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RESEARCH

Doubling and *do*-support in verbal fronting: Towards a typology of repair operations

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Most known languages seem to follow the intuitive and economical implication that if they show a repair such as verb doubling or *do*-support when just the verb is fronted, they also show that same repair when the verb is fronted together with its internal argument(s) (provided that the language has both types of fronting). In this paper, I present data from Asante Twi, where the verb is doubled in the former case but there is *do*-support in the latter instead. I argue that the attested patterns can be accounted for under the Copy Theory of Movement by introducing different orders of the operations Chain Reduction (CR) and head movement (HM) at PF (analogous to what Schoorlemmer 2012 proposed for Chain Reduction and Local Dislocation). CR either bleeds HM giving rise to consistent *do*-support (as in German) or counterbleeds it leading to consistent verb doubling (as in Hebrew). The Asante Twi pattern is a result of the interaction of the bleeding order with Ā-head movement, where the bleeding effect of the order is neutralised by the inability of Ā-head movement to form chains, which is rooted in the Chain Uniformity Condition (Chomsky 1995). The account provides a unified minimalist analysis of verb doubling and *do*-support in verbal fronting, which derives all attested patterns but correctly precludes the derivation of the unattested reverse Asante Twi pattern.

Keywords: Copy Theory; Asante Twi; predicate cleft; verb doubling; head movement; *do*-support; order of operations; syntactic doubling

1 Introduction

Verbal fronting, that is a verb or a verb phrase appearing at the beginning of a sentence instead of in their canonical position, is a widespread phenomenon cross-linguistically and often expresses verbal topicalisation or focus. In a number of languages this displacement triggers verb doubling, i.e. a copy of the fronted verb shows up in the base position (1). In other languages a semantically vacuous dummy verb is inserted (2). As illustrated in (1) and (2), if a language has verb and verb phrase fronting, both usually trigger the same process of either verb doubling (1) or dummy verb insertion (2). Thus it seems that the repair mechanism for the displaced verb is independent of the type of verbal fronting.

(1) *Spanish* (Vicente 2009: 167ff.)

a. **Venir** me parece que ya no **vienes**.
come.INF me.DAT seems that already not come.2SG
'As for coming, it seems to me that you aren't coming in the end.'

b. **Leer** el libro Juan lo ha **leído**.
read.INF the book Juan CL has read
'As for reading the book, Juan has indeed read it.'

(2) *Dutch* (Broekhuis & Corver 2016)

a. **Verraden doet** hij haar niet.
betray does he her not
'He doesn't betray her.'

b. Haar **verraden doet** hij niet.
her betray does he not
'He doesn't betray her.'

In this paper, I present new data from Asante Twi, a Kwa language (Niger–Congo) spoken in Ghana, that deviates from the symmetric pattern of all the other languages. It shows verb doubling when the verb is fronted on its own while verb phrase fronting triggers insertion of a dummy verb *yɔ* 'do' and thus contradicts the apparent independence of the repair mechanism. Consequently, the typology of repair mechanisms in verbal fronting has to be extended to include asymmetric patterns as well. Intriguingly though, the reverse pattern, namely cooccurrence of verb doubling with verb phrase fronting and *do*-support with bare verb fronting, remains hitherto unattested.

Section 2 provides an overview over the phenomenon based on a number of examples from various languages. It also presents the idea that the trigger for repair is the need for finiteness marking inside the TP, which may either be achieved by doubling the lexical verb or by inserting a dummy verb. In Section 3 the relevant data from Asante Twi are presented and discussed, which argue in favour of a dependency of the repair mechanism on the type of fronting. Further, a treatment of V fronting and VP fronting as two very different phenomena both within a single language as well as cross-linguistically is refuted. Rather, a unified analysis is vindicated by the various similarities of both constructions including *inter alia* the syntactic category of the displaced constituent, the locus of displacement, and the syntactic restrictions they are subject to. The section concludes by presenting data that corroborate an account of Asante Twi verbal fronting in terms of syntactic Ā-movement (see Landau 2006; Vicente 2007, 2009 for Hebrew and Spanish) rather than base generation (see Cable 2004 for Yiddish and Brazilian Portuguese). A minimalist analysis of the three different patterns of repairs in verbal fronting (symmetric verb doubling, symmetric *do*-support, and the asymmetric Asante Twi pattern) is proposed in Section 4 embedded in the Copy Theory of Movement (Chomsky 1993, 1995), where verb doubling is the result of multiple copy pronunciation (Abels 2001; Nunes 2004). It is claimed that Chain Reduction (the deletion/non-pronunciation of lower copies) and head(-to-head) movement, which is assumed to be a post-syntactic operation (see Chomsky 1995; Harley 2004; Zwart 2016, among others), apply in a strict, language-specific order. Which repair is used then depends on the interaction of two language-specific factors: (i) whether V fronting involves remnant VP movement or Ā-head movement of V (Koopman 1984), and (ii) whether Chain Reduction applies before or after head movement. In VP fronting, only (ii) plays a role: the VP moves to SpecCP in syntax leaving a copy in its base position. If Chain Reduction applies first, the lower copy is deleted bleeding subsequent head movement of V to *v*/T/C. In order to enable spell out of inflectional affixes in *v*/T a dummy verb is then inserted to serve as a base. If the order is the reverse, a counter-bleeding relation is established: V can move out of the lower copy of the VP before Chain Reduction applies and thus evade deletion. In V fronting, the type of movement is crucial: remnant VP movement behaves like full VP movement with regard to the order of post-syntactic operations, i.e. Chain Reduction applying before head movement leads to *do*-support while the reverse order results in verb doubling. Syntactic Ā-head movement, however, violates the Chain Uniformity Condition (Chomsky 1995) and thus cannot create a chain.

Therefore, even if Chain Reduction precedes head movement, an order that usually gives rise to *do*-support, it cannot delete the lower V copy left by Ā-head movement. Hence, subsequent head movement of V to *v*/T can take place, resulting in verb doubling. This derives the attested patterns as follows: symmetric verb doubling is the consequence of head movement preceding Chain Reduction, symmetric *do*-support is the result of Chain Reduction preceding head movement, the asymmetric Asante Twi pattern arises when Chain Reduction precedes head movement but Ā-head movement neutralizes the effect of this order by virtue of not creating a chain. Crucially, there is no neutralisation in the other direction, i.e. remnant VP movement neutralising the effect of head movement preceding Chain Reduction, correctly ruling out the derivation of the fourth logically possible pattern. Section 5 summarizes and concludes the paper.

2 A typology of verbal fronting

In a number of languages, verbal topicalisation or focus is expressed by displacing the lexical verb from its usual position inside the clause to a position in the left periphery of the clause (i.e. SpecCP) that is typically associated with either some kind of topic or focus interpretation. However, in many of these languages, this displacement does not leave a gap. Instead, an overt copy of the verb occupies the base position. While the fronted verb is usually non-finite, i.e. infinitive or nominalised, the copy in base position shows full inflection for the relevant categories of the language.

This kind of displacement, also often termed *predicate cleft* (though see Aboh 2006 for criticism of this notion), is very common in verbal focus of West African languages and Atlantic Creoles (e.g. Vata and Nweh, Koopman 1984, 1997; Yoruba, Manfredi 1993; Cho & Nishiyama 2000; Gungbe, Aboh 1998, 2006; Tuki, Biloa 1997, 2013; Buli, Hiraiwa 2005; Ewegbe, Ameka 1992; Ga, Kropp Dakubu 2005; Dàgáárè, Hiraiwa & Bodomo 2008; Mani, Childs 2011; Fongbe, Lefebvre & Brousseau 2002; Kisi, Childs 1995; Krachi, Kandybowicz & Torrence 2016; Berbice Dutch Creole, Kouwenberg 1994; Pichi, Yakpo 2009; Sranan Tongo, Parkvall 2000; Papiamentu, Kouwenberg & Murray 1994; among many others) but is also attested in other languages (e.g. Hebrew, Landau 2006; Yiddish, Travis 2003; Cable 2004; Russian, Abels 2001; Aboh & Dyakonova 2009; Polish, Bondaruk 2009, 2012; Brazilian Portuguese, Bastos-Gee 2009; Spanish, Vicente 2007, 2009; Hungarian, Ürögdi 2006; Vietnamese, Trinh 2011), where it is largely used to express verbal topics. A few illustrative examples from some of the aforementioned languages are given in (3) (glosses as found in the sources with minor typographical changes).

(3) *Verb doubling with verb fronting in various languages*

a. *Dàgáárè* (Hiraiwa & Bodomo 2008: 803)
Dááó lá ká ń dà **dà** bóɔ́.
buy.NML F C 1.SG PST buy goat
'It is buying that I did to a goat (as opposed to e.g. selling it).'

b. *Mani* (Childs 2011: 219)
Ù-bán kɔ́ ḿbòm wɔ̀ **báŋ** wɔ̀m-yɛ̀.
NCM-build PRO.FOC Mbom 3SG build boat-STAT
'It is building a boat that Mbom did (built a boad).'

c. *Tuki* (Biloa 2013: 75)
O-nyá ówú vítsu **tu-nyám** cwí.
INF-eat FOC we SM-eat fish
'We ATE the fish.'

d. *Krachi* (Kandybowicz & Torrence 2016: 227)
Kɛ-dɪkɛ yɪ ɔkyɪ wʊ **ɛ-dɪkɛ** i-gyo.
NMLZ-cook FOC woman the PST-cook PL-yam
'It was cooking that the woman did to yams (not, say, eating).'

e. *Pichi* (Yakpo 2009: 297)
Nà **go** à dè **go** ò.
FOC go 1SG.SUBJ IPFV go SP
'[Mind you] I'm going.'

f. *Sranan Tongo* (Parkvall 2000: 89)
Da **skrifi** mi de **skrifi**.
COP write 1SG PROG write
'I am actually writing.'

g. *Papiamentu* (Kouwenberg & Murray 1994: 36)
Ta **pòst** mi no a **pòst** e karta.
be mail 1SG not ASP mail the letter
'It's just that I hadn't mailed the letter.'

h. *Hebrew* (Landau 2006: 37)
Liknot, hi **kanta** et ha-praxim.
to.buy she bought ACC the-flowers
'As for buying, she bought the flowers.'

i. *Polish* (Bondaruk 2012: 55)
Wypić (to) Marek **wypije** herbatę, ale nie wypije kawy.
drink.INF TO Marek will.drink tea but not will.drink coffee
'As for drinking, Marek will drink tea, but he will not drink coffee.'

j. *Yiddish* (Cable 2004: 2)
Essen est Maks fish.
to.eat eats Max fish
'As for eating, Max eats fish.'

In a subset of these languages, it is also possible to front more than just the verb, namely also its internal argument (s), i.e. the whole VP. In all of these languages, as is the case in V fronting, a fully inflected copy of the verb occurs in base position. Examples are given in (4).

(4) *Verb doubling with VP fronting in various languages*

a. *Dàgáárè* (Hiraiwa & Bodomo 2008: 805)
[Bóɔ́ **dááó**] lá ká ń dà **dà**.
goat buy.NML F C 1.SG PST buy
'It is buying a goat that I did (as opposed to e.g. selling a hen).'

b. *Mani* (Childs 2011: 219)
[**Ù-bán** wɔ́m] kɔ́ ḿbòm wɔ́ **báŋ**-yɛ̀.
NCM-build boat PRO.FOC Mbom 3SG build-STAT
'It is building a boat Mbom did built a boat.'

c. *Krachi* (Kandybowicz & Torrence 2016: 228)
[Ke-i-gyo **dɪkɛ**] yɪ ɔkyɪ wʊ **ɛ-dɪkɛ**.
NMLZ-PL-yam cook FOC woman the PST-cook
'It was cooking yams that the woman did (not, say, eating rice).'

d. *Pichi* (Yakpo 2009: 298)
Nà [**krach** = àn] yù dè **skrach**.
FOC scratch = 3SG.OBJ 2SG IPFV scratch
'You are actually scratching it.'

e. *Hebrew* (Landau 2006: 37)
[**Liknot** et ha-praxim], hi **kanta**.
to.buy ACC the-flowers she bought
'As for buying the flowers, she bought (them).'

f. *Polish* (Bondaruk 2012: 55)
[**Wypić** herbatę] (to) Marek **wypije**, ale nie wypije kawy.
drink.INF tea TO Marek will.drink but not will.drink coffee
'As for drinking tea, Marek will drink it, but he will not drink coffee.'

g. *Yiddish* (Cable 2004: 2)
[**Essen** fish] **est** Maks.
to.eat fish eats Max
'As for eating fish, Max eats them.'

The fact that verb doubling occurs in both V fronting and VP fronting, if a language has both processes, seems hardly surprising, at least under the most intuitive and widespread explanation for verb doubling, namely that the verb has to fulfill two conflicting requirements: on the one hand it needs to move into a focus/topic position in the left periphery of the clause while on the other hand it has to express finiteness, e.g. host inflectional affixes TP-internally. This conflict is then resolved by doubling the verb such that one copy of it is moved to the designated focus/topic position while another copy of the same verb is placed within TP to encode finiteness (see e.g. Cho & Nishiyama 2000; Abels 2001; Travis 2003; Kobele 2006; Landau 2006; Bayer 2008; Fleischer 2008; Kandybowicz 2008; Aboh & Dyakonova 2009; Vicente 2009; Müller 2009b; Trinh 2011). As these conflicting requirements arise in V fronting and VP fronting alike, the most economical, and hence expected, strategy is for a language to employ the same repair in both configurations. This repair does not necessarily have to be verb doubling. It is also conceivable to insert a default verb that acts as a host for finiteness inflection.

Indeed, this strategy is found in languages such as Skou (Donohue 2004), Danish (Ørsnes 2011; Platzack 2012), Swedish (Platzack 2012), Norwegian (Siri M. Gjersøe p.c.), Hausa (Abdoulaye 1992), Dutch (Broekhuis & Corver 2016), and German (Diedrichsen 2008). Of these, Skou (5) and the mainland Scandinavian languages (I take Norwegian as a representative case (6)) arguably only show VP fronting (b. examples) rather than both VP and V fronting since they cannot front a (di)transitive verb without its internal argument(s) (c. examples). Instead, V fronting is only available for intransitive verbs and might thus actually be regarded as a fronted intransitive VP.[1] (Examples a. illustrate the neutral word order in a declarative sentence for each language.)

(5) *Skou* (Donohue 2004: 126f.)
a. Bàng moerító ke = k-ang.
yesterday fish(sp.) 3.SG.NF = 3.SG.NF-eat
'He ate some Yellowtail scad yesterday.'

b. [Moerító ke = k-**ang** = inga] bàng ke = baléng ke = **li**.
fish(sp.) 3SG.NF = 3.SG.NF-eat = the yesterday 3.SG.NF = man 3.SG.NF = do
'Eating Yellowtail scad, he did (it) yesterday.'

[1] Unfortunately, I could not find any examples directly showing the ungrammaticality of a fronted (di)transitive verb with stranded argument(s) for Danish and Swedish in the literature. Thus, fronted intransitives might after all constitute actual V fronting. However, as they also trigger *do*-support, this does not impair the argumentation here.

c. *Ke = k-**ang** = inga$_i$ bàng ke = baléng [moerító t$_i$].[2]
3.SG.NF = 3.SG.NF-eat = the yesterday 3.SG.NF = man fish(sp.)
'Eating he did to the Yellowtail scad.'

(6) *Norwegian* (Siri M. Gjersøe p.c.)

a. Han lese-r bøk-er hele dag-en.
he read-3.SG.PRES book.PL-PL.INDEF whole day-DEF
'He is reading books all day.'

b. [Å **lese** bøk-er] **gjør** han hele dag-en.
INF read book.PL-PL.INDEF do.3.SG.PRES he whole day-DEF
'Reading books he does all day.'

c. *Å **lese**$_i$ **gjør** han [t$_i$ bøk-er] hele dag-en.
INF read do.3.SG.PRES he book.PL-PL.INDEF whole day-DEF
'Reading he does to books all day.'

However in German (7) and Dutch (8) both V and VP fronting are possible and as expected the same repair, a kind of *do*-support, occurs in both.

(7) *German* (Diedrichsen 2008: 221)

a. **Waschen tut** er das Auto nie.
wash.INF do.3SG.PRES 3M.SG.NOM DEF.N.SG.ACC car.SG never
'He never washes the car.'

b. [Das Auto **waschen**] **tut** er nie.
DEF.N.SG.ACC car.SG wash.INF do.3SG.PRES 3M.SG.NOM never
'Something that he never does is wash the car.'

(8) *Dutch* (Broekhuis & Corver 2016)

a. **Verraden doet** hij haar niet.
betray does he her not
'He doesn't betray her.'

b. [Haar **verraden**] **doet** hij niet.
her betray does he not
'He doesn't betray her.'

The situation in Hausa is less clear. With some (di)transitive verbs argument stranding and thus proper V fronting is possible while with others it is not. Nonetheless, with both types of fronting insertion of a default verbal element takes place rather than doubling of the lexical verb.

Thus, at first sight, the line of reasoning about the economy of repair mechanisms above seems to be in agreement with the data and might be formulated as the implicational generalisation (9).

(9) *Verbal fronting generalisation (to be refuted)*
If a language shows some repair mechanism in V fronting it also shows that same repair mechanism in VP fronting (provided that it has VP fronting).

[2] In order to show that V fronting is indeed impossible, this example would actually have to contain a form of 'do' and remain ungrammatical. Unfortunately, such an example is not provided by Donohue (2004). However, in the discussion of verbal fronting with *do*-support he explicitly states that "these sentences are only grammatical if the full VP is in the topic position, and placing the verb, but not the object, in the preclausal position is ungrammatical" (Donohue 2004: 127).

3 A revised typology of verbal fronting

However, this generalisation is empirically false. Consider the following examples of V fronting and VP fronting in Asante Twi, a Kwa language (Niger–Congo) spoken in Ghana.

(10) a. **Sí**-(é) na Kofí **á-sí**/*á-yɔ́ dán.
build-NMLZ FOC Kofi PRF-build/PRF-do house
'Kofi has BUILT a house.'

b. [Dán **sí**-é] na Kofí *á-sí/**á-yɔ́**.
house build-NMLZ FOC Kofi PRF-build/PRF-do
'Kofi has BUILT A HOUSE.'

c. Kofí á-si dán.
Kofi PRF-build house
'Kofi has built a house.'

d. Dán na Kofí á-sí.
house FOC Kofi PRF-build
'It is a house that Kofi has built.'

Examples (10-a, b) are both syntactic configurations where a (nominalised) verbal constituent – the verb alone (10-a) and the verb with its internal argument (10-b) – appears in the left periphery of the clause expressing focus of that constituent. As in many other West African languages, there are two copies of the main verb in (10-a), one of them fronted and nominalised/non-finite, the other in its base position and finite. In (10-b), on the other hand, the finite copy of the main verb is replaced by a dummy verb *yɔ*[3] (translatable as 'do'), while the only copy of the main verb appears in the fronted nominalized object-verb complex.[4] The data in (10-c, d) provide examples of a standard transitive sentence exemplifying basic SVO word order and standard object focus, respectively.

In (10), a kind of *do*-support occurs in VP fronting, even though there is verb doubling in V fronting, thus proving (9) wrong. The reasoning that led to (9) thus must be flawed in one of two ways: either (i) it is not *a priori* the most economical way for a language to use one and the same repair mechanism for both V and VP fronting, or (ii) both V and VP fronting are very different phenomena within a language and across languages such that conclusions cannot be drawn between them and any expectations for what should occur

[3] Note that there is a phonologically and semantically similar element *(y)ɛ* 'do, make, be' which as Kandybowicz (2015) argues is inserted whenever AspP (a projection inbetween *v*P and VP in Asante Twi) has been fully evacuated. As this evacuation also takes place in VP fronting where the VP is moved away from below AspP, one expects *(y)ɛ* in these contexts. If *yɔ* were a variant of *(y)ɛ* the occurrence of the former in VP fronting would be explained. However, *yɔ* and *(y)ɛ* cannot be the same element underlyingly because the former also occurs when AspP still contains an aspectual affix (i-a). Furthermore, both elements can cooccur in VP fronting in the past tense (i-b).

(i) a. Dán sí-é na Kofí ré-yɔ́.
house build-NMLZ FOC Kofi PROG-do
'Kofi is BUILDING A HOUSE.'

b. Dán sí-é na Kofí yɔ́-ɔ yɛ́.
house build-NMLZ FOC Kofi do-PST **yɛ**
'Kofi BUILT A HOUSE.'

[4] Nominalisation is obligatory with focussed verb phrases while it is optional with focussed bare verbs. This difference, however, is not tied to the choice of *yɔ* vs. main verb in base position. *Yɔ* is ungrammatical with a fronted bare verb be it nominalised or not. Likewise, a fronted non-nominalised verb phrase is ungrammatical, irrespective of whether there is *yɔ* or a copy of the main verb in base position.

Also, I will have nothing to say about the different order of verb and object in a nominalised vs. verbal VP (OV vs. standard VO) as this issue is orthogonal to the questions pursued in this paper.

in a language based on seemingly similar patterns in other languages are unjustified. They are too heterogeneous to justify a unified treatment.

In this paper, I would like pursue (i) and make a case here against the adoption of the view that underlies (ii). First, V and VP fronting, if both exist in a language, have a lot in common: most obviously, they affect the same syntactic category, i.e. V or projections thereof, and displace it into the same position, i.e. the left periphery. Further, within one and the same language both have the same type of information-structural interpretation, namely some kind of topic or focus, i.e. it is never the case that for example V fronting leads to a focus interpretation while VP fronting results in a topic interpretation. Second, both V fronting and VP fronting on their own show commonalities across different languages, indicating that their derivations are similar. Apart from the fact that the category affected and the displacement site is the same across languages, their interpretive effect is always information-structural, where the choice between focus or topic is language-specific. Third, they are usually subject to the same syntactic restrictions, i.e. islands or clause-boundedness, and they often show the same morphological marking, i.e. nominalisation or infinitivisation. I thus think it is most justified to regard them as two sides of the same coin differing only in the size of the affected constituent. The fact that V(P) fronting goes together with verb doubling in one language and *do*-support in another is not an argument that the phenomena in each language are completely different either. Rather, since we find each, verb doubling and *do*-support with both a topic and focus interpretation, this indicates that what we actually have here is a syntactic process of verbal movement that somehow creates the need for a repair in every language. Based on language-specific factors that will be discussed in Section 4 this repair may take the form of either verb doubling or *do*-support independently of which interpretive purpose the displacement actually serves. An additional argument in favour of this view is that in many languages there is evidence that V and VP fronting involve Ā-movement. It should be mentioned though that there are exceptions: as Cable (2004) argues, at least Yiddish and Brazilian Portuguese lack this evidence and show so-called genus-species effects, where the lexical material in the front position is different from that in the base position with a semantic entailment relation holding between the two (11).

(11) Genus-species effects

a. *Yiddish* (Cable 2004: 9)
?**Forn keyn amerike** bin ikh **gefloygn keyn nyu-york**.
travel.INF to america be.1SG I flown to New York
'As for travelling to America, I have flown to New York.'

b. *Brazilian Portuguese* (Cable 2004: 11)
Comer peixe, eu normalmente **como samão**.
eat.INF fish I usually eat.1SG salmon
'As for eating fish, I usually eat salmon.'

Verbal fronting in these languages might thus better be analysed as base generation rather than movement. However, with the exception of movement-free genus-species languages, I think it is justified to regard V and VP fronting across languages as syntactically uniform albeit with different pragmatic effects and language-specific repair mechanisms.

In order for the data from Asante Twi to qualify as actual counter-evidence to the purported generalization (9) one needs to demonstrate that Asante Twi is not one of those above-mentioned exceptions that might better be analysed as base generation. It turns out to be quite difficult to construe and check the (un)grammaticality of Asante Twi examples that instantiate a genus species effect analogous to those in (11). First, unlike in

Brazilian Portuguese, in a VP fronting sentence it is not possible to have two distinct but taxonomically related objects in the fronted VP and the VP in base position, as illustrated in (12-a). And second, testing genus-species effects in V fronting is by no means trivial because many intransitive predicates that are semantically predestined to encode some entailment relation between each other, like verbs denoting different manners (flying, sailing, cycling, running) of a general action (moving), are expressed phrasally (i.e. flying = go by plane, cycling = go by bike, etc.). The best example that I could construct is given in (12-b) and turns out to be ungrammatical. (Note that in (12), in contrast to (11), the fronted material is more specific than that in base position because fronting in Asante Twi is associated with a focus interpretation, while it receives a topic interpretation in Yiddish and Brazilian Portuguese. Thus, as expected, the reverse order is equally ungrammatical (12-c, d)).

(12) a. *__Tuna__-di-e na Ama yɔ-ɔ/di-i __nam__.
tuna-eat-NMLZ FOC Ama do-PST/eat-PST fish
'It was eating tuna that Ama did/ate fish.'

b. *__Tia__-e na Kofi __kasa__-a.
shout-NMLZ FOC Kofi speak-PST
'It was shouting that Kofi spoke.'

c. *__Nam__-di-e na Ama yɔ-ɔ/di-i __tuna__.
fish-eat-NMLZ FOC Ama do-PST/eat-PST tuna
'It was eating fish that Ama did/ate tuna.'

d. *__Kasa__-e na Kofi __tia__-a.
speak-NMLZ FOC Kofi shout-PST
'It was speaking that Kofi shouted.'

Hence, one might cautiously conclude that genus-species effects are absent from Asante Twi which in turn supports the view that it might not pattern with the above-mentioned exceptional languages.

Furthermore, there are two pieces of evidence against the base generation approach and in favour of the view that V and VP fronting involve Ā-movement. First, the dependency can cross finite clause boundaries (13) and is sensitive to islands such as wh-islands (14), complex NP islands (15), subject islands (16), relative clause islands (17), and adjunct islands (18).[5]

(13) a. Sí-(é) na Ama ká-a [sé Kofí á-sí dán].
build-NMLZ FOC Ama say-PST COMP Kofi PRF-build house
'Ama said that Kofi has BUILT a house.'

b. Dán sí-é na Ama ká-a [sé Kofí á-yɔ́].
house build-NMLZ FOC Ama say.PST COMP Kofi PRF-do
'Ama said that Kofi has BUILT A HOUSE.'

[5] This contradicts Saah & Goodluck (1995), who show that Asante Twi does not exhibit island effects in question formation, relativisation, and topicalisation. However they only tested cases of Ā-movement from argument positions the island insensitivity of which is, as Korsah & Murphy (2017) argue, due to Asante Twi having obligatory overt resumption with animates and obligatory covert resumption with inanimates, where resumption can obviate island effects (Borer 1984). Consequently, verb doubling (and *do*-support) in Asante Twi cannot be treated on a par with resumption (i.e. as "verbal resumption") because one would expect it to be insensitive to islands, too, contrary to fact.

(14) Wh-island
a. *Sí-(é) na Ama bísá-a [sɛ dabɛ́n na Kofí sí-i dán].
build-NMLZ FOC Ama ask-PST COMP when FOC Kofi build-PST house
'Ama asked when Kofi BUILT a house.'
b. *?Dán sí-é na Ama bísá-a [sɛ dabɛ́n na Kofí yɔ́-ɔɛ́].
house build-NMLZ FOC Ama ask-PST COMP when FOC Kofi do-PST
'Ama asked when Kofi BUILT A HOUSE.'

(15) Complex NP island
a. *Sí-(é) na mé-ń-té-e [atétɛ́sɛ́m bíárá sɛ Kofí á-sí
build-NMLZ FOC 1SG-NEG-hear-PST rumour.PL any COMP Kofi PRF-build
dán].
house
'I didn't hear any rumours that Kofi has BUILT a house.'
b. *?Dán sí-é na mé-ń-té-e [atétɛ́sɛ́m bíárá sɛ́ Kofí
house build-NMLZ FOC 1SG-NEG-hear-PST rumour.PL any COMP Kofi
á-yɔ́]
PRF-do
'I didn't hear any rumours that Kofi has BUILT A HOUSE.'

(16) Subject island
a. *Sí-(é) na [sɛ́ Kofí á-sí dán nó] má-a Ama ání
build-NMLZ FOC COMP Kofi PRF-build house CD give-PST Ama eye
gyé-eɛ́.
collect-PST
'That Kofi has BUILT a house made Ama happy.'
b. *Dán sí-é na [sɛ́ Kofí á-yɔ́ nó] má-a Ama ání gye-eɛ́.
house build-NMLZ FOC COMP Kofi PRF-do CD give Ama eye collect
'That Kofi has BUILT A HOUSE made Ama happy.'

(17) Relative clause island
a. *Sí-(é) na Ama bísá-a ɛdá [áa Kofí sí-i dán].
build-NMLZ FOC Ama ask-PST day REL Kofi build-PST house
'Ama asked for the day that Kofi BUILT a house.'
b. *?Dán sí-é na Ama bísá-a ɛdá [áa Kofí yɔ́-ɔɛ́].
house build-NMLZ FOC Ama ask-PST day REL Kofi do-PST
'Ama asked for the day that Kofi BUILT A HOUSE.'

(18) Adjunct island
a. *Sí-(é) na Kofí nóm nsúó [ésánsɛ́ ɔ-á-sí dán].
build-NMLZ FOC Kofi drink water because 3.SG-PRF-build house
'Kofi drinks water because he has BUILT a house.'
b. *?Dán sí-é na Kofí nóm nsúó [ésánsɛ́ ɔ-á-yɔ́].
house build-NMLZ FOC Kofi drink water because 3.SG-PRF-do
'Kofi drinks water because he has BUILT A HOUSE.'

Second, there are a number of TAM constructions and some morphosyntactic processes in Asante Twi that lead to tonal changes on the verb (Boadi 2008; Paster 2010). Among these changes is a process of low tone raising on verbs with underlying L tones. It is triggered in certain syntactic environments, all of which typically involve Ā-movement, like *ex situ* wh-questions (19-b) and nominal focus fronting (20-b). It raises all L tones on the

verb and attached aspectual (but not tense) affixes. The following examples illustrate this for the *pɛ* 'like' (19-a) and *boá* 'help' (20-a) which contain at least one L tone (unmarked).

(19) Korsah & Murphy (2016: 228)
a. Ámꜜmá **pɛ** bayéré.
Ama like yam
'Ama likes yam.'
b. Déén na Ámꜜmá **pé**?
what FOC Ama like
'What does Ama like?'

(20) Marfo (2005: 9)
a. Kofí **boá**-a Afíá.
Kofi help-PST Afia
'Kofi helped Afia.'
b. Kofí na ɔ-**bóá**-a Afíá.
Kofi FOC 3SG-help-PST Afia
'It is Kofi who helped Afia.'

Korsah & Murphy (2016) argue that L tone raising is not a specific property of the *na*-construction (pace Marfo 2005; Marfo & Bodomo 2005), as one might suspect from (20) and (19), because it is also attested in relative clauses (21-b) and affects every verb in a long-distance dependency, where only one instance of *na* is present (22-b) (with (22-a) as baseline).

(21) Saah (2010: 92)
a. Kofí **waré**-e ɔbáá nó.
Kofi marry-PST woman DEF
'Kofi married the woman.'
b. [$_{DP}$ Ɔbáá$_i$ [$_{CP}$ áa ɔ$_i$-**wáré**-e Kofí nó]] fi Aburí.
woman REL 3SG-marry-PST Kofi CD be.from Aburi
'The woman who married Kofi is from Aburi.'

(22) Korsah & Murphy (2016: 232)
a. [$_{CP}$ Kofí **nim** [$_{CP}$ sé Ési á-**ka** [$_{CP}$ sé Ámꜜmá **pɛ** bayéré.]]]
Kofi know COMP Esi PRF-say COMP Ama like yam
'Kofi knows that Esi has said that Ama likes yam.'
b. [$_{CP}$ Déén na Kofí **nímˊ** [$_{CP}$ sɛ Esi á-**ká** [$_{CP}$ sɛ Ámꜜmá **pé**?]]]
what FOC Kofi know COMP Esi PRF-say COMP Ama like
'What does Kofi know that Esi has said that Ama likes.'

Since tonal changes as reflexes of movement are well-attested cross-linguistically (Lahne 2008; Georgi 2014) and they are associated with verbs (i.e. *v*) in Asante Twi thus corresponding to what is standardly assumed to be a phase head (Chomsky 2000, 2001), Korsah & Murphy (2016) analyse low tone raising on verbs in Asante Twi as a reflex of successive-cyclic Ā-movement through Spec*v*P. Crucially, this tonal change also occurs on the lower verb copy or *yɔ* in the predicate cleft constructions under discussion here (23).

(23) a. Pɛ na Ámꜜmá **pé** bayéré.
like FOC Ama like yam
'Ama LIKES yam.'

b. Bayéré pɛ-é na Ám!má **yɔ́**.
yam like-NMLZ FOC Ama do
'It is liking yam that Ama does.'

If Korsah and Murphy's analysis is on the right track, this means that these constructions involve an Ā-dependency, too. In conclusion, this means that V and VP fronting in Asante Twi is comparable with V and VP fronting in other languages such as Hebrew, Polish, German, etc. and provides proper evidence against the generalization (9).

Under the assumption that V and VP fronting are comparable and differ only with regard to the size of the displaced constituent, the Asante Twi data thus raise two questions, one typological and the other theoretical: (i) if *do*-support and verb doubling are two legitimate strategies to deal with displaced predicates in one and the same language as evidenced by Asante Twi, are there languages that instantiate its mirror image, namely exhibiting *do*-support with V fronting and verb doubling with VP fronting, and (ii) what is it that makes VP fronting in Asante Twi different from V fronting, and from VP fronting in other verb doubling languages like Hebrew?

After consulting the literature on verb doubling and predicate clefts it seems that the first question can be answered negatively. To my knowledge, there are no languages that show verb doubling in VP fronting contexts but *do*-support with V fronting.

The attested patterns for languages that have both types of fronting are shown in Table 1 with a language given that instantiates the respective pattern. These three languages, Hebrew, German, and Asante Twi will be discussed as representatives of the patterns in Section 4, where an analysis of verbal fronting is presented.

In the following section, I will provide an answer to the second question. I will present an analysis that identifies two factors as decisive when it comes to determining which repair will be used: (i) the type of movement in V fronting, i.e. Ā-head movement to a specifier[6] or remnant VP movement, and (ii) the order of the two operations Chain Reduction and head-to-head movement at the level of post-syntax. In Asante Twi, the combination of Ā-head movement with an order of operations where Chain Reduction precedes head(-to-head) movement gives rise to the asymmetry in repair mechanisms between V and VP fronting. Crucially, the fourth, unattested pattern will not be derivable under this analysis.

4 An analysis

In this section, I will develop an analysis of the distribution of verb doubling and *do*-support in verbal fronting structures based on the aforementioned intuition that the verb has to fulfill two conflicting requirements: it has to move to SpecCP for information-structural

Table 1: Attested patterns of repair mechanisms in verbal fronting.

		V fronting	
		V doubling	***do*-support**
VP fronting	*do*-support	Asante Twi	German
	V doubling	Hebrew	—

[6] As argued by Vicente (2007, 2009) this type of head-to-specifier movement is indispensable in order to account for Spanish predicate clefts, is not in conflict with current minimalist conceptions of movement, and should therefore be regarded as legitimate. (See also Matushansky 2006 for an account uniformly treating all head movement as movement to a specifier position). The issue will be discussed in more detail in Section 4.3.

reasons while it also has to stay inside the TP to signal finiteness, i.e. act as a host for inflectional material. This conflict can be resolved by verb doubling or by *do*-support. Let us first consider the former.

Under the Copy Theory of Movement, where movement is decomposed into the sub-operations Copy and Merge and leaves a copy of the moved element in its base position (Chomsky 1993, 1995), verb doubling can be easily accounted for as being a consequence of spell-out of more than one copy of a moved element (Abels 2001; Nunes 2004). However, in the standard cases, only one link/copy in a movement chain is pronounced, namely the head of that chain, while the others are left unpronounced. Several attempts have been made to account for this (Brody 1995; Bobaljik 1995; Groat & O'Neill 1996; Pesetsky 1997, 1998), the most recent one being Nunes (2004). He proposes an operation of Chain Reduction that applies at PF and (in the standard case) deletes a lower element under phonological identity with a higher one that c-commands it. I will adopt his approach in the following insofar as I assume an operation Chain Reduction that applies to movement chains post-syntactically and deletes lower copies. However, I assume that movement is necessary in order for a chain to be created but not sufficient. Rather, the two positions related by movement also have to have the same phrase structural status. A chain is therefore an object of the theory (very much like it was originally envisaged by Chomsky) and not merely a structural relation of (asymmetric) c-command between phonologically identical elements. Under this view, a chain consists of syntactic elements in positions that are related by syntactic movement (chain links). Chain Reduction then inspects a chain, determines the lower chain links, and deletes the elements that occupy the lower positions (copies) if they are identical to or constitute a proper subset of the copy in the highest chain link.[7]

What is then the reason that the verb is spelled out two times in the examples of verbal fronting above? The answer is that the verb actually moves twice in those constructions thereby creating two distinct movement relations whose respective heads are spelled out while their tail is deleted/empty (Aboh 2006; Collins & Essizewa 2007; Chomsky 2008; Kandybowicz 2008; Aboh & Dyakonova 2009). Although similar to the notion of *parallel chains* suggested in Chomsky (2008) and developed in Aboh (2006); Aboh & Dyakonova (2009) the current proposal differs in that the two movements do not take place simultaneously but rather sequentially. In VP fronting, one of these movements is Ā-movement of the VP into SpecCP, where the verb moves as part of the VP, whereas the other is head movement of the verb to *v* and/or T. In V fronting, there are two different kinds of movement into SpecCP: (i) the verb either moves as part of a remnant VP that has been evacuated by the internal argument(s) (see den Besten & Webelhuth 1990; Grewendorf & Sabel 1994; Koopman 1997; Müller 1998, 2014; Takano 2000; Abels 2001; Hinterhölzl 2002; Aboh & Dyakonova 2009; Bondaruk 2012) or (ii) the verb undergoes Ā-head movement as has first been suggested by Koopman (1984) (see also van Riemsdijk 1989; Larson & Lefebvre 1991; Holmberg 1999; Fanselow 2002; Landau 2006; Vicente 2007, 2009; Harbour 2008; Bastos-Gee 2009). Vicente (2007, 2009) shows that this latter kind of Ā-head movement is not in conflict with current ideas about how movement works, but is rather a logical extension of them. Since it shows all the characteristics of phrasal

[7] Actually, for Nunes' (2004) proposal to work in a feature valuation approach, identity of copies must be restricted to identity of their phonological features ignoring their morphosyntactic ones. Otherwise, one would have to treat lower copies with unvalued morphosyntactic features, such as e.g. Case, as distinct from higher copies with the respective valued versions of these features. The way Nunes' system is set up, morphosyntactically, lower copies necessarily are (proper) subsets of higher copies. This property is used in a Late Insertion approach to resolution of movement chains by Muñoz Pérez (2015) in order to overcome several flaws of Nunes' original proposal.

Ā-movement, I assume that Ā-head movement works just like phrasal Ā-movement in that it is triggered by the same features and has to obey the standard constraints on movement (Minimal Link Condition, Phase Impenetrability Condition). Languages may differ in whether they employ remnant VP movement or Ā-head movement to achieve V fronting on the surface. In fact, this difference will turn out to be crucial in determining which of the two repairs a language shows: verb doubling is a consequence of Ā-head movement and *do*-support is a result of remnant VP movement. As is the case with VP fronting, the second movement is plain head movement of V to *v* and/or T. In the following, I will discuss VP fronting and V fronting in turn.

4.1 VP fronting

Examples of VP fronting are given again in (24), one from each of the languages that represent the three attested repair patterns in verbal fronting.

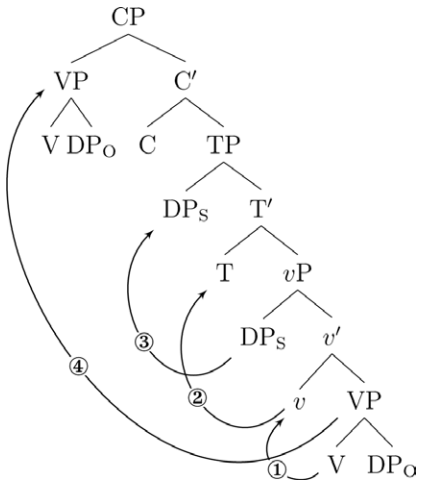
(24) a. *Hebrew* (Landau 2006: 37)
Liknot et ha-praxim, hi **kanta**.
to.buy ACC the-flowers she bought
'As for buying the flowers, she bought (them).'

b. *German* (Diedrichsen 2008: 221)
Das Auto **waschen** **tut** er nie.
DEF.N.SG.ACC car.SG wash.INF do.3SG.PRES 3M.SG.NOM never
'Something that he never does is wash the car.'

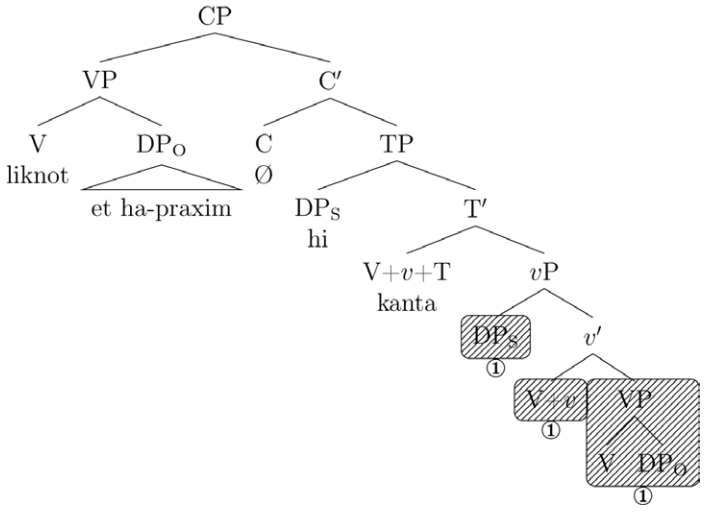
c. *Asante Twi*
Dán **sí**-é na Kofí **á-yɔ́**.
house build-NMLZ FOC Kofi PRF-do
'Kofi has BUILT A HOUSE.'

Consider cases involving verb doubling (24-a) first. As mentioned before, under the Copy Theory of Movement doubling can be regarded as multiple spell-out of copies resulting from different movements. That is, the verb is (included in) the head of two distinct movement dependencies. In VP fronting, these movements are phrasal Ā-movement of VP (including the V head) to SpecCP and head movement of V to *v* and T. The derivation of the Hebrew example (24-a) could be represented as in (25) (which will be revised in (30) below).

(25) Hebrew VP fronting (to be revised)
a. Syntax



b. Post-syntax



First in (25-a), after Merge of *v*, V-to-*v* movement takes place (step ①). When T is merged, the complex V + *v* head moves on to T (step ②) and the subject moves to its specifier (step ③). When the C head enters the structure, the whole VP, including a copy of V, moves into its specifier (step ④).[8] Finally, after syntax (25-b), all copies but those that are heads of a movement chain get deleted by Chain Reduction (step ① indicated by a box around the deleted material). Since both the V copy inside the fronted VP and the one in the complex V + *v* + T head are (part of) the head of a chain, they remain unaffected by Chain Reduction and are both spelled out resulting in verb doubling on the surface.[9]

Let us now turn to the German and Asante Twi examples (25-b, c), where the dummy verbs *tun* 'do' and *yɔ* 'do' are inserted to act as a host for inflectional affixes. Why do they not show verb doubling? At first glance one might think that these languages simply lack V-to-T movement. The verb thus has no possibility to move out of VP and is consequently deleted by Chain Reduction because it is part of the lower copy of VP. In order to be able to spell out the inflectional affixes, a dummy verb is inserted as a Last Resort (cf. the Stray Affix Filter, Lasnik 1981). However, this analysis cannot be upheld, neither for German, nor for Asante Twi. Even though there is no direct empirical evidence for V-to-T movement in German (or, in fact, for the existence of T at all, see Haider 2010), the status of V-to-C movement in verb second sentences is uncontroversial. As example (24-b) is a verb second sentence, V-to-C movement could in principle have taken place, that is, the verb could have moved out of the VP before it was deleted. However, this is obviously not the case, which means that for some reason this movement was blocked during the derivation.

Concerning Asante Twi, Kandybowicz (2015) argues that V moves to T unless an overt/contentful head (e.g. Aspect) intervenes and that the V + T complex is realized by

[8] There is a simplification here: Landau (2006) convincingly argues that the constituent that is fronted in Hebrew VP fronting is *v*P rather than VP. This does not affect the argumentation since there also is V-to-T movement (Landau 2006), which allows V to evacuate the *v*P and thus evade deletion. I treat the constituent as a VP here for reasons of simplicity, exposition, and comparability.

[9] An attentive reader might have noticed that the structure in (25-a) is strikingly similar to a remnant VP movement configuration where it is the object DP that vacates the VP which is subsequently fronted to SpecCP with only the verb being pronounced. This immediately raises the question why the verb is spelled out in (25) while the object DP is deleted in remnant VP movement, both, V and DP respectively, being (a part of) the head of a movement chain in the relevant derivations. The solution to this problem lies in the different properties of phrasal movement, which takes place in narrow syntax, and head movement, which, as will be discussed in the following, takes place in the post-syntactic component of grammar. I will come back to the problem in the last paragraph of this section.

segment-final lengthening on the verb. Thus, V-to-T movement is in effect restricted to past tense sentences without overt aspectual marking. Therefore, we would at least expect verb doubling when there is past tense without aspectual marking because we know that in this context V moves out of VP. However, when applying VP fronting to those sentences, *do*-support occurs (26).

(26) *Asante Twi*

Dán	**sí**-é	na	Kofí	**yɔ́**-ɔɛ́.
house	build-NMLZ	FOC	Kofi	do-PST

'Kofi did build a house.'

Here again, the verb could have escaped the VP before deletion but the movement seems to have been blocked for some reason.

Languages that show *do*-support rather than verb doubling with VP fronting therefore do not simply lack VP-evacuating head movement that leads to verb doubling in Hebrew. Rather, this head movement, which is in principle available, cannot apply in derivations of VP fronting structures. However, blocking head movement in this context requires look-ahead because the VP only moves after T and C are merged, i.e. after V has moved to T or C. Avoiding this look-ahead is possible only if head movement takes place after phrasal movement. This in turn would violate the Strict Cycle Condition because head movement would then exclusively apply to nodes that are dominated by the current phrase marker, i.e. CP. A solution to this problem, that I will pursue here, is to treat head movement (or at least verb movement) as a post-syntactic operation that applies at the PF-branch as has first been suggested by Chomsky (1995) (cf. Brody 2000; Merchant 2001; Hale & Keyser 2002; Bury 2003; Harley 2004; Schoorlemmer & Temmerman 2012; Platzack 2013, and for verb movement in particular Zwart 2016) and that does not leave behind any copies or traces (Boeckx & Stjepanović 2001; Sauerland & Elbourne 2002).[10] It is worth pointing out that "post-syntactic" in this context is not understood as "phonological". Rather, I regard the post-syntactic component as a quite intricate system of operations that have more or less access to the hierarchical structure provided by narrow syntax, as argued for by Arregi & Nevins (2012).[11] As I will show, this move allows for a simple and elegant analysis of the verb doubling and *do*-support patterns in verbal fronting structures. Hence, the present analysis might in a sense also serve as an argument for regarding head movement as a post-syntactic operation. What is missing is some principle or operation that blocks post-syntactic V-to-T/C movement if VP fronting has taken place in the syntax. This operation is Chain Reduction. If the lower VP copy is deleted before head movement takes place, there is no verb to be moved anymore. Hence, a dummy verb is inserted as a Last Resort to spell out the inflectional material in T and/or C.

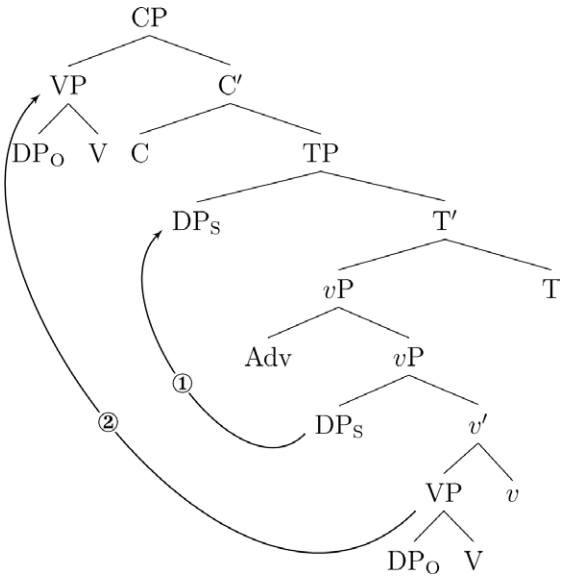
[10] See Lechner (2001, 2004, 2007) and Roberts (2010) for arguments against head movement at the PF-branch.

[11] Kandybowicz's generalization that "verbs raise to T^0 unless blocked by an overt/contentful head" (Kandybowicz 2015: 249) provides a nice argument for post-syntactic head (or at least verb) movement. In a late insertion approach to morphology phonological information becomes available only after syntax. Hence, in narrow syntax it is not possible to tell whether the aspect head is overt/contentful, i.e. phonologically realized, or not. This implies that V-to-T movement, being sensitive to this information as stated above, must take place after it becomes available, that is, after syntax proper. This means that in Asante Twi, it seems reasonable to assume that head movement, which includes V-to-T movement, applies post-syntactically. Note that it is not possible to alternatively tie the phonological presence/absence of an aspect head to its presence/absence in syntax because Asante Twi has null-marking of the habitual aspect. If the absence of phonological aspect marking were due to the absence of an aspect head in syntax the null-marked habitual aspect would remain unaccounted for.

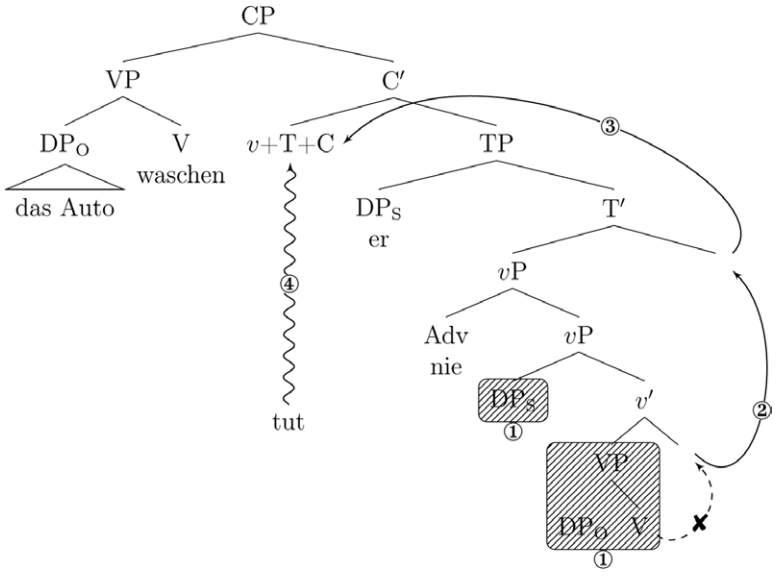
The derivation of VP fronting of the German example (24-b) in this system is given in (27).

(27) German VP fronting

a. Syntax



b. Post-syntax



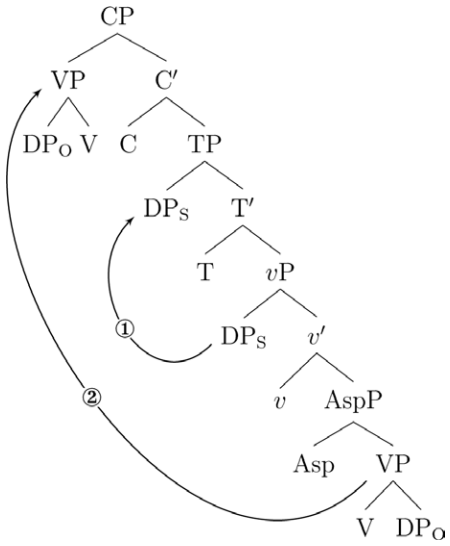
First, the subject and the VP move to SpecTP and SpecCP respectively (27-a). In the post-synactic component (27-b), Chain Reduction precedes head movement and deletes the lower copies of DP_S and VP (step ①) bleeding V to *v* movement (step ✕). Movement of *v* to T and C (steps ② and ③) takes place unproblematically. However, the inflection hosted in *v* and T needs a host which leads to the insertion of the dummy verb *tun* 'do' (step ④).

The derivation of VP fronting in Asante Twi (24-c) proceeds similarly to the German one as illustrated in (28), which is based on the clause structure suggested by Kandybowicz

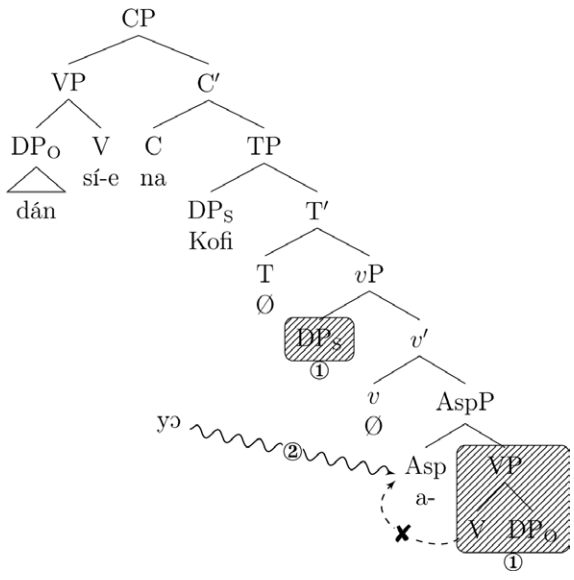
(2015). In syntax (28-a), subject and VP move to SpecTP and SpecCP respectively. Chain Reduction applies first post-syntactically (28-b) and deletes the lower copies of DP_S and VP (step ①). Subsequent head movement of V is bled and insertion of the dummy verb *yɔ* 'do' takes place as a Last Resort to enable spell out of the aspectual affix (step ②).

(28) Asante Twi VP fronting

a. Syntax



b. Post-syntax



Crucially, this analysis implies that there is a strict order between the two post-syntactic operations Chain Reduction and head movement. The proposal that there is a language-specific order of operations has already been made for various other syntactic and post-syntactic operations (Müller 2009a; Arregi & Nevins 2012; Schoorlemmer 2012; Georgi 2014; Murphy & Puškar to appear; Puškar 2015; Assmann et al. 2015). In particular, Schoorlemmer (2012) shows that different definiteness marking strategies (i.e. double

definiteness) in Germanic languages can be derived from language-specific orders of application between the two processes Chain Reduction and Local Dislocation in the post-syntax. I thus claim that there also is such a strict language-specific order of operations between Chain Reduction and head movement such that Hebrew and other languages that show verb doubling with VP fronting have the order HM ≫ CR while German, Asante Twi, and other languages that show *do*-support with VP fronting have the reverse order CR ≫ HM as summarized in Table 2.[12]

In light of the division between syntactic phrasal movement and post-syntactic head movement, let us reconsider Hebrew VP fronting.[13] In this system, the VP fronting example (24-a), repeated in (29), has the derivation in (30).

(29) *Hebrew* (Landau 2006: 37)
Liknot et ha-praxim, hi **kanta**.
to.buy ACC the-flowers she bought
'As for buying the flowers, she bought (them).'

Table 2: Repair mechanism in VP fronting depending on order of post-syntactic operations.

Order	Repair	Language
CR ≫ HM	*do*-support	German, Asante Twi
HM ≫ CR	verb doubling	Hebrew

[12] A potential problem for this claim is so-called multiple fronting in German (i) (from Bildhauer & Cook 2010) where two DPs appear in the prefield (i.e. before the verb in a V2 sentence) that can usually only contain one constituent.

(i) [$_{DP}$ Dem Saft] [$_{DP}$ eine kräftigere Farbe] geben
DEF.M.SG.DAT juice INDEF.F.SG.ACC strong.COMP.F.SG.ACC colour give.3PL.PRES
Blutorangen.
blood.orange.PL
'Blood oranges give the juice a stronger colour.'

One possible analysis of data like these is that a VP containing the trace of the verbal head has been moved to SpecCP (Müller 1998). Under the present assumptions, however, such headless VP fronting is underivable because post-syntactic head movement comes too late to create a headless VP that could be fronted in syntax. Instead, one would expect full VP fronting and *do*-support as in (24-b), which is also a possible option (ii).

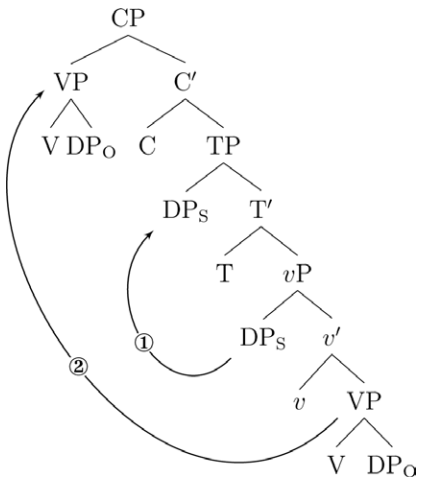
(ii) [$_{VP}$ Dem Saft eine kräftigere Farbe geben] tun
DEF.M.SG.DAT juice INDEF.F.SG.ACC strong.COMP.F.SG.ACC colour give.INF do.3PL.PRES
Blutorangen.
blood.orange.PL
'Blood oranges give the juice a stronger colour.'

However, recent accounts of multiple fronting treat it either as involving movement of more than one constituent into SpecCP (Lötscher 1985; Speyer 2008) or as fronting of a VP that contains a silent verbal head rather than an actual trace of the overt verb (Fanselow 1993, St. Müller 2005, 2015). Both of these analyses are compatible with the assumptions in this paper and under both analyses the absence of any kind of *do*-support or verb doubling is the expected outcome.

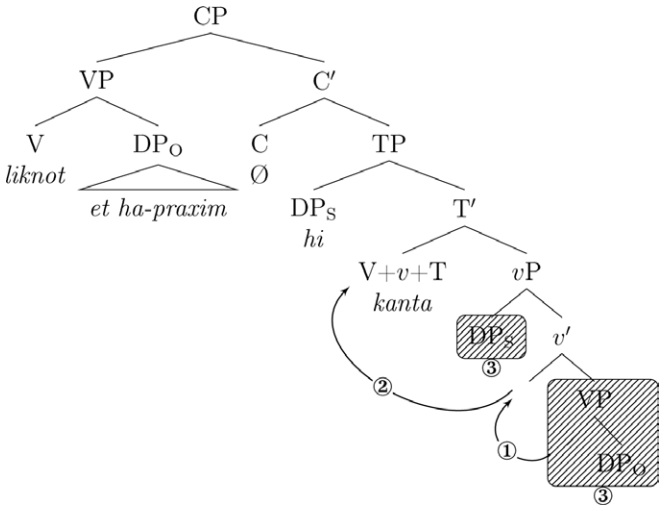
[13] An anonymous reviewer suggests to encode the variation between Hebrew vs. German and Asante Twi as a parameterized choice between syntactic head movement vs. post-syntactic head movement (always applying after CR). There are two issues with this: (i) if head movement were syntactic in Hebrew, one would have to make Chain Reduction treat copies of heads and phrases differently to derive the fact that in remnant VP movement, the copy of the object in the fronted VP is not spelled out, whereas in the analogous predicate cleft structures, the verb copy in the fronted VP is spelled out (also see footnote 9). This difference follows nicely in the present approach. (ii) It is in my view conceptually more attractive to encode cross-linguistic variation in the different interactions between grammatical operations rather than in the operations (like head movement) themselves.

(30) Hebrew VP fronting (final)

a. Syntax



b. Post-syntax



In the syntax (30-a), when T is merged the subject moves to SpecTP (step ①). Then, after C is merged, the VP moves to SpecCP (step ②). In the post-syntactic component (30-b), head movement applies before Chain Reduction and V moves out of the lower VP copy to *v* (step ①). This movement does not leave anything behind, neither a copy nor a trace. Next, The V + *v* complex moves to T again without leaving anything (step ②). Now, after all head movement steps have taken place, Chain Reduction can apply. It deletes the lower copy of the subject in Spec*v*P and also the headless lower copy of the VP, which is not identical to the higher copy anymore but still a proper subset of it, as demanded by the definition of Chain Reduction used in this paper (see also footnote 7 on copies as subsets). Thus, the verb has evaded deletion by virtue of moving out of the lower VP copy before Chain Reduction applied to it. On the surface we therefore find two copies of the verb in Hebrew, one inside the fronted VP and another one in the complex V + *v* + T head.

It is now also possible to address the issue raised in footnote 9: why is the verb spelled out in the fronted VP in sentences such as (29) whereas the DP inside the fronted VP of a remnant VP movement configuration like (7-a) or (8-a) is not, even though both, V and DP respectively, seem to have moved out of their containing VP in the relevant constructions? In cases such as (29), the VP-evacuating movement is post-syntactic head

movement of the verb. This movement does not leave a copy inside the lower VP that might trigger the need for some kind of deletion mechanism (like Chain Reduction) nor does it create a chain. Therefore, there is only one chain in (30), the VP-chain, whose lower link undergoes Chain Reduction while the higher link remains unaffected. Thus, the verb inside the higher link survives (as does the verb that has left the lower VP copy). In remnant VP movement configurations, on the other hand, the VP-evacuating movement is phrasal movement of DP in the syntax. This movement does leave a copy inside the lower VP and creates a (DP-)chain, therefore the lower chain link, i.e. the DP inside the lower VP, is deleted by Chain Reduction. Because the DP copy inside the fronted VP is itself a copy of the lower chain link of the DP-chain and is in the same environment as this lower chain link, i.e. both copies are the sister of a V, it will also be deleted.[14]

4.2 Excursus: Arbitrary or triggered choice of order?

One might wonder whether the choice between the two orders is arbitrary for each language or whether there are properties elsewhere in a language's grammar that determine it. An argument in favour of the latter approach comes from an observation concerning German and Yiddish both being V2 languages but differing in being OV vs. VO. As German is an OV language, fronting a VP gives rise to a configuration in which two very similar verbs occur adjacent to each other, one on the right edge of the fronted VP, the other in V2 position in C. In order to avoid this "OCP-effect", the order of post-syntactic operations in German is set to CR ≫ HM, which leads to the verb in V2 position being a dummy rather than a full lexical verb. In the VO language Yiddish, on the other hand, the object in the fronted VP intervenes between the two similar verbs and thus the order of HM ≫ CR is chosen, which might be treated as the neutral/default order.[15] Taking into account the languages with VP fronting listed in Section 2, there indeed seems to be a correlation such that VO languages mainly have verb doubling while OV languages show *do*-support as shown in Table 3.

There are four eye-catching exceptions to this general pattern (shaded in Table 3). First, in Dàgáárè, which basically follows the VO order (31-a), this order is reverted to OV when

[14] There is, of course, a long standing problem with remnant movement that even predates the Copy Theory of movement, namely that it violates the Proper Binding Condition on traces (Fiengo 1977; May 1977; Barss 1986). When the VP moves to SpecCP, the trace of the object DP inside that VP is moved out of the c-command (i.e. binding) domain of its antecedent and is therefore no longer bound by it (for discussion see Müller 1998). This problem also translates into Copy Theory. It is hard to formulate a definition of Chain Reduction that identifies the DP copy in the higher VP copy as eligible for deletion (Gärtner 1998). Nunes (2004) suggests that chains do not only contain the two copies that are related by movement, but also their respective syntactic environment, e.g. what their sister node is. Under this view, the DP chain of object scrambling to Spec*v*P in a remnant VP configuration could look like (i).

(i) ⟨{DP,sister:*v*P},{DP,sister:V}⟩

Chain Reduction would then identify {DP,sister:V} as the lower link and proceed to delete every occurrence of DP whose sister is a V that it can find in a given domain, say CP, including the occurrence of the DP copy inside the fronted copy of VP. This makes Chain Reduction a very complex operation, but it has been shown that remnant movement itself is quite elaborate and increases the computational complexity of formal grammars (Kobele 2010; Graf 2013). For the sake of concreteness, I will adopt this solution here, but nothing crucial hinges on it. Alternatively, one might pursue a phasal approach to spell-out. The idea behind this approach is that the DP copy left by VP-evacuating movement is deleted by Chain Reduction before the VP itself moves to SpecCP. As a result, the higher VP copy would not contain a copy of the object DP to start with. A verb, on the other hand, could not leave the VP before it is moved to SpecCP because the latter movement is syntactic and therefore always precedes the former movement which being head movement takes place post-syntactically here. The fronted VP copy would thus always contain a copy of the verbal head.

[15] The intriguing observation about the link between OV and CR ≫ HM and VO and HM ≫ CR as well as the idea to treat it as the result of an OCP-effect are due to an anonymous reviewer to whom I am very grateful for bringing this to my attention.

Table 3: Correlation between VP-internal word order and repair mechanism in VP fronting.

Language	word order	repair	order of operations	V2
German	OV	*do*-support	CR ≫ HM	yes
Dutch	OV	*do*-support	CR ≫ HM	yes
Skou	OV	*do*-support	CR ≫ HM	no
Norwegian	VO	*do*-support	CR ≫ HM	yes
Asante Twi	VO/OV	*do*-support	CR ≫ HM	no
Yiddish	VO	V doubling	HM ≫ CR	yes
Spanish	VO	V doubling	HM ≫ CR	no
Polish	VO	V doubling	HM ≫ CR	no
Hebrew	VO	V doubling	HM ≫ CR	no
Mani	VO	V doubling	HM ≫ CR	no
Pichi	VO	V doubling	HM ≫ CR	no
Krachi	VO/OV	V doubling	HM ≫ CR	no
Dàgáárè	VO/OV	V doubling	HM ≫ CR	no

the VP gets fronted (31-b). Under a naive view of the correlation, one would expect it to show CR ≫ HM and therefore *do*-support.

(31) *Dàgáárè* (Hiraiwa & Bodomo 2008: 803, 805)
a. Ǹ dà dá lá bóɔ́.
1.SG PST buy F goat
'I bought a goat.'
b. Bóɔ́ **dááó** lá ká ń dà **dà**.
goat buy.NMLZ F C 1.SG PST buy
'It is buying a goat that I did (as opposed to e.g. selling a hen).'

However, the verb copy in the fronted VP and the clause-internal one never end up in an OCP configuration because Dàgáárè has an overt focus particle *lá*, an overt complementizer *ká*, and the subject intervening (31-b). Hence, there is no need to invert the order of post-synactic operations. This exception therefore does not contradict the idea that the order of operations is caused by the need to avoid an OCP configuration.

Krachi constitutes the second exception and actually shows variability of the word order inside the fronted VP. Its basic word order is VO (32-a) while in a fronted VP both VO (32-b) and OV (32-c) are allowed. The former signals exhaustive focus whereas the latter receives a contrastive focus interpretation.

(32) *Krachi* (Kandybowicz & Torrence 2016: 227f.)
a. ɔkyɪ wʊ ɛ-dɪkɛ i-gyo.
woman the PST-cook PL-yam
'The woman cooked yams.'
b. **Kɛ-dɪkɛ** i-gyo yɪ ɔkyɪ wʊ **ɛ-dɪkɛ**.
NMLZ-cook PL-yam FOC woman the PST-cook
'The woman only cooked yams (i.e. she did nothing else).'
c. Kɛ-i-gyo **dɪkɛ** yɪ ɔkyɪ wʊ **ɛ-dɪkɛ**.
NMLZ-PL-yam cook FOC woman the PST-cook
'It was cooking yams that the woman did (not, say, eating rice).'

As with the Dàgáárè examples above, however, there is always an overt focus particle *yı* and the subject intervening between both occurrences of the verb. Thus, Krachi also does not undermine the proposal that an OCP-effect underlies the verb doubling patterns.

The third exception is Asante Twi, which shows the same word order change from VO in base-generated VPs (33-a) to OV in fronted VPs (33-b) as we have seen in Dàgáárè.

(33) *Asante Twi*

a. Kofí á-si dán.
Kofi PRF-build house
'Kofi has built a house.'

b. Dán **sí**-é na Kofí **á-yɔ́**.
house build-NMLZ FOC Kofi PRF-build/PRF-do
'Kofi has BUILT A HOUSE.'

In contrast to the latter, however, it shows *do*-support, even though it also has an overt focus marker and the subject intervening between the two verb positions and thus preventing an OCP configuration. If HM ≫ CR were indeed the basic order of operations which is reversed as a consequence of an OCP-effect, the issue of Asante Twi having the reversed order despite the absence of its precondition would be left unresolved. There might of course be additional factors that could trigger an order reversal but it remains unclear what those would be.

The existence of a fourth exception, Norwegian, further indicates that the issue is more complicated than a simple one-to-one correspondence between an OCP configuration and the order of Chain Reduction and head movement. In Norwegian, basic word order inside a VP is VO (34-a). This also holds for fronted VPs (34-b).

(34) *Norwegian* (Siri M. Gjersøe p.c.)

a. Han lese-r bøk-er hele dag-en.
he read-3.SG.PRES book.PL-PL.INDEF whole day-DEF
'He is reading books all day.'

b. Å **lese** bøk-er **gjør** han hele dag-en.
INF read book.PL-PL.INDEF do.3.SG.PRES he whole day-DEF
'Reading books he does all day.'

Under the OCP-account, there is no need to diverge from the basic HM ≫ CR order here since an OCP configuration of two adjacent similar verbs is prevented by the intervening object. One would thus expect Norwegian to feature verb doubling in VP fronting, contrary to fact.

A somewhat similar counter-example from the opposite perspective is instantiated by Skou. This language has the word order OV (35-a) and shows *do*-support in VP fronting (35-b), thereby confirming the link between the two.

(35) *Skou* (Donohue 2004: 126f.)

a. Bàng moerító ke=k-ang.
yesterday fish(sp.) 3.SG.NF=3.SG.NF-eat
'He ate some Yellowtail scad yesterday.'

b. Moerító ke = k-**ang** = inga bàng ke = baléng ke = **li**.
fish(sp.) 3SG.NF = 3.SG.NF-eat = the yesterday 3.SG.NF = man 3.SG.NF = do
'Eating Yellowtail scad, he did (it) yesterday.'

Intriguingly though it undermines the argumentation for this link as arising from the need to avoid an OCP configuration. Like Dàgáárè and Asante Twi, Skou lacks the V2 property. Various elements, such as adverbs or the subject (35-b), intervene between the verb position in the fronted VP and that inside the clause. Therefore, an OCP configuration never arises. Nonetheless, the order of CR and HM is such that it leads to *do*-support in VP fronting constructions, a repair that is supposedly triggered by the need to avoid OCP configurations.

A last argument against linking the order of operations to the word order inside the VP via a ban on adjacent verb forms being too similar can be made on the basis of verb fronting. If this ban is supposed to derive the choice of operation ordering from independent properties of a language, it has to hold in all languages under consideration. If it did not it would hold no explanatory power since it would not be different from stating the order of operations on a language by language basis. Now consider the following Yiddish example of verb fronting.

(36) *Yiddish* (Cable 2004: 2)
Essen est Maks fish.
to.eat eats Maks fish
'As for eating, Max eats fish.'

This is exactly the OCP configuration that is presumed to be repaired by *do*-support in German and Dutch VP fronting. It does not lead to *do*-support in Yiddish. Apparently, the ban on adjacent similar verb forms is not active here. But if it is not active, it cannot serve as a means to derive the difference between Yiddish and German/Dutch from their independently different word orders. One could of course restrict the ban to VP fronting only. However, this would leave unexplained the fact that V fronting in German and Dutch also show *do*-support rather than verb doubling.

To conclude this section, although there is a strong tendency that OV word order correlates with *do*-support and VO word order with verb doubling, it is not possible to establish a causative link between the two such that an OCP-effect triggers the choice of one order of post-syntactic operations over the other. Thus, for now, I will assume that this choice is made on a language by language basis. However, I do think that, ultimately, it is desirable to determine this choice from other independent properties of a language.

4.3 V fronting

As mentioned above, V fronting can be brought about by two different kinds of movement: remnant VP movement or Ā-head movement of V. In this section, I will show how remnant movement behaves exactly like full VP movement with regard to the order of operations and the repair mechanism while Ā-head movement has a peculiar property that neutralizes the influence of the order of operations and always results in verb doubling, even in languages that have CR ≫ HM.

Consider German first, where V fronting as illustrated in (37) involves remnant VP movement rather than Ā-head movement (den Besten & Webelhuth 1990; Grewendorf & Sabel 1994; Koopman 1997; Müller 1998; 2014; Hinterhölzl 2002).

(37) *German* (Diedrichsen 2008: 221)
Waschen tut er das Auto nie.
wash.INF do.3SG.PRES 3M.SG.NOM DEF.N.SG.ACC car.SG never
'He never washes the car.'

As expected for a language that has the order of operations CR ≫ HM, we find *do*-support. The objects evacuate the VP which is then moved to SpecCP in syntax. Post-syntactically, Chain Reduction applies first and deletes the lower copy of the VP. Subsequent head movement cannot move V to T/C because V has already been deleted. Therefore, *do*-insertion takes place to allow for Spell-Out of the inflectional affix(es).

In Asante Twi, which also has CR ≫ HM as noted in the preceding section, we find that V fronting triggers verb doubling rather than *do*-support (38).

(38) *Asante Twi*
Sí-(é) na Kofí **á-sí**/*á-yɔ́ dán.
build-NMLZ FOC Kofi PRF-build/PRF-do house
'Kofi has BUILT a house.'

This suggests that it does not involve remnant VP movement since, as shown above, under the order CR ≫ HM remnant VP movement should give rise to *do*-support. Indeed, we do not find evidence for scrambling or similar VP-evacuating movement of objects as illustrated in (39) for transitive and in (40) for ditransitive sentences.[16] (39-a) and (40-a) exemplify the basic word order whilst (39-b) and (40-b) show the ungrammaticality of object movement across the verb and across another object.

(39) a. Kofí á-si dán nó.
Kofi PRF-build house DET
'Kofi has built the house.'

b. *Kofí dán nó á-si.
Kofi house DET PRF-build
'Kofi has built the house.'

(40) a. Kofí ma-a mmɔfŕá nó kŕataá nó.
Kofi give-PST children DET book DET
'Kofi gave the children a book.'

b. *Kofí ma-a kŕataá nó mmɔfŕá nó.
Kofi give-PST book DET children DET.
'Kofi gave a book to the children.'

[16] One apparent exception are complements of a certain class of verbs including *pɛ* 'like', *kyiri* 'hate', and *gyae* 'stop' which require OV order (i).

(i) Me kyiri nám dí
1.SG hate fish eat
'I hate to eat fish.'

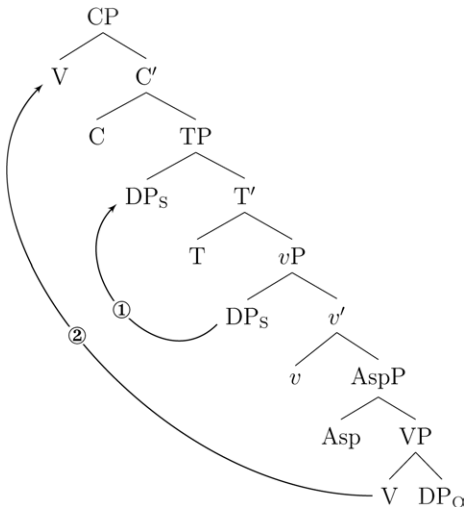
(ii) *Me kyiri dí nám
1.SG hate eat fish
'I hate to eat fish.'

However, this "object shift" is highly restricted, specific to "restructuring" predicates, and certainly not the kind of freely applicable scrambling needed to create a remnant VP in examples like (38).

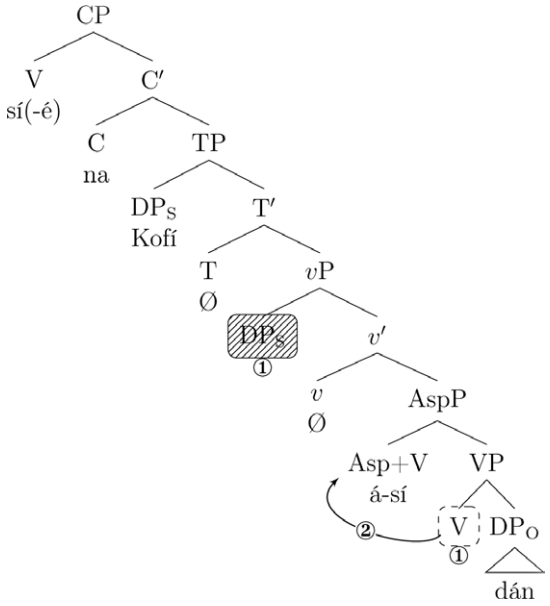
However, if no such movement exists, a remnant VP containing only the verbal head can never be created and therefore not moved to SpecCP to result in V fronting on the surface. Asante Twi, in contrast to German, thus patterns with Hebrew and Spanish both of which have been argued to employ Ā-head movement of V instead of remnant VP movement precisely because they lack an applicable remnant-creating movement (see Landau 2006 for Hebrew and Vicente 2007, 2009 for Spanish). It is this Ā-head movement that leads to verb doubling despite Chain Reduction preceding head movement in the post-syntax in Asante Twi. Importantly, Ā-head movement as opposed to head movement must take place in (narrow) syntax for two reasons. First, it targets a genuine syntactic position, that is, a position that is only created by the syntactic operation of (internal or external) merge. Second, it shows characteristic properties of syntactic Ā-movement: it is unbounded and sensitive to islands. For Asante Twi in particular, the unboundedness and island-sensitivity of V fronting as well as its triggering of tonal reflexes linked to Ā-movement were discussed in Section 3. However, Ā-head movement is different from phrasal Ā-movement in the sense that it connects two positions whose phrase structure status is different. The base position is a head position and thus minimal but not maximal, whereas the target position is a head in a specifier position and thus minimal as well as maximal. In its standard interpretation the Chain Uniformity Condition (Chomsky 1995), which demands that a chain be uniform with regard to phrase structure status, therefore exactly precludes movement of a head into a specifier position. In light of the growing evidence in favour of the existence of this kind of movement (Koopman 1984; Landau 2006; Vicente 2007, 2009), including the Asante Twi data, however, I advocate the weaker interpretation here that this movement can indeed take place. It just does not lead to the creation of a chain in the sense of a chain being a separate object. Thus, internal merge of the head with the current phrase marker, i.e. CP, may take place since it respects constraints on Merge like the Extension Condition. However, the derivational system does not create an accompanying chain object like for example ⟨{V,sister:C′},{V,sister:VP}⟩ (compare footnote 14). As a consequence, Chain Reduction cannot delete the lower copy of the Ā-moved head because there is no chain to be reduced. Consider the derivation of V fronting in Asante Twi in (41).

(41) Asante Twi V fronting

a. Syntax



b. Post-syntax



In the syntax, the V head Ā-head moves to SpecCP, a movement step that does not create a chain. In the post-syntactic component then, Chain Reduction applies first albeit vacuously because due to the Chain Uniformity Condition there is no chain between the two copies of V. Subsequently, the lower copy of V head-moves to *v* and T. Since post-syntactic head movement, due to it being non-syntactic, does not leave copies (Boeckx & Stjepanović 2001; Sauerland & Elbourne 2002), the resulting structure contains two copies of V and therefore shows verb doubling rather than *do*-support. Thus, even though in Asante Twi Chain Reduction precedes head movement, an order which would normally give rise to *do*-support, verb doubling occurs in V fronting because it involves Ā-head movement, which has the particular property of not creating a chain and thus neutralizes the influence of the order of post-syntactic operations.

It is worth pointing out that an analysis of Asante Twi in which the verb head-moves to the head of CP or FocP fails to derive the doubling pattern. In the current system, this head movement would take place post-syntactically. As such it would not leave any copy in the lower position that could be spelled out in addition to the higher one. In an approach that treats head movement as a syntactic operation, we would expect the lower copies of the moved verb to be deleted by post-syntactic Chain Reduction.

Finally, let us turn to Hebrew, where head movement applies before Chain Reduction. As we have seen, this order leads to verb doubling in VP fronting. Hebrew, as expected, also shows verb doubling in V fronting (42).

(42) *Hebrew* (Landau 2006: 37)
Liknot, hi **kanta** et ha-praxim.
to.buy she bought ACC the-flowers
'As for buying, she bought the flowers.'

Taking into account the discussion up to this point, verb doubling is actually enforced by two different properties of Hebrew grammar. First, Hebrew employs Ā-head movement

to front a bare verb (Landau 2006).[17] This movement does not create a chain meaning that the lower copy of V cannot be deleted by Chain Reduction. Second, head movement applies before Chain Reduction, that is, even if the lower V copy could in principle be deleted by Chain Reduction, it is bled by preceding head movement of V to *v* and T.

So far we have discussed three types of languages: (i) the German-type that has CR ≫ HM and remnant VP movement, which leads to a symmetric use of *do*-support; (ii) the Asante Twi-type that also has CR ≫ HM but employs Ā-head movement which gives rise to *do*-support in VP fronting due to the order of post-syntactic operations while verb doubling occurs in V fronting due to Ā-head movement neutralizing the effect of the ordering; and (iii) the Hebrew-type that has HM ≫ CR and Ā-head movement, which results in a symmteric use of verb doubling. One last logically possible combination of operation order and type of movement has not featured hitherto: HM ≫ CR and remnant VP movement. This combination would be expected to show symmetric verb doubling just like Hebrew because the order HM before CR, where HM bleeds CR, leads to verb doubling in VP fronting and remnant VP movement in V fronting behaves completely parallel to full VP movement thus also resulting in verb doubling. The present analysis therefore predicts that languages should exist that pattern with Hebrew with regard to the repairs used in V and VP fronting but have remnant VP movement rather than Ā-head movement. Indeed, this type of language does exist. Consider the repair pattern of Polish in (43), where verb doubling occurs in both V fronting and VP fronting.

(43) *Polish* (Bondaruk 2012: 55)

a. **Wypić** (to) Marek **wypije** herbatę, ale nie wypije kawy.
drink.INF TO Marek will.drink tea but not will.drink coffee
'As for drinking, Marek will drink tea, but he will not drink coffee.'

b. **Wypić** herbatę (to) Marek **wypije**, ale nie wypije kawy.
drink.INF tea TO Marek will.drink but not will.drink coffee
'As for drinking tea, Marek will drink it, but he will not drink coffee.'

According to Bondaruk (2009, 2012), V fronting involves remnant movement rather than Ā-head movement in Polish because the language has independently available scrambling movement of the object.

5 Summary and conclusion

In this paper, I have presented new data from Asante Twi showing that repair mechanisms for the displaced verb in verbal fronting structures may be different within one and the same language depending on the type of fronting, i.e. V or VP fronting. However, only one asymmetric pattern – verb doubling with V fronting and *do*-support with VP fronting – exists while the reverse pattern is to the best of my knowledge unattested. I have proposed an analysis that derives all three attested patterns from two properties of a language: (i) the order of the two operations Chain Reduction and head movement in the post-syntactic component and (ii) the type of movement, Ā-head movement or remnant VP movement, involved in V fronting. With the exception of languages that have no V-rescuing head

[17] Again, Landau (2006) argues that what is fronted in Hebrew V fronting is actually the V + *v* complex rather than the V alone. Since head movement in the present system takes place in the post-syntax, it counterfeeds Ā-head movement of the V + *v* complex to SpecCP. One would thus have to assume that both V and *v* move to SpecCP independently in the syntax leaving a copy each. Post-syntactically, both the copy of V in base position and the one in SpecCP head-move to their respective copy of *v* resulting in a doubling of V + *v* on the surface. I treat the fronted constituent as a bare V head here for reasons of exposition and comprehensibility.

movement, the order HM ≫ CR leads to verb doubling independently of the size of the fronted constituent (bare V head, remnant VP, or full VP). In contrast, the reverse order CR ≫ HM gives rise to *do*-support for both full VP and remnant VP movement, but results in verb doubling for Ā-head movement of V. The effect of the order of operations is neutralised by this kind of movement because it does not create a chain to which early Chain Reduction could apply since such a chain is precluded by the Chain Uniformity Condition (Chomsky 1995). A summary of the influence of the order of post-syntactic operations and the moved constituent on the repair strategy is given in Table 4.

A language with a pattern of *do*-support in V fronting and verb doubling in VP fronting has not yet been reported. The present account predicts this typological gap as this pattern is not derivable under the assumptions here. In order to show verb doubling in VP fronting, a language would have to have the order HM ≫ CR (and some kind of V-rescuing movement). However, as mentioned above, this order results in verb doubling for V fronting, too, independent of whether that involves Ā-head movement of V or remnant VP movement. The analysis thus accounts for the typology of repair mechanisms in verbal fronting by deriving all and only the three attested patterns to the exclusion of the unattested one.[18]

In addition, it supports the claim that head movement takes place post-syntactically (or at least outside narrow syntax) because it interacts with other post-syntactic operations whereas no such interaction occurs with genuine syntactic operations. Finally, it also corroborates the idea that operations and processes in syntax and post-syntax apply in a specific order such that their various interactions (feeding, bleeding, counter feeding, counter bleeding) give rise to complex and partly opaque surface patterns.

Looking ahead, we would expect to find more languages that behave like Asante Twi with regard to verbal fronting and verb doubling vs. *do*-support. One potential case is Limbum, a Grassfields Bantu languages spoken in Cameroon. This language has basic SVO word order (44-a) with object (information) focus being expressed by moving the object to sentence-initial position preceded by a focus particle *á* (44-b). If the verb alone is focussed in this way, verb doubling occurs (44-c) whereas a dummy verb *gī* appears in the verbal base position if the whole VP is in the focus position (44-d). In the latter case, verb doubling is ungrammatical (44-e).

Table 4: Repair strategy depending on order of operations and constituency.

	Order of post-syntactic operations		
Moved constituent	**HM ≫ CR**	**CR ≫ HM**	**Surface**
full VP	verb doubling	*do*-support	VP fronting
remnant VP	verb doubling	*do*-support	V fronting
bare V	verb doubling	verb doubling	V fronting

[18] As an anonymous reviewer points out, the account makes two further predictions. (i) Because under the present proposal, *do*-support in V fronting only arises with remnant movement and remnant movement presupposes a scrambling operation which is always optional, no language should exhibit V fronting with *do*-support without also showing VP fronting with *do*-support. (ii) Since Ā-head movement is immune to Chain Reduction (because it does not lead to the creation of a chain) it should always result in the spell-out of two copies of the moved verb, one in the lower position and the other in the final landing site. Languages that dispose of this type of movement therefore will always allow verb doubling in V fronting (in case they also comprise of remnant VP movement) or even force it (in case they lack remnant VP movement) independently of whether the lower verb copy is required to express finiteness or not, that means, verb doubling would also occur in the presence of an inflected auxiliary. I will leave it to future research to determine whether these predictions are borne out (see Hein in prep. for further discussion).

(44) *Limbum* (Becker & Nformi 2016: 58ff.; Jude Nformi p.c.)

a. Ŋwɛ̀ fɔ̄ àm tí ŋgū.
man DET PST3 cut wood
'The man cut the wood.'

b. Á Ngàlá (cí) mɛ̀ bí kɔ̄nī.
FOC Ngala (COMP) I FUT1 meet
'I will meet NGALA.'

c. Á **r-yū** (cí) njíŋwɛ̀ fɔ̄ bí **yū** msāŋ.
FOC INF-buy (COMP) woman DET FUT1 buy rice
'The woman will BUY rice.'

d. Á **r-yū** msāŋ (cí) njíŋwɛ̀ fɔ̄ bí **gī**.
FOC INF-buy rice (COMP) woman DET FUT1 do
'The woman will BUY RICE.'

e. *Á **r-yū** msāŋ (cí) njíŋwɛ̀ fɔ̄ bí **yū** (msāŋ).

In addition, there is another focus construction expressing identificational focus in which the object stays *in situ* being preceded by a focus particle *bá*. In this low focus construction, verb focus leads to verb doubling while VP focus seems to not be available at all (see Becker & Nformi 2016 for discussion of both focus constructions). As the data on Limbum is still quite sparse at this point, I leave it to future research to establish whether verbal focus in Limbum can indeed receive a similar analysis as Asante Twi.

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Competing Interests

The author has no competing interests to declare.

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