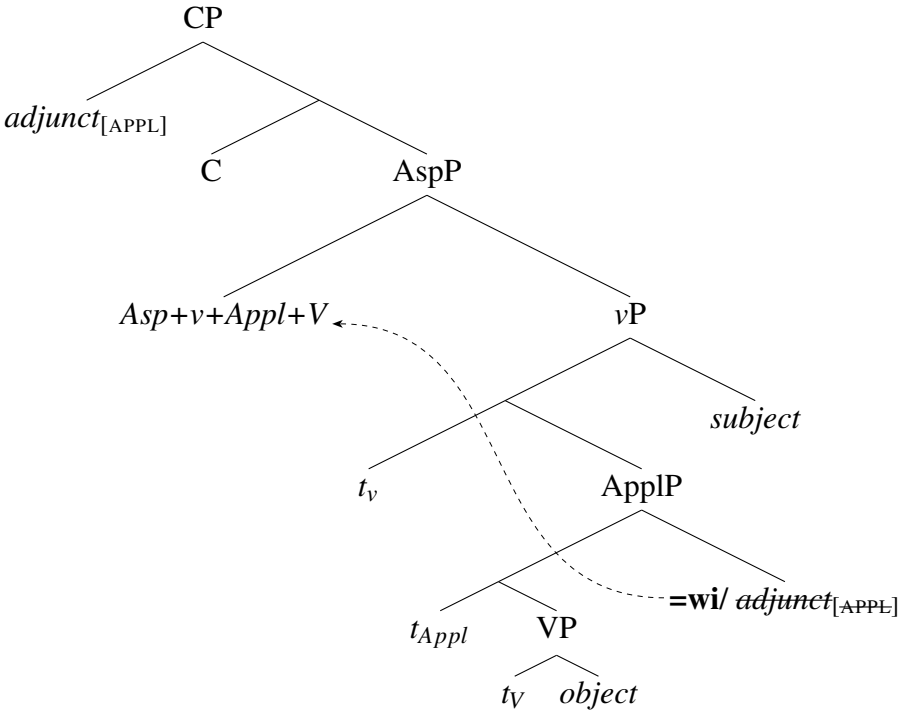
Recall that in Patzún Kaqchikel, the fronting particle is optional. We propose that speakers learn from positive evidence that the Substitution rule that applies to XP[APPL] is optional, given that the primary linguistic data contains examples with and without the fronting particle. We assume, then, that this is enough for speakers

[23] It is possible that cliticization on the verb happens before verb movement if verb movement actually occurs at PF (Chomsky 2000; but see Roberts 2010, a.o.). We set aside the question of the ordering of other enclitics on the verbal stem in relation to *wi*; see Henderson 2008 for some discussion.

to conclude that the Substitution rule need not apply. If the Substitution rule is not applied, then an XP[APPL] undergoes Deletion.[24]

(30) *Kaqchikel monotransitive adjunct extraction*
Ankuchi x-Ø-tzopin (wi) a Lu'?
where COM-B3S-jump FP CLF Pedro
'Where did Pedro jump?'

(31) *Kaqchikel: Chain Reduction via Substitution or Deletion*



Let us move on now to the more complex cases of long-distance extraction. We showed that the presence of the fronting particle in the matrix clause is contingent on the presence of an overt complementizer in the embedded clause:

[24] There is another way to capture the optionality. Since all of our consultants are balanced bilinguals, one could propose that the deletion strategy results from Spanish interference, since substitution is inactive in that language. To assess this alternative, we would need to observe a sample of primary linguistic data. If we observed that Patzún Kaqchikel speakers are *not* exposed to enough examples without *wi*, then we would be inclined to argue for Spanish interference. No such investigation is currently possible, so we leave this assessment for future research.

(32) *K'iche' extraction from embedded CP: multiple wi*
Jawi x-Ø-ki-b'iij *(wi) chi k-e-'e *(wi)?
where COM-B3S-A3S-say FP COMP INC-B3P-go FP
'Where did they say that they would go?'
(Adapted from Can Pixabaj 2015: 166-167)

(33) *Kaqchikel extraction from embedded CP: multiple wi*
Ankuchi x-Ø-u-b'ij (wi) Maria chi x-Ø-u-tej (wi)
where COM-B3S-A3S-say FP Maria COMP COM-B3S-A3S-eat FP
knaq' Juan?
beans Juan
'Where did Maria say that Juan ate the beans?'

(34) *K'iche' extraction from AspP: wi in the embedded clause*
Jas r-uuk' k-Ø-a-rayii-j (*wi) k-Ø-a-tij *(wi)
WH A3S-RN INC-B3S-A2S-desire-ACT FP INC-B3S-A2S-eat FP
le wa?
DET food
Intended: 'With what do you desire to eat the food?'
(Adapted from Can Pixabaj 2015: 163 and T. Can Pixabaj p.c.)

(35) *Kaqchikel extraction from AspP: wi in the embedded clause*
Achoj k'in x-Ø-u-rayij (*wi) x-Ø-u-tz'ët (wi) xta
WH RN COM-B3S-A3S-desire FP COM-B3S-A3S-see FP CLF
Ixchel?
Ixchel
'Who did he have the desire to see Ixchel with?'

We stated the generalization that arises in the following terms:

(36) **Fronting particle generalization:** In long distance A'-extraction of low adjuncts, the presence of *wi* in the matrix clause is contingent on the presence of an overt complementizer in the embedded clause.

(*repeated from (5)*)

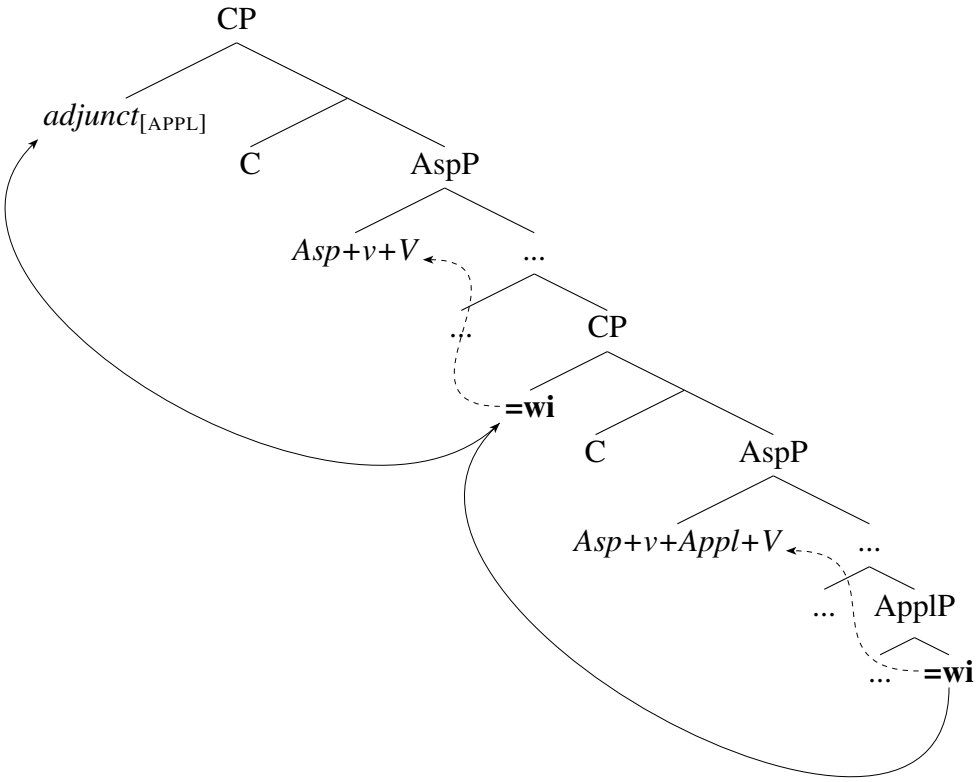
We also saw evidence that embedded clauses that are not introduced by an overt complementizer are structurally reduced, instantiating AspP.

With all of this in mind, let us illustrate the analysis. We assume that C^0 is a phase. As a result, Spec,CP is an obligatory stopover point in a movement dependency. In long-distance extraction from a full CP, then, movement of the adjunct from its base position to Spec,CP of the matrix clause proceeds in successive-cyclic fashion through an intermediate step in the embedded Spec,CP headed by the overt

complementizer. Assume for now that *v*P is not a phase, an issue we will expand on in the discussion section.

We can now see why the presence of the fronting particle in the matrix clause is contingent on the presence of an overt complementizer in the embedded clause: the adjunct has to stop in the embedded Spec,CP. This intermediate copy undergoes Chain Reduction via Substituion by *wi*, which then attaches *upward* to the nearest verb-like element.

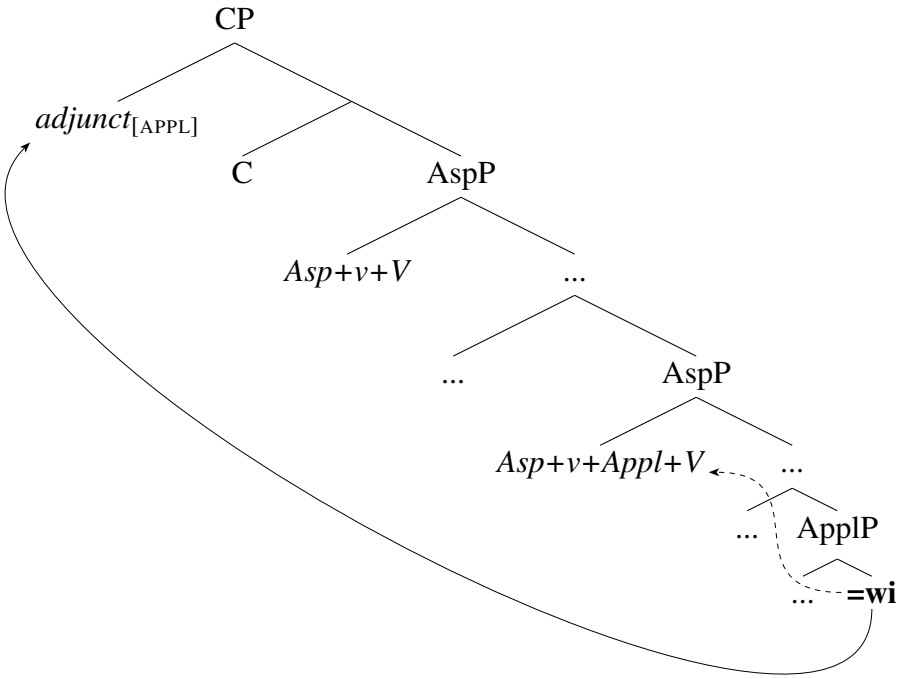
(37) *Chain Reduction via Substitution: extraction from CP*



If the embedded clause lacks an overt complementizer (thus lacking a CP), movement of the adjunct occurs in one fell swoop:[25]

[25] Can Pixabaj (2015): 168 was the first to suggest this analytical possibility.

(38) *Chain Reduction via Substitution: extraction from AspP*



We have now derived the behavior of *wi* in long-distance extraction.

We note that the CP extraction examples (where multiple fronting particles appear), show that one could not derive the connection between the fronting particle and (low) adjuncts exclusively from the *base* position of the adjunct, since any structural asymmetry between the relevant adjuncts and arguments is neutralized in the stopover in Spec,CP. Nevertheless, a *wi* stemming from the Spec,CP copy appears in the matrix clause. Put differently, it is necessary for the relevant adjuncts to carry a *feature* that is present in every chain link.

Let us summarize our analysis. The fronting particle in K'ichean is the result of applying Chain Reduction via Substitution to links in A'-movement chains bearing [APPL]. The distribution of *wi* in long-distance dependencies is explained via the requirement of a stopover in Spec,CP, as well as the lack of a corresponding stopover in Spec*v*P. If extraction proceeds from a clause lacking a CP layer, no such intermediate step occurs.[26]

[26] We are aware that (Can Pixabaj 2015: 163) reports that A'-extraction from the nominalized complement of verbs like 'force' or 'begin' results in a single *wi* appearing on the verb that selects for the nominal. These data are identical in Patzún Kaqchikel, modulo the optionality. We do not discuss these data in-depth, since they can be handled straightforwardly: the base copy is substituted by *wi* (a verbal clitic), so *wi* attaches to the only possible verbal host.

4 Alternative analyses

In this section, we assess four competing analyses of the phenomenon. The analyses we will consider are the following:

(39) *Alternative analyses (to be rejected)*

a. The fronting particle is the spell-out of an applicative head
b. The fronting particle is a (resumptive) pronoun
c. The fronting particle is the spell-out of the movement triggering head (*wh*-agreement)
d. The fronting particle is parallel to Agent Focus

We will argue that none of these analyses are tenable.

4.1 The fronting particle is not an applicative head

González (2016) proposes that the fronting particle is itself an applicative.[27]

In order to assess this analysis, let us be wholly explicit. Assume that the fronting particle is the spell-out of the applicative head (Baker 1988; Pylkkänen 2008) that introduces the adjunct. Data below from Chichewa (Bantu) illustrate the flavor of the analysis. The morpheme *-ir* is the spell-out of the head introducing an instrumental.

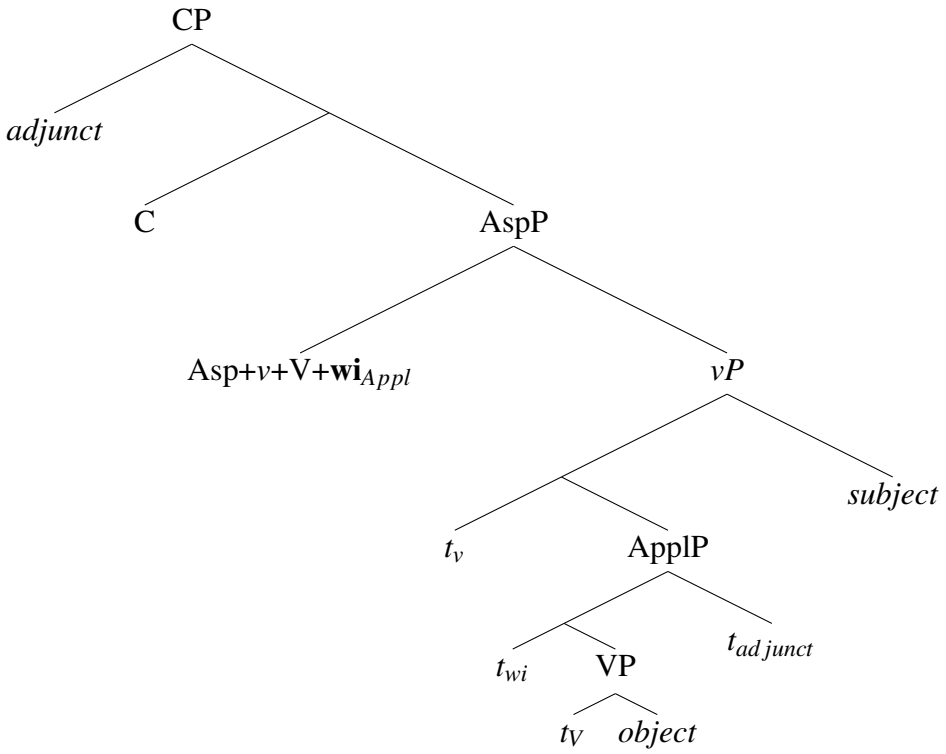
(40) *Chichewa (Bantu) applicative*

a. Mavuto a-na-umba-a mtsuko.
Mavuto SA-PST-mold-ASP waterpot
'Mavuto molded the waterpot.'
b. Mavuto a-na-umb-ir-a **mpeni** mtsuko.
Mavuto SA-PST-mold-APPL-ASP **knife** waterpot
'Mavuto molded the waterpot with a knife.' (Baker 1988)

Applied to K'ichean, *wi* would be parallel to the overt applicative morpheme above. We would assume, then, that *wi* instantiates the applicative head.

[27] The terminology used by González is *aplicativo de registro* 'register applicative'. See the cited work for details on the meaning of this term.

(41)



An approach of this nature predicts that a single instance of *wi* should appear in long-distance extraction, possibly in the embedded clause. However, this prediction is incorrect, as shown before. Low-adjunct extraction from an embedded CP triggers a fronting particle on both embedded and matrix verbs in K'iche' and Patzún Kaqchikel (modulo the optionality in Kaqchikel).

The behavior of the fronting particle is therefore unexpected under the applicative head analysis: we would not predict multiple applicative heads to surface in any context. Beyond the empirical picture, however, theoretical concerns also arise. As we have discussed before, the fronting particle cannot co-occur with any *in-situ* adjunct. Why would an applicative head introduce an adjunct only in the event that A'-extraction occurs?

González 2016 discusses the following example as evidence for his analysis.[28] According to him, *wä* retrieves the adjunct *in the forest* uttered 11 clauses before in the text.

[28] The phonological shape of the fronting particle is *wä* in this dialect. It is actually unclear to us how this example follows from the applicative analysis.

(42) *The fronting particle in Sololá Kaqchikel*
ye k'ö chi' pa **chäj**... ...x-e-b'ä **wä** la'
B3P EXS there in forest COM-B3P-go FP DEM2:SURELY
äl taq winäq
DIR:towards.there P person.
'[The soldiers] are there in **the forest** ... for sure, people went **there**.'
(Adapted from González 2016: 83)

It is not clear to us that González's interpretation of this example is sound. We suggest that *wä* itself does not retrieve the locative. Notice crucially that there is a directional particle **äl** in the second clause. We suggest that this particle is actually the element that is referring back to the location, as opposed to *wä* alone.

The reason for the presence of *wä* is not clear though. One possibility is that we are dealing with predicate focus, which has also been reported to be marked via the fronting particle (see section 6). In order to establish why the particle appears in this particular example, however, a more careful inspection of the surrounding environments in the text would be necessary.

To summarize, the empirical inadequacy and conceptual complications with this type of analysis lead us to conclude that the fronting particle does not instantiate the applicative head.

4.2 The fronting particle is not a resumptive pronoun

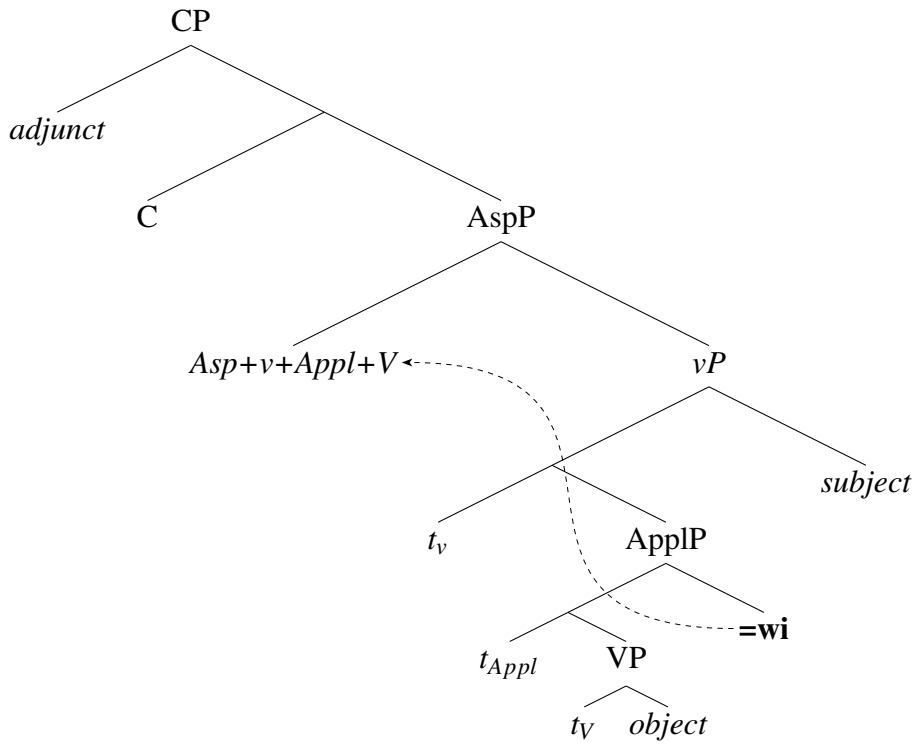
Resumptive pronouns are pronouns in the tail position of a chain that is created via movement or base generation complemented with another mechanism (Ross 1967; Chomsky 1977; Shlonsky 1992; Boeckx 2003; Sichel 2014). The precise analysis of a resumptive pronoun is immaterial to the point we will make here. Let us illustrate with modern Arabic, a language that has both a gap strategy and a resumptive strategy for *wh*-extraction. The resumptive pronoun is a verbal clitic:

(43) *Modern Arabic: gap strategy*
ʔayy-a **T-tullaab-i** qaabala l-qaaʔid-u
which-ACC **the-students-**GEN met.3SG.M the-leader-NOM
~~<ʔayy-a T-tullaab-i>~~?
which-ACC **the-students-**GEN
'Which of the students has the leader met?'

(44) *Modern Arabic: resumptive strategy*
ʔayy-u **T-tullaab-i** qaabala-**hum** l-qaaʔid-u
which-NOM **the-students-**GEN met.3SG.M-**them** the-leader-NOM
~~**<ʔayy-a T-tullaab-i>**~~?
which-NOM **the-students-**GEN
'Which of the students has the leader met?' (Alotaibi & Borsley 2013)

This analysis would propose, then, that *wi* is a resumptive element that occupies the tail of an A'-chain.[29]

(45)



Let us move to concrete predictions made by the resumptive pronoun analysis. With regards to long-distance extraction, this analysis predicts that the fronting particle will appear only in the clause from which an adjunct is extracted. This prediction is wrong. Remember that in long-distance extraction from a CP, the fronting particle appears in both embedded and matrix clauses, as shown previously.

Another prediction concerns islands. In languages such as Lebanese Arabic, resumptive pronouns ameliorate island effects, as seen below.

[29] This structure exemplifies an analysis of resumption that does not involve movement.

(46) *Lebanese Arabic*
ʔiSkiina maʃ l-muχriʒ yalli fallit Laila ʔabl ma tʃuuf-***(o)**.
talked.1P with the-director that left L. before see.3SF-***(him)**
'We talked to the director that Laila left before she saw him.' (Aoun 2000)

In contrast, the fronting particle doesn't alleviate island effects (see section 2). We repeat the relevant kind of data below.[30]

(47) *No island amelioration with wi in Kaqchikel*

a. N-Ø-Ø-raj Maria ri ala' ri x-Ø-tj-o knaq'
INC-B3S-A3S-love Maria DET man COMP COM-B3S-eat-AF beans
chwa jay.
PREP.A3S.RN house
'Maria wants the young man who ate beans in the yard'

b. Ankuchi n-Ø-Ø-raj (wi) ri Maria ri ala' ri
where INC-B3S-A3S-want FP DET Maria DET man COMP
x-Ø-tj-o knaq'?
COM-B3S-eat-AF beans
'Where does Maria want the young man who ate beans (to be)?'

c. *Ankuchi n-Ø-Ø-raj wi ri Maria ri ala' ri
where INC-B3S-A3S-want FP DET Maria DET man COMP
x-Ø-tj-o wi knaq'?
COM-B3S-eat-AF FP beans
Intended: 'Which is the place such that Maria wants the young man who ate beans at such a place?'

d. *Ankuchi n-Ø-Ø-raj ri Maria ri ala' ri
where INC-B3S-A3S-want DET Maria DET man COMP
x-Ø-tj-o wi knaq'?
COM-B3S-eat-AF FP beans
Intended: 'Which is the place such that Maria wants the young man who ate beans at such a place?'

We can see, then, that the fronting particle does not exhibit the hallmarks of resumption.

Analyzing *wi* as a pronoun would also require it to be a pronoun that encompasses different kinds of phrases: *wi* would be a pronoun for instruments, locations, etc. However, we have been unable to find any evidence that *wi* functions as a run-

[30] In the example below, the A3S marker is dropped. This is a property of Patzún Kaqchikel, where that marker can be dropped if the set B marker is also 3S; Patal Majzul et al. 2000: 69.

of-the-mill pronoun. For example, *wi* cannot be used anaphorically. Consider (48), where an anaphoric use of *wi* is attempted:

(48) *Wi cannot be used as an anaphoric pronoun in Patzún Kaqchikel*

a. *Context*: Two friends are discussing where Pedro bought beans.
b. Pa k'ayib'äl x-Ø-u-löq' wi pe?
PREP market COM-B3S-A3S-buy FP DIR
'Did he buy them (beans) [at the market]F?'
c. *Ja, x-Ø-u-löq' wi (pe).
yes COM-B3S-A3S-buy FP DIR
Intended: 'Yes, he bought them there.'

Speaker A mentions the location of the buying, but speaker B cannot use *wi* anaphorically to refer back to that location. The same is observed below. Whereas (49)c can follow the utterance in (49)b, (49)d cannot:

(49) *Wi cannot be used as an anaphoric pronoun in Patzún Kaqchikel*

a. *Context*: Two friends are discussing Juan's purchases at the market.
b. Juan, [pa k'ayib'äl]F x-Ø-u-löq' wi pe knaq'.
Juan PREP market COM-B3S-A3S-buy FP DIR beans
'Juan bought beans [at the market]F.'
c. Ja, x-Ø-u-löq' chqa' pe ri ixim!
yes COM-B3S-A3S-buy also DIR DET corn
'He also bought the corn!'
d. *Ja, x-Ø-u-löq' wi (pe) chqa' ri ixim.
yes COM-B3S-A3S-buy FP DIR also DET corn
Intended: 'Yes, he also bought the corn there.'

We observe again that *wi* cannot be used anaphorically.

The example given below shows this one last time. In the dialogue, the speaker answering the question attempts to refer to the location/saleswoman using *wi*, while pointing to the relevant referent. An anaphoric use is again impossible here.

(50) *Wi cannot be used as an anaphoric pronoun in Patzún Kaqchikel*

Context: Two sisters are walking by the marketplace. They pass by the flower stand where one of the two had bought flowers the day before.

a. Q: Achike x-Ø-a-b'än iwir? A: X-Ø-in-löq'
what COM-B3S-A2S-do yesterday COM-B3S-A2S-buy
kotz'i'j.
flowers
Q: 'What did you do yesterday?' A: 'I bought flowers'

b. Q: Achike x-Ø-a-b'än iwir? A: *X-Ø-in-löq' wi
what COM-B3S-A2S-do yesterday COM-B3S-A2S-buy FP
kotz'i'j.
flowers
Q: 'What did you do yesterday?' A: *Intended*: 'I bought flowers there/with her.' (*pointing to the flower stand/the saleswoman*)

c. Q: Achike x-Ø-a-b'än iwir? A: X-Ø-in-löq'
what COM-B3S-A2S-do yesterday COM-B3S-A2S-buy
kotz'i'j chi la' / r-k'in rija'.
flowers PREP DEM A3S-RN 3S
Q: 'What did you do yesterday?' A: 'I bought flowers there / with her.' (*pointing to the flower stand/the saleswoman*)

d. Q: Achike x-Ø-a-b'än iwir? A: Chi la' / r-k'in
what COM-B3S-A2S-do yesterday PREP DEM A3S-RN
rija' x-Ø-in-löq' wi kotz'i'j.
3S COM-B3S-A2S-buy FP flowers
'Q: What did you do yesterday?' A: 'I bought flowers there/with her.' (*pointing to the flower stand/the saleswoman*)

The way we interpret these results is that an analysis of *wi* as a pronoun would need to assume that it is a very strange pronoun: *wi* would be a pronoun that (i) cannot be used anaphorically and (ii) appears only in instances of A'-movement. In other words, it would be a pronoun that is used exclusively for resumption. However, there do not seem to be any languages that have a pronoun paradigm that is used exclusively for resumption (Boeckx 2008; see also Boeckx 2003 and McCloskey 2002). This in itself casts doubt on analyzing *wi* as a resumptive pronoun. Even if we assumed that *wi* is a typological outlier, though, we would still be faced with the challenges noted previously. We would need to propose that *wi* is a typologically extraordinary resumptive pronoun that also (i) cannot ameliorate island effects and (ii) occurs multiple times on the movement path of long-distance extraction from a CP. [31]

[31] Furthermore, we will see in section 6 that some dialects of K'ichean have extended the use of *wi* to predicate fronting. If these data are the same phenomenon, then, *wi* would need to be a pronoun that encompasses a subset of adjuncts, as well as phrases such as VP.

Given that these these behaviours are unexpected for (resumptive) pronouns, we find that this analysis has no obvious virtues and set it aside.[32]

4.3 The fronting particle is not the spell-out of movement triggering head (wh-agreement)

The fronting particle could be analyzed as the spell-out of the X^0 that drives movement.[33]This is equivalent to describing the fronting particle as the spell-out of *wh*-agreement.

Some languages have a dedicated morpheme that marks displacement to a focus position. In Kuria (Bantu), focused elements surface preceded by a clitic which has been analyzed as the spell-out of Foc^0 (Landman & Ranero 2018). Under this analysis, the difference between Kuria and K'ichean would be which constituent the movement trigger attaches to: in Kuria, as a proclitic on the displaced constituent, whereas in K'ichean, as an enclitic on the verb.

[32] Another type of resumption-like phenomenon is what van Urk (2018) calls *pronoun copying* in Dinka. Pronoun copying arises when a nominal is extracted and is analyzed as the result of partially deleting copies created by phrasal movement. In a nutshell, Dinka has a V2 requirement at the *v*P level that enforces the presence of a constituent in that position. Van Urk assumes that the *v*P is a phase and, thus, an intermediate landing site. Chain reduction deletes only a portion of the copy in Spec,*v*P and the resulting item satisfies the *v*P's V2 requirement. The pronoun is basically the spell-out of the functional material remaining from NP-ellipsis (see also Postal 1969; Elbourne 2001, a.o.). Van Urk's analysis of pronoun copying and our analysis of *wi* have the same kind of flavor. There are crucial differences though. In Dinka, pronoun copying is proposed to be the result of partial deletion plus lexical insertion of pronominal material that exists in the language *independently* of extraction contexts. In our analysis, substitution by *wi* does not involve deletion. Instead, *wi replaces* movement copies. Assimilating *wi* insertion into a van Urk-style analysis runs into several problems, which are echoed in the main text here. First, as far as we know, there is no language that employs a single pronoun for a class of adjuncts, in our case low-adjuncts. Second, the formalization involving partial deletion cannot work for K'ichean. We would need to establish the portion of structure that is deleted in all of the moved adjuncts, such that the remnant structure in *all* of those cases is inserted as the same pronoun, which would not be part of the regular pronominal system. This is in contrast with Dinka, where the relevant particle *is* an independent pronoun. Van Urk's analysis might be on the right track for Dinka, but we see no possibility of extending his mechanism to the phenomenon here.

[33] See Henderson 2008, Can Pixabaj 2009 and England 2009. For Henderson, the feature that spells-out as *wi* is the [FOC] on the moved element itself, making his analysis more similar to the applicative analysis we rejected in 4.1. Nevertheless, assessing the alternative we lay out here is important for our argumentation.

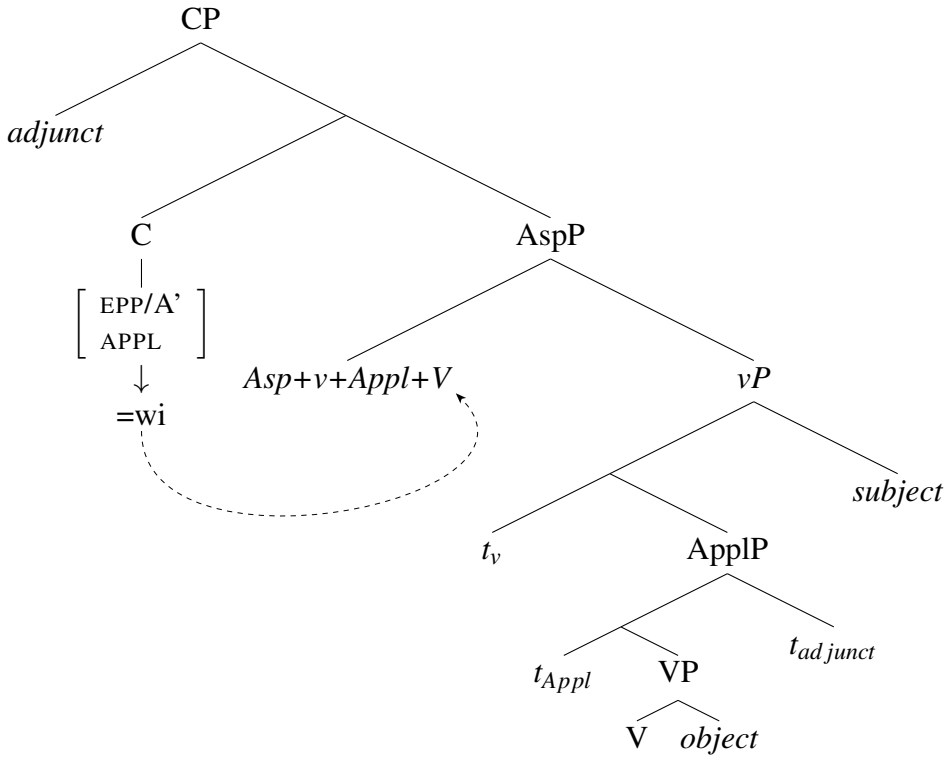
(51) *Kuria (Bantu)*

a. Q: Where will Gati see the owl?

b. **N**-ko mesa Gati umw-iti a-ra-maah-e ~~<ko mesa>~~.
FOC-PREP table Gati 3-owl 3SA-FUT-see-FV
'Gati will see the owl ON THE TABLE.' (Landman & Ranero 2018)

Let us call this the *movement trigger* analysis and formalize it as follows: the fronting particle *wi* would be the spell-out of a head in the CP layer bearing an EPP/*A'*-feature and an applicative feature [APPL]. Under this analysis, the fronting particle would cliticize downwards onto the verb. [34]

(52)



The crucial examples that will determine the feasibility of this analysis involve long-distance extraction. The movement-trigger analysis predicts that *wi* will appear in both embedded and matrix clauses upon long-distance extraction from a full CP. As we have seen previously, this prediction is correct. Therefore, the movement-trigger analysis, and our own, cannot be teased apart via this type of example.

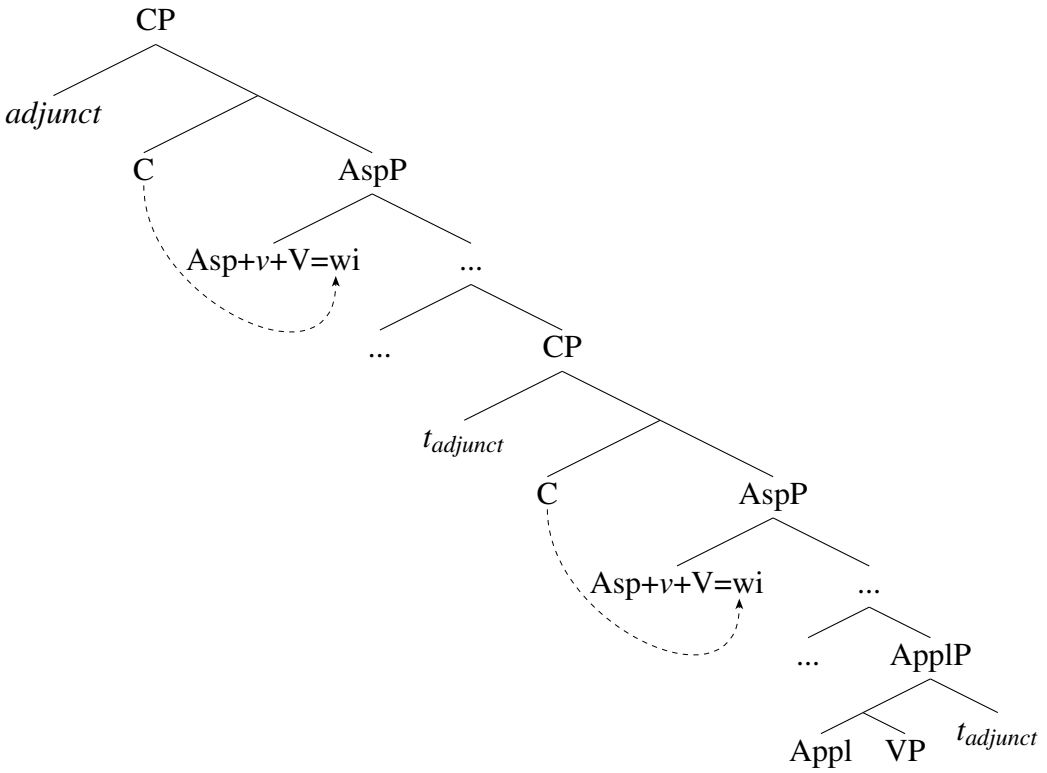
[34] It would also be possible to analyze the fronting particle as the spell out of a v^0 bearing the EPP feature. We set aside this possibility, since it will run into a broader range of problems; see 5.1.

However, extraction from reduced clauses favors our analysis. Recall that extraction from embedded clauses with an overt complementizer results in *wi* appearing on both the embedded and matrix verbs, but extraction from a reduced clause results in *wi* appearing only in the embedded clause (see examples 33-36).

The two structures below show why these data are crucial.

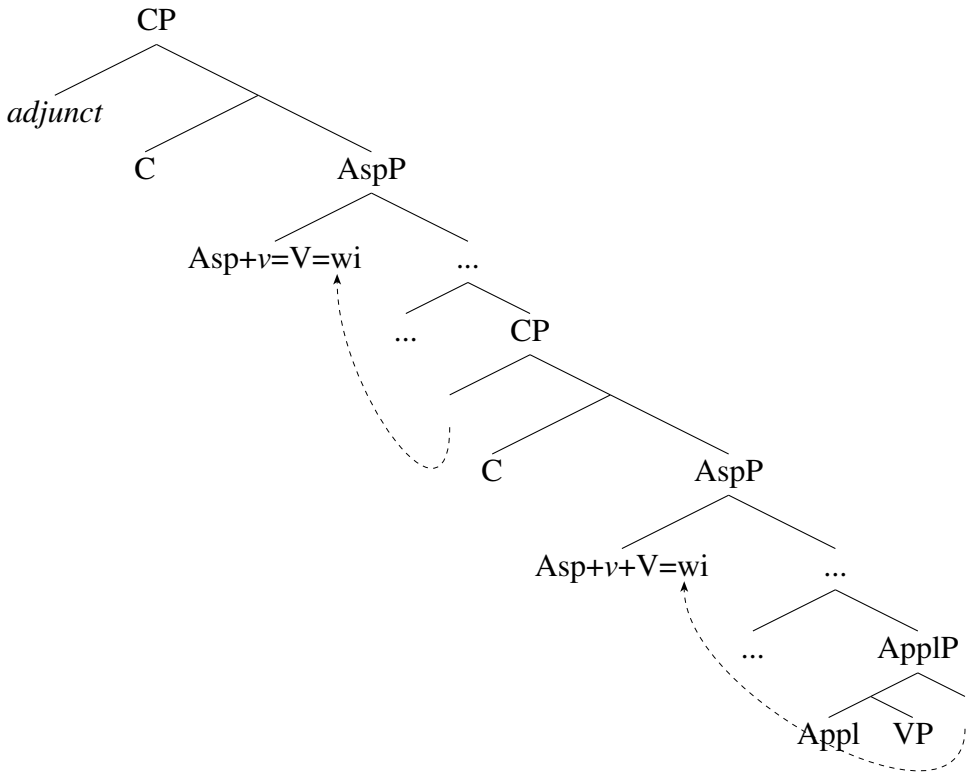
(53) *Movement-trigger analysis*

The head in the C domain that triggers movement of the adjunct is spelled-out as *wi* and attaches *downward* to the verb in the clause.



(54) *Chain Reduction via Substitution analysis*

A chain link undergoes substitution by *wi* and attaches *upward* to the nearest verb-like element.



In extraction from AspP, there is no C^0 in the embedded clause. The movement-trigger analysis predicts that, in the absence of a C^0 in the embedded clause, the fronting particle would appear attached to the matrix verb (see (53)). However, this prediction is incorrect: the absence of C^0 in the embedded clause bleeds the appearance of *wi* in the *matrix* clause. In contrast, our analysis makes the correct prediction, since the absence of an embedded C^0 bleeds the appearance of *wi* in the *matrix* clause because there is no intermediate movement step in Spec,CP (see (54)).

Put differently, our analysis can account for the asymmetry between extraction from full versus reduced clauses, whereas the *movement trigger* analysis predicts the opposite asymmetry from the one that is attested. We therefore reject the *movement trigger* analysis.

4.4 The fronting particle is not parallel to Agent Focus

Superficially, there seems to be a connection between the phenomenon here and another characteristic of the K'ichean languages. Across K'ichean, ergative subjects cannot be A'-extracted freely. In other words, these languages are syntactically ergative (Coon et al. 2014; Polinsky 2016; Aissen 2017b). In order for ergative subjects to A'-extract, the verb must appear in the Agent Focus (henceforth AF) voice.[35] The Patzún Kaqchikel data below illustrate the phenomenon:

(55) *AF in Patzún Kaqchikel*

a. *Achike x-Ø-u-tej nu-way?
who COM-B3S-A3S-eat A1S-tortilla
Intended: 'Who ate my tortillas?'

b. Achike x-Ø-tj-o nu-way?
who COM-B3S-eat-AF A1S-tortilla
'Who ate my tortillas?'

The superficial parallel should be clear. In instances of both ergative subject and low-adjunct extraction, an element cannot be extracted unless a special morpheme appears on the verb. Given this parallel, one could pursue the following analysis: (i) AF feeds A'-extraction of *v*P internal material which is otherwise inaccessible (the ergative subject) and, similarly, (ii) the fronting particle facilitates the extraction of low-adjuncts (Douglas et al. 2017). This parallel could be made regardless of the specifics of the analysis of AF. [36]

A crucial step in assessing this parallelism involves comparing the distribution of AF and the fronting particle. What we find is that their distribution is not parallel at all:

(56) *Differences between AF and the fronting particle*

a. AF cannot appear in intransitive clauses; the fronting particle can.
b. AF appears only once in long-distance extraction from a full CP; the fronting particle appears once per CP.
c. Focusing an ergative subject forces the use of AF; focusing an adjunct does not force the fronting particle.
d. In Patzún Kaqchikel, AF is never optional; the fronting particle is.

[35] The oblique antipassive voice can also be used (García Matzar & Rodríguez Guaján 1997; Heaton 2017; López Ixcoy 1997).

[36] For competing accounts of AF, see Ordóñez (1995); Stiebels (2006); Aissen (2017b); Coon et al. (2019); Deal (2016); Erlewine (2016); Baier (2019); Ranero (2019).

e. The fronting particle is compatible with passive and incorporation antipassive voices, which is unexpected under some analyses of AF.

The difference in distribution leads us to conclude that the fronting particle is not related to syntactic ergativity, nor is its function parallel to AF.

Let us begin with (56)a. While the subject of a transitive clause is barred from extraction, intransitive subjects can extract freely and AF cannot be used (García Matzar & Rodríguez Guaján 1997, López Ixcoy 1997). If the fronting particle were akin to AF, we would not expect *wi* to be possible in intransitive clauses since, on the hypothesis that the two are parallel, transitivity would also be the source of the extraction restriction relevant to *wi*. This first distributional asymmetry suggests to us that AF and the fronting particle are not parallel.

Long-distance extraction showcases another distributional asymmetry between AF and *wi*. Data from Kaqchikel show that extraction of a transitive subject from a full CP triggers AF only in the embedded clause (Erlewine 2016).[37] In contrast, *wi* can appear in both clauses, as we have observed before.[38]

(57) a. Achike n-Ø-a-b'ij rat [chin x-oj-tz'et-**ö** roj]?
who INC-B3S-A2S-say 2SG that COM-B1P-see-AF 1PL
'Who do you say saw us?'

b. *Achike n-a-b'i-n rat [chin x-oj-tz'et-**ö** roj]?
who INC-B2S-say-AF 2SG that COM-B1P-see-AF 1PL

c. *Achike n-Ø-a-b'ij rat [chin x-oj-r-tz'ët roj]?
who INC-B3S-A2S-say 2SG that COM-B1P-A3S-see 1PL

d. *Achike n-a-b'i-n rat [chin x-oj-r-tz'ët roj]?
who INC-B2S-say-AF 2SG that COM-B1P-A3S-see 1PL

(Adapted from Erlewine 2016)

Any analysis that ties the fronting particle to syntactic ergativity would be challenged by this asymmetry.

A third difference is more subtle. Recall that AF is used for focusing the subject of a transitive clause. Velleman 2014 shows that subjects of transitive clauses cannot be focused *in-situ* in K'iche', but are *required* instead to front, triggering AF (Velleman 2014: 220). If *wi* is parallel to AF, we predict that focusing an adjunct would force its movement to the left-periphery as well, triggering the fronting particle. However, this prediction is not borne out. While ergative subjects cannot be focused *in-situ*, all adjuncts can be. Put differently, the use of the fronting particle is not required for adjunct focus (Velleman 2014: 209). The same pattern holds

[37] The Kaqchikel data from Erlewine (2016) come from Patzún speakers as well.
[38] We do not know how AF behaves in long-distance extraction in K'iche'.

identically in Kaqchikel. Whereas adjuncts can be focused *in-situ*, the subject of a transitive cannot:

(58) *Adjunct focus in Patzún Kaqchikel*

a. Q: Ankuchi x-Ø-a-löq' wi re kotz'i'j re'?
where COM-B3S-A2S-buy FP DET flower DET
'Where did you buy these flowers?'

b. A: [Pa k'ayib'äl]F x-Ø-in-löq' wi.
PREP market COM-B3S-A1S-buy FP
'[At the market]F I bought them.'

c. A: X-Ø-in-löq' [pa k'ayib'äl]F.
COM-B3S-A1S-buy PREP market
'I bought them [at the market]F.'

(59) *Transitive subject focus in Patzún Kaqchikel*

a. Q: Achike x-Ø-loq'-o ri kotz'i'j?
who COM-B3S-buy-AF DET flower
'Who bought the flowers?'

b. A: Ja ri ma Juan x-Ø-loq'-o.
FOC DET CLF Juan COM-B3S-buy-AF
'[Juan]F bought them.'

c. A: *X-Ø-loq'-o ja ri ma Juan.
COM-B3S-buy-AF FOC DET CLF Juan
Intended: '[Juan]F bought them.'

d. A: *X-Ø-u-löq' ja ri ma Juan.
COM-B3S-A3S-buy FOC DET CLF Juan
Intended: '[Juan]F bought them.'

e. A: #X-Ø-u-löq' ri ma Juan.
COM-B3S-A3S-buy DET CLF Juan
Intended: '[Juan]F bought them.'

The fourth argument is as follows: we have noted that the fronting particle is obligatory in K'iche', whereas it is optional in Patzún Kaqchikel. If the fronting particle were tied to syntactic ergativity, we would expect that the obligatoriness of the fronting particle within a particular language would be mirrored by AF. Put differently, if a language showed the fronting particle obligatorily, then AF should also be obligatory; conversely, if a language showed the fronting particle optionally,

then AF should also be optional.[39] As far as we can tell, this holds for K'iche', as discussed by Velleman (2014) and Can Pixabaj (2015), since AF and the fronting particle are obligatory. However, the prediction fails in Patzún Kaqchikel. Whereas the fronting particle is optional, AF never is. The following examples show that A'-extraction of the ergative subject requires the use of AF.[40]

(60) *AF is obligatory in Patzún Kaqchikel*

a. *Achike x-Ø-(u-)kam-sa-j ri aq?
who COM-B3S-A3S-die-CAUS-TRANS DET pig
Intended: 'Who killed the pig?'

b. Achike x-Ø-kam-sa-n ri aq?
who COM-B3S-die-CAUS-AF DET pig
'Who killed the pig?'

In contrast, we have shown throughout that *wi* is optional in Patzún Kaqchikel. We therefore conclude that the distributions of *wi* and AF do not go hand-in-hand, suggesting that they are different in nature.

A final argument is tied to one particular analysis of AF. Let us consider Coon et al. (2014)'s analysis (see Ordóñez 1995 for Popti/Jakaltek, Aldridge (2004) for Austronesian).[41] In transitive clauses, Coon et.al. assume that the internal argument moves to the edge of the verbal domain in order to be Case licensed by T^0, resulting in absolutive agreement. Movement of the internal argument "traps" the external argument, since the internal argument comes to occupy the only escape hatch. As a result, the external argument is inaccessible to the C^0 probe, giving rise to syntactic ergativity. Under this approach, AF is a Last Resort Case licenser of an *in-situ* internal argument. In a nutshell, AF licenses the internal argument, bleeding its movement to the edge of the verbal domain. As a result, the escape hatch remains empty and the external argument can extract.

[39] Assmann et al. 2015 give a similar argument to dissociate AF from *wi*. They report that their consultants use AF but do not use *wi*. As we will see in section 6, there are Kaqchikel dialects that do not have a fronting particle.

[40] The issue of whether AF is ever truly optional requires further work. Velleman (2014) notes that some K'iche' dialects have been claimed to use AF optionally, but she found little evidence to support this in her fieldwork. Heaton 2017 surveys Kaqchikel dialects and notes generational differences in the use of AF. What seems to be established is that certain Mayan languages do not use AF in some A'-extraction contexts (Stiebels 2006, Heaton et al. 2015, Gagliardi et al. 2013, Douglas et al. 2017; Heaton 2017).

[41] Coon et al. (2014) developed their analysis for Q'anjob'al. Therefore, their approach might not transfer to Kaqchikel. However, since this is one of the prominent analyses of AF, we assume that it would be a promising analysis of Kaqchikel and Mayan more broadly (see Ranero (2019) and Douglas et al. (2017) for an extension of this nature).

If the fronting particle is parallel to AF, we would propose that it is a licenser of the *in-situ* internal argument when a low-adjunct bears an A'-feature. Since the internal argument is licensed *in-situ* by *wi*, the IA would not need to move to the edge of the phase, occupy the escape hatch, and "trap" low adjuncts.

We would predict, then, that *wi* should be impossible in constructions where the internal argument does *not* require licensing: (i) passive and (ii) antipassive clauses. This prediction is incorrect for Kaqchikel. As shown below, both these voices are compatible with *wi*.[42]

(61) *Passive voice is compatible with wi in Kaqchikel*
Ankuchi x-Ø-k'ay-ix (wi) ri wäy?
where COM-B3S-sell-PASS FP DET tortilla
'Where were the tortillas sold?'

(62) *Antipassive voice is compatible with wi in Kaqchikel*

a. Akuchi' x-at-loq'-on wi?
where COM-B2S-buy-AP FP
'Where did you go buying (something)?' (Filiberto Patal Majzul p.c.)

b. R-ik'in jun xik x-Ø-i-tz'ib'-an wi.
A3S-RN a pen COM-B3S-A1S-write-AP FP
'With a pen I wrote.' (Adapted from Silberman 1995:33)

c. Ankuchi x-Ø-kam-sa-n (wi)?
where COM-B3S-die-CAUS-AP FP
'Where is the killing place?'

Since *wi* is available in both passive and antipassive clauses, the presence of *wi* cannot be tied to licensing of the internal argument. Thus, the fronting particle is not parallel to AF, given Coon et.al.'s analysis of the construction. In other words, *wi* is not a Last Resort Case licenser.

To summarize, this section has shown that the fronting particle is not tied to syntactic ergativity. Having rejected four competing analyses, we now turn to the broader theoretical implications of our proposal.

5 Theoretical implications

Here, we discuss the broader theoretical implications of our analysis. First, we comment on the consequences of our approach for Chain Reduction. Second, we engage with proposals that claim that C^0 is not a phase (den Dikken 2009; 2017),

[42] Kaqchikel has different types of antipassives. The examples here involve an antipassive where the internal argument is not expressed obliquely.

arguing that such conceptions of phasehood cannot account for the phenomenon discussed here.

5.1 Chain reduction

Our analysis has taken Chain Reduction to be applicable in two ways: a chain link is either (i) deleted or (ii) substituted by a particular morpheme.

Let us first step back and reconsider why an operation like Chain Reduction is needed at all. The function of Chain Reduction is to eliminate chain links that would otherwise lead to a problem in the linearization component (Nunes 2004). The logic is as follows: in a movement chain, every link is identical for the purposes of the linearization algorithm. If every chain link survived intact, the linearization algorithm would be unable to provide an output.

We can see immediately why a configuration involving *wh*-movement would lead to a problem. If both copies of the *wh*-element are identical for the purposes of linearization, then the algorithm would output a string where the *wh*-element both precedes and follows the terminals located between the two. In Nunes 2004's terms, the derivation is cancelled unless the paradox is resolved. This is where Chain Reduction kicks in and deletes one of the copies.

Note crucially that *deletion* is assumed to be the process through which Chain Reduction ensures that only a single copy survives, resulting in a convergent output. However, all that is needed for linearization to succeed is for the copies to be rendered non-identical *somehow*. It has been simply taken for granted that deletion is the operation that resolves the linearization issue through the complete removal of phonological material of all but one chain link. We argue that limiting Chain Reduction to deletion is a stipulation based on a limited empirical sample. There is no *a priori* reason why deletion should be the only operation that feeds linearization. Instead, it seems plausible that the language faculty provides different strategies for resolving the issue at hand. One of these is deletion, which is observed in languages like English. Another strategy involves changing a chain link into a different element, what we have called Chain Reduction via Substitution. This substitution serves the purpose of rendering the targeted chain link non-identical to other links, resulting in a linearizable output. In other words, substitution for a clitic like *wi* in K'ichean low-adjunct extraction renders each chain link distinct from each other: in a monoclausal structure, *wi* is non-identical to the topmost copy. In long-distance extraction from a CP, each verbal stem to which a *wi* cliticizes is distinct from the other as well (see Nunes (2004) on how the linearization process cannot access word-level domains).

It is not our intention to attempt to explain *why* the application of Chain Reduction via Deletion appears to be more frequent cross-linguistically. Matters of

frequency should not be encoded within UG. What we wish to highlight instead is the following: work within generative grammar takes for granted that the linearization component resolves linearization paradoxes via deletion, but limiting Chain Reduction to deletion is a stipulation. We have shown that Chain Reduction can apply via substitution as well. Our proposal thus sheds light on the particularities of an understudied phenomenon, while also enriching our understanding of the possibilities offered by UG in resolving the problem of converting unlinearized hierarchical structure to an externalizable output. We hope that our proposal can inform other phenomena where movement leaves behind items that appear to be "overt traces".

5.2 C^0 must be a phase; v^0 cannot be a phase

In a series of articles, Marcel den Dikken has argued that C^0 is not a phase head (den Dikken 2009; 2017). He assesses the evidence in the literature for intermediate Spec,CP movement and argues that whenever Spec,CP is implicated in a movement dependency, an alternative analysis exists where such a position is not targeted.[43] While we concur with den Dikken that the evidence for intermediate Spec,CP movement is occasionally problematic, proposing that C^0 is not a phase will fail to account for the K'ichean adjunct extraction phenomenon. This in itself casts doubt on the feasibility of a conception of phase heads that excludes C^0. The crucial examples which adjudicate between den Dikken's proposal (C^0 is not a phase) and the one advocated for in this article (C^0 is crucially a phase) involve long-distance movement, once again.

In section 4, we showed that the fronting particle is not an applicative head, a pronoun, a movement trigger, or an element akin to AF. In order to assess den Dikken's approach versus our own, let us take for granted, then, that we are correct regarding the analysis of the fronting particle as the output of Chain Reduction via Substitution. Consider the K'iche' data below once again, involving extraction from a full CP:

(63) *K'iche' long distance extraction from CP*

a. X-Ø-aw-il-o chi x-Ø-ki-qupi-j le ti'iij
COM-B3S-A2S-see-SS COMP COM-B3S-A3P-cut-ACT DET meat
r-uk' kuchiilo.
A3S-RN knife
'You saw that they cut the meat with a knife.'

[43] We will not review den Dikken's arguments here. We do note that his alternative proposals fare better in some cases than in others. For instance, and as he himself acknowledges in den Dikken (2017), his alternative analysis of Irish complementizers is not obviously superior to McCloskey (2002)'s classic approach.

b. Jas r-uuk' x-Ø-aw-il wi chi x-Ø-ki-qupi-j
WH A3S-RN COM-B3S-A2S-see FP COMP COM-B3S-A3P-cut-ACT
wi le ti'iij?
FP DET meat
'With what did you see that they cut the meat?'

c. *Jas r-uuk' x-Ø-aw-il-o chi x-Ø-ki-qupi-j
WH A3S-RN COM-B3S-A2S-see-SS COMP COM-B3S-A3P-cut-ACT
wi le ti'iij?
DET meat
Intended: 'With what did you see that they cut the meat?'

d. *Jas r-uuk' x-Ø-aw-il wi chi x-Ø-ki-qupi-j
WH A3S-RN COM-B3S-A2S-see FP COMP COM-B3S-A3P-cut-ACT
le ti'iij?
DET meat
Intended: 'With what did you see that they cut the meat?'

(Adapted from Can Pixabaj 2015: 166-167)

As discussed before, this type of example shows one fronting particle per clause. We argued that the embedded *wi* is the output of Chain Reduction via Substitution on the lowermost link of the movement chain, while the matrix fronting particle is the output of Chain Reduction via Substitution on the chain link in embedded Spec,CP.

Now, let us take a den Dikken-style approach to phasehood, assuming that C^0 is *not* a phase, and attempt to make sense of the appearance of both fronting particles. If C^0 is not a phase, then the *wi* in the matrix clause could not be the chain link in intermediate Spec,CP, since such a position would not be an obligatory landing site in the path of movement. Let us assume, then, that v^0 is the only phase head. We would propose as a result that the matrix fronting particle is the output of Chain Reduction via Substitution of the chain link in matrix Spec,*v*P. The embedded fronting particle would be the output of Chain Reduction via Substitution of the chain link in embedded Spec,*v*P. We have thus derived the pattern in long distance extraction from CP under an approach where C^0 is not a phase:[44]

(64) *Long-distance extraction from CP in K'iche'; only v^0 is a phase*

a. [$_{CP}$ *wh* [C [$_{AspP}$ [Asp [$_{vP}$ **wh** [*v* [$_{VP}$ [V [$_{CP}$ [C [$_{AspP}$ [Asp [$_{vP}$ **wh** [$_{vP}$ EA *v* [$_{ApplP}$ **wh** [Appl [$_{VP}$ V]]]]]]]]]]]]]]]]] →

[44] A complication under this analysis is what to do with the base copy of the adjunct, which would also be turned into a fronting particle. To streamline the discussion, let us assume that a morphophonological process deletes one *wi* if two were to arise on the same verbal stem.

b. [$_{CP}$ *wh* [C [$_{AspP}$ [$_{Asp}$ [$_{vP}$ **wi** [*v* [$_{VP}$ [V [$_{CP}$ [C [$_{AspP}$ [Asp [$_{vP}$ **wi** [$_{vP}$ EA *v* [$_{ApplP}$ **Ø** [Appl [$_{VP}$ V]]]]]]]]]]]]]]]]]

output of Chain Reduction

However, a den Dikken-style approach cannot explain the distribution of the fronting particle upon extraction from a reduced clause. Recall that these examples show a single fronting particle on the embedded verb:

(65) *K'iche' long distance extraction from AspP*

a. Jas r-uuk' k-Ø-aw-aaj k-Ø-a-choy wi le sii'?
WH A3S-RN INC-B3S-A3S-want INC-B3S-A3S-cut FP FP firewood
'With what do you want to cut the firewood?'

b. *Jas r-uuk' k-Ø-aw-aaj wi k-Ø-a-choy le sii'?
WH A3S-RN INC-B3S-A3S-want FP INC-B3S-A3S-cut FP firewood
Intended: 'With what do you want to cut the firewood?'

(Can Pixabaj 2015: 163)

Let us emphasize the difference between an example like (65) and one in which extraction occurs from a full CP. The difference involves a manipulation of the *C* domain, and nothing else. Under our approach, the appearance of a single fronting particle on the embedded clause follows straightforwardly from the absence of C^0: since there is no C^0, there is no phase, and no obligatory stopover. Movement thus proceeds in one fell swoop from base position to matrix Spec,CP. The single fronting particle in the embedded clause in (65) is the output of Chain Reduction via Substitution on the tail of the movement chain. For a den Dikken-style approach, though, these type of data pose a serious problem. If the fronting particle is the result of Chain Substitution of a chain link in *Spec,vP*, then we would expect two fronting particles in (65) as well. In other words, manipulating the C domain should not have any consequences for the distribution of the fronting particle, contrary to fact.

Note that we could not claim that examples like (65) display a single fronting particle because they involve a single *v*P layer, somehow shared between both clauses, instead of an independent *v*P layer in each clause. The reason is simple: in K'ichean, v^0 is the locus of ergative agreement (Aissen 2011; Coon et al. 2014; Coon 2016). If examples like the above involved a single *v*P layer, then we would predict that only one verb would display ergative agreement. However, this prediction is not borne out. Therefore, data like (65) are structurally identical in their *v*P layers to examples involving extraction from a full CP. The only difference between the example types is the manipulation of the embedded C domain. We

conclude then that the data here show that C^0 must be a phase, contra den Dikken (2009; 2017).[45]

Perhaps, then, our approach is compatible with the broadly assumed stance that both C^0 and v^0 are phases (see Citko 2014 for discussion).[46] For this to work, we would need to complicate our rules of Chain Reduction such that they are context sensitive. Let us illustrate explicitly, assuming as we have so far that the base position of the relevant adjuncts is Spec,*Appl*P, which is above VP. Consider a simple monotransitive where a single *wi* appears:

(66) *Monotransitive extraction; both C^0 and v^0 are phases*

a. [$_{CP}$ **wh** [$_{AspP}$ [Asp [$_{vP}$ **wh** [$_{vP}$ EA [*v* [$_{ApplP}$ **wh** [Appl [$_{VP}$ [V]]]]]]]]]]

b. [$_{CP}$ **wh** [$_{AspP}$ [Asp [$_{vP}$ **wi** [$_{vP}$ EA [*v* [$_{ApplP}$ **Ø** [Appl [$_{VP}$ [V]]]]]]]]]]

output of Chain Reduction

An approach taking C and *v* to be phases could assume that the copy in Spec,*v*P is substituted for *wi*.[47] For this to work, we would need to modify our Chain Reduction rules so that the substitution of XP[APPL] by *wi* occurs only in the context of v^0 (applying to copies in Spec,*v*P). In other words, we would need to encode XP[APPL] → *wi* / _ *v*. Let us not delve into the question of whether encoding such context sensitivity is possible or conceptually desirable. Instead, let us focus on the data involving extraction from a reduced clause, to show why this approach is problematic.

Recall again that in these examples, only one fronting particle appears in the embedded clause. The problem that arises is significant. If we assume that there is a stopover in Spec,*v*P of the matrix clause, we are forced to propose that the copy in *matrix* Spec,*v*P *does not* trigger Chain Reduction via Substitution, unlike the copy in the *embedded* Spec*v*P. If we did not encode some difference between matrix and embedded *v*Ps, we would expect two fronting particles here, contrary to fact:

(67) *Long-distance extraction from AspP in K'iche'; both C^0 and v^0 are phases*

a. [$_{CP}$ *wh* [C [$_{AspP}$ [AsP [$_{vP}$ **wh** [*v* [$_{VP}$ [V [$_{AspP}$ [Asp [$_{vP}$ **wh** [$_{vP}$ EA [$_{ApplP}$ **wh** [Appl [$_{VP}$ [V]]]]]]]]]]]]]]]] →

[45] Embedding of reduced clauses shows a subject connectivity effect wherein the subject in both clauses must be identical (Can Pixabaj 2015; Ajsivinac Sian 2007). We hypothesize that this connectivity results from a movement dependency (Hornstein 1999). We leave a more thorough investigation of the subject connectivity effect for future work, but restate that the subject connectivity effect could not arise due to a shared *v*P layer, given ergative agreement in both clauses.

[46] Let us assume here for ease of exposition that all flavours of v^0 are phases (see Legate 2003).

[47] Alternatively, one could assume that both the base copy and the Spec,*v*P copy are substituted for *wi*, but one *wi* is deleted in the morphophonology. See footnote 42.

b. [$_{CP}$ *wh* [C [$_{AspP}$ [Asp [$_{vP}$ **wi** [$_{v}$ [$_{VP}$ [V [$_{AspP}$ [Asp [$_{vP}$ **wi** [$_{vP}$ EA [$_{ApplP}$ **Ø** [Appl [$_{VP}$ V]]]]]]]]]]]]]]]] *__unattested__
output of Chain Reduction

Therefore, We would need to specify the context for Chain Reduction via Substitution such that copies in *embedded* Spec,*v*Ps trigger substitution by *wi*, but matrix Spec,*v*P copies (in contexts of extraction from AspP), do not. We know of no feasible way of formally encoding such a distinction without recourse to blunt stipulation. Therefore, we consider that an approach taking both C^0 and v^0 to be phases cannot straightforwardly account for the K'ichean adjunct extraction phenomenon.

The main problem for analyses that take only v^0, or both C^0 and v^0, as phase heads is that an explanation for the fronting particle generalization is lost:

(68) **Fronting particle generalization:** In long distance extraction of low adjuncts, the presence of *wi* in the matrix clause is contingent on the presence of an overt complementizer introducing the embedded clause.

Since the most elegant analysis of the phenomenon discussed here takes C^0 as the *only* phase head, we advocate for this position (see Keine 2017 for independent arguments from Hindi long-distance agreement in favor of the same conclusion).[48] Put differently, the most explanatory account takes extraction from a reduced clause to occur in one fell swoop. There is no intermediate landing site at all, since there are no phase boundaries: v^0 is not a phase, and there is no C^0 in the embedded clause.

There are additional data supporting our conclusion. If v^0 *were* a phase, the following empirical fact is unexpected: in extractions from a reduced clause, no manipulation of matrix or embedded *v*P affects the pattern we have described. Let us illustrate with Kaqchikel, since we presently have no parallel K'iche' data.

First, recall that extraction from AspP results in a single fronting particle in the embedded clause. In the example below, neither matrix nor embedded *v*P show ergative agreement. The matrix verb is a modal that takes AspP complements and only controls absolutive agreement, while the embedded verb is an intransitive:[49]

[48] Readers familiar with the Mayanist literature might wonder about syntactic ergativity in relation to the phasal status of a verbal head. Some authors tie the extraction restriction to the lower phase domain (e.g. Coon et al. 2014). There are proposals in the literature, however, that take syntactic ergativity in K'ichean to arise for reasons independent of the phasehood of v^0 (i.e. Erlewine 2016; but see Henderson & Coon 2017) or due to ergative DPs moving too early (Assmann et al. 2015). We leave for future work an assessment of different proposals for syntactic ergativity in K'ichean in light of our proposal here.

[49] We set aside how it is that modal verbs like matrix *-tikïr* do not control ergative agreement morphology. Our point is that manipulating little-*v* flavors here does not change the pattern.

(69) *Patzún Kaqchikel extraction from AspP*

a. Rija' x-Ø-tikïr x-Ø-muxan.
3S COM-B3S-be.able COM-B3S-swim
'He was able to swim.'

b. Ankuchi x-Ø-tikïr x-Ø-muxan (wi) rija'?
where COM-B3S-be.able COM-B3S-swim FP 3S
'Where was he able to swim?'

c. *Ankuchi x-Ø-tikïr wi x-Ø-muxan wi rija'?
where COM-B3S-be.able FP COM-B3S-swim FP 3S
Intended: 'Where was he able to swim?'

d. *Ankuchi x-Ø-tikïr wi x-Ø-muxan rija'?
where COM-B3S-A3S-be.able FP COM-B3S-swim 3S
Intended: 'Where was he able to swim?'

The pattern remains the same. Let us now manipulate the embedded *v*P such that it controls ergative agreement. As shown below, the pattern is identical, regardless of this manipulation:

(70) *Patzún Kaqchikel extraction from AspP*

a. Ankuchi x-e-tikïr x-Ø-ki-löq' (wi) kotz'i'j?
where COM-B3P-be.able COM-B3S-A3P-buy FP flowers
'Where were they able to buy flowers?'

b. *Ankuchi x-e-tikïr wi x-Ø-ki-löq' wi kotz'i'j?
where COM-B3P-be.able FP COM-B3S-A3P-buy FP flowers
Intended: 'Where were they able to buy flowers?'

c. *Ankuchi x-e-tikïr wi x-Ø-ki-löq' kotz'i'j?
where COM-B3P-be.able FP COM-B3S-A3P-buy flowers
Intended: 'Where were they able to buy flowers?'

Conceivably, manipulating the matrix *v*P might lead to a different pattern regarding the behavior of *wi*. However, this is not the case either. In the example below, both matrix and embedded *v*Ps control ergative agreement, but the pattern is identical.

(71) *Patzún Kaqchikel extraction from AspP*

a. Ri ma Lu' x-Ø-u-rayij x-Ø-u-tz'ët xta
DET CLF Pedro COM-B3S-A3S-desire COM-B3S-A3S-see CLF
Ixchel.
Ixchel
'Pedro had the desire to see Ixchel.'

b. Achoj k'in x-Ø-u-rayij x-Ø-u-tz'ët (wi) xta
WH RN COM-B3S-A3S-desire COM-B3S-A3S-see FP CLF
Ixchel.
Ixchel
'Who did he have the desire to see Ixchel with?'

c. *Achoj k'in x-Ø-u-rayij wi x-Ø-u-tz'ët wi xta
WH RN COM-B3S-A3S-desire FP COM-B3S-A3S-see FP CLF
Ixchel.
Ixchel
Intended: 'Who did he have the desire to see Ixchel with?'

d. *Achoj k'in x-Ø-u-rayij wi x-Ø-u-tz'ët xta Ixchel.
WH RN COM-B3S-A3S-desire FP COM-B3S-A3S-see CLF Ixchel
Intended: 'Who did he have the desire to see Ixchel with?'

In a nutshell, the manipulation of *v*Ps does not change the pattern when extracting from AspPs. Any analysis which took the appearance of *wi* to be tied to the phasehood of v^0 would need to explain why manipulation of the C domain changes the distribution of *wi*, but the featural make-up of v^0 is irrelevant. This complication leads us to conclude that our approach is superior.

To summarize this section, the K'ichean adjunct extraction phenomenon adds to the existing empirical evidence that v^0 is not a phase (Keine 2017). Note, crucially, that we are not claiming that v^0 is not a *possible* stopover in movement dependencies. Rather, since the theory of phases is about *obligatory* intermediate movement steps, we conclude that the phenomenon here argues against such obligatory stopovers in the verbal domain.[50]

6 Future research

In this section, we lay out areas for future research. First, we describe data that do not follow straightforwardly from our proposal, suggesting possible analyses. We then show the range of microvariation attested in the phenomenon, arguing that it can be captured via our proposal.

Even though *wi* is canonically tied to low-adjunct extraction, several authors have reported other functions (Henderson 2008 for Kaqchikel and Velleman 2014 and Can Pixabaj 2009 for K'iche').

[50] We are also not dismissing previous arguments for intermediate movement in Spec,*v*P (e.g. Legate 2003, Sauerland 2003, Henry 2012, as well as van Urk 2018). However, our proposal here suggests, at least, that a broader re-evaluation is needed. Note, nevertheless, that Legate and Sauerland's only show that Spec,*v*P is a *possible* stopover point, not an obligatory one.

Consider first the following examples:,[51]

(72) *Kaqchikel predicate focus*

a. X-Ø-in-löq' **wi** ri äk'.
COM-B3S-A1S-see FP DEM chicken
'I BOUGHT the chicken (I didn't steal it).'

b. X-i-samäj wi.
COM-B1S-work FP
'I WORKED (nothing else).' (Adapted from Henderson 2008:19)

(73) *K'iche' polarity focus*

Pero a're', xaq si na k-u-maj=ta=**wi** ki-wach.
but 3P just really NEG1 INC-A3S-begin=NEG2=FP A3S-face
'But they really just did not like it.' (Adapted from Velleman 2014: 42)

Here, *wi* is not tied to A'-extraction of a low adjunct.[52] One possibility would be that the entire predicate is substituted by *wi*. This analysis would require further refinements in the Chain Reduction procedure in order for VP copies to also undergo substitution.

Consider now examples reported by González (2016) for Sololá Kaqchikel and Can Pixabaj (2009) for K'iche', where the fronting particle does not appear after the verb. Rather, the fronting particle appears directly after a (presumably fronted) temporal adverb or nominal.[53]

(74) *Sololá Kaqchikel*

Pan aninäq=**w**=ri' x-Ø-Ø-b'än ru=samaj.
PAN fast=WA=DEM3:ADV COM-B3SG-A3SG-do A3SG=work
'It was fast that he did his work.' (González 2016: 81) [54]

(75) *K'iche'*

Achijaab' wi la' k-e-qaasa-n r-ech le che'.
workers FOC DEM INC-B3P-cut-AP A3S-RN DET tree
'It should be men who should cut down the tree.' (as opposed to children, women, boys who could not do that) (Can Pixabaj 2009)

[51] Velleman transcribes *wi* as polarity focus.

[52] Examples like these were rejected by all of our Patzún Kaqchikel consultants, but since they have been reported for some dialects, providing an analysis consistent with ours is desirable.

[53] We have also been unable to replicate these examples in Patzún Kaqchikel.

[54] We suspect the word *pan* in the example is a typo, but leave the example as reported.

Though these examples appear difficult to reconcile with our proposal as it stands, we can offer some analytical direction. The presence of the demonstratives *ri'* in the Sololá Kaqchikel example and *la'* in the K'iche' example suggests that these structures are clefts of some sort. If so, we hypothesize that in both cases, the fronting particle is not marking adjunct or nominal extraction. Rather, and in a similar fashion to the first examples discussed here, there exists some predicate focus associated with the cleft structure. The study of clefts in K'ichean requires more careful research, in order to test our hypothesis.

Finally, Henderson (2008) reports Kaqchikel examples where long-distance extraction from CP triggers only a single *wi* in the embedded clause (examples 32-36; Silberman 1995 shows similar examples for some speakers). Henderson, however, does not show that having multiple *wi* particles is *impossible*, so the full pattern is unclear. A possibility, nevertheless, is that the dialect discussed by Henderson should not be analyzed in the same manner as Patzún Kaqchikel. What this illustrates is that a unified analysis of all reported variation in the fronting particle might be too ambitious, but we hope to return to this issue in the future.

At this juncture, then, let us turn to microvariation more broadly. The fronting particle occurs in all K'ichean languages: Kaqchikel (including colonial Kaqchikel; Matsumoto 2015), K'iche', Tz'utujil (San Juan, San Pedro, and Santiago dialects: Dayley 1985; García Ixmatá 1997; Mendes & Ranero 2017), Sipakapense (Barrett 1999; 2008), Sakapulteko (DuBois 1981; Mó Isém 2007), Uspanteko (Can Pixabaj 2007), Q'eqchi' (Berinstein 1984; Caz Cho 2000), and Poqom (Malchic Nicolás et al. 2000).[55] There are two parameters governing the microvariation: (i) Whether the fronting particle is required, optional, or banned, and (ii) which adjuncts trigger the fronting particle.

Let us turn to (i) first. We are not the first to report the existence of optional uses of *wi* in Kaqchikel.[56] Silberman 1995: 41 shows optional uses of *wi* for a Tecpán Kaqchikel speaker and Patal Majzul et al. 2000: 144-145 report optional uses of *wi* (without specifying the dialect).

In contrast, *wi* has been reported as obligatory by Henderson 2008 and García Matzar & Rodríguez Guaján 1997. Henderson worked primarily with speakers from Santiago Sacatepéquez, complemented with data from San Juan Comalapa and Patzicía (Robert Henderson p.c.). García Matzar & Rodriguez Guaján are native speakers of the San Andrés Semetabaj and Tecpán dialects respectively. There

[55] There is a similar phenomenon in some dialects of Mam, which is not K'ichean (Pérez Vail 2014 for Cajolá Mam and England 1989 for Tacaná and Ostuncalco Mam). The fronting particle in Mam is not a cognate of *wi*.

[56] For reasons of space, we do not discuss microvariation in K'iche'. Par Sapón & Can Pixabaj (2000):167 report that *wi* is absent in some varieties, and optional in others (without specifying any details).

exist, then, Kaqchikel dialects where the particle is obligatory, in a similar vein to the K'iche' data discussed previously.

Moreover, our fieldwork and prior literature show that some Kaqchikel speakers do not use *wi* at all. Our consultants from Tecpán reject *wi*:

(76) *Tecpán Kaqchikel: no fronting particle*

a. Akuchi' x-Ø-tzopin (*wi) ri Lolmay?
where COM-B3S-jump FP DET Lolmaay
'Where did Lolmay jump?'

b. Choj k'in x-Ø-tzopin (*wi) ri Ixchel?
WH RN COM-B3S-jump FP DET Ixchel
'What did Ixchel jump with?'

c. R-ik'in ri k'an x-Ø-tzopin (*wi).
A3S-RN DET rope COM-B3S-jump FP
'Ixchel jumped [with the rope]F.'

As we noted before, Silberman worked with Tecpán consultants who employed the particle optionally. Conversely, Rodríguez Guaján is from Tecpán, yet reports the particle as being obligatory. We therefore observe that, even within the same dialect, descriptions vary regarding the use of *wi*.[57] The existence of dialects that do not employ *wi* had been noted elsewhere by Assmann et al. (2015).[58] Additionally, Patal Majzul et al. 2000:145 show that the Santo Domingo Xenacoj dialect does not employ the particle.

In a nutshell, there is significant variation regarding the obligatoriness of *wi* across Kaqchikel dialects. We propose that this aspect of the variation should not be modelled via parameters encoded via the presence/absence of features on functional heads (Hagit Borer's conjecture: Borer 1984). Rather, the microvariation we observe in this respect can be relegated to the PF component. Within the domain of low adjunct extraction, some grammars recur to Chain Reduction via Deletion across the board (no *wi*). Other speakers acquire a system wherein either deletion or substitution applies. This system can be acquired through positive evidence in the input showing that there is no intrinsic ordering between the two Chain Reduction operations; in other words, acquirers encounter *wi* in some tokens of a specific construction. Still, other speakers acquire a system where the two operations are ordered, with Chain Reduction via Substitution taking precedence. As a result, these speakers apply substitution to XP[APPL] without exception, resulting in the

[57] The difference could be a result of diachronic change, rather than there existing three different grammars within the Tecpán area today. However, our analysis can handle this type of variation, if it were indeed present within a single community.

[58] The authors, however, are not explicit regarding their informants' hometowns.

obligatory fronting particle. Our approach to modelling microvariation falls in line, then, with work that seeks to place variation within the PF component (Boeckx 2016). We find this result to be desirable on a conceptual level, since an aspect of the microvariation associated with an apparently syntactic phenomenon need not be attributed to variation within the syntax itself.

The other component of the microvariation involves *which* XPs trigger the fronting particle. For example, Henderson (2008) reports that benefactive extraction does not trigger *wi* in Kaqchikel, but it does for our Patzún informants:[59]

(77) *Patzún Kaqchikel: benefactives trigger wi*
Achoj ru-ma x-Ø-samäj (wi) ri Daniel?
WH A3S-RN COM-B3S-work FP DET Daniel
'Who did Daniel work for?'

Additionally, Patal Majzul et al. 2000: 150 show that instrumental extraction in the San Antonio Palopó and San José Poaquil dialects does not trigger *wi*. This contrasts with the reports in Henderson (2008), García Matzar & Rodríguez Guaján (1997), and our own.[60]

The question of how to model this aspect of the variation is simple under our analysis. The variation arises from speakers' categorization of XPs during the acquisition process. In other words, when acquirers categorize the space of adjunct XPs, only some are analyzed as introduced by high applicatives (thus bearing [APPL]). In the mature grammar, whichever XPs were analyzed as XP[APPL] serve as input to Chain Reduction via Substitution. We expect microvariation to arise here, since the mature grammar will be wholly dependent on the input. In other words, variable input regarding extraction of the relevant XPs will result in (i) unstable and (ii) minutely different grammars. Under our account, the analysis of *wi* as the output of Chain Reduction via Substitution remains constant across dialects, but differences arise due to the acquisition process. For example, imagine that a child is not exposed to any benefactive extraction data with *wi*. We would expect that she would then fail to identify the benefactive as a high applicative. In other words, benefactives would not trigger *wi* in her grammar, leading thus to a minutely different grammar from the input.

[59] Note that Pylkkänen (2002) assumes that benefactives can be high (Chaga) or low (English), depending on the language. We would expect such microvariation to exist in K'ichean as well, with the availability of *wi* tracking this difference, resulting in subtle semantic differences.

[60] The prose in Par Sapón & Can Pixabaj (2000): 191-194 suggests that such microvariation exists for K'iche' as well.

7 Conclusion

We have shown that deletion of a subset of copies in a movement chain is not the only strategy available to deliver a linearizable string. Through the lens of low-adjunct extraction in a subset of K'ichean (Mayan) languages, we proposed that copies can also undergo substitution by a particular morpheme (here *wi*). This substitution is equally successful in circumventing a linearization paradox.

The empirical domain explored here has also shed light on the nature of movement and phases. Following work by Can Pixabaj (2015), we showed that the behavior of fronting particles in the context of long-distance extraction depends on the presence or absence of a C domain within the complement clause from which movement is launched. We showed, furthermore, that an analysis that takes C^0 to be the only phase head can account for the distribution of the fronting particle most elegantly. This proposal was defended via our rejection of analyses claiming that C^0 is not a phase (den Dikken 2017). In arriving at this conclusion, we have contributed to recent arguments that only C^0 delimits a cyclical domain, whereas v^0 does not (Keine 2017).

We also showed that certain recalcitrant data could follow from our approach, pending future work. Most importantly, however, we showed that microvariation in the phenomenon can be straightforwardly modelled via our analysis. This is a significant result, given the range of reports regarding the distribution of the fronting particle across K'ichean languages and dialects.

Naturally, our work here is not done. Whereas this particular phenomenon points in one direction, there are arguments in the literature which rely crucially on the phasehood of v^0. The question that arises as we conclude is how to reconcile assumptions that explain independent empirical phenomena, but which are broadly incompatible. We leave this for future research, but hope that our particular approach will entice further work into these issues, most saliently through the lens of hitherto under-explored empirical domains.

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Competing interests

The authors declare that they have no competing interests.

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