

VP Nominalization and the Final-over-Final Condition

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Abstract

The Final-over-Final Condition has emerged as a robust and explanatory generalization for a wide range of phenomena (Biberauer et al. 2014; Sheehan et al. 2017). In this paper, we argue that it also holds in another domain, nominalization. In languages which show overt nominalization of VPs, we find that one word order is routinely unattested, namely a head-initial VP with a suffixal nominalizer. This typological gap can be accounted for by the FOFC, if we allow it to hold within mixed extended projections. Furthermore, we show that this view also makes correct predictions about agentive nominalizations, as well as nominalized serial verb constructions.

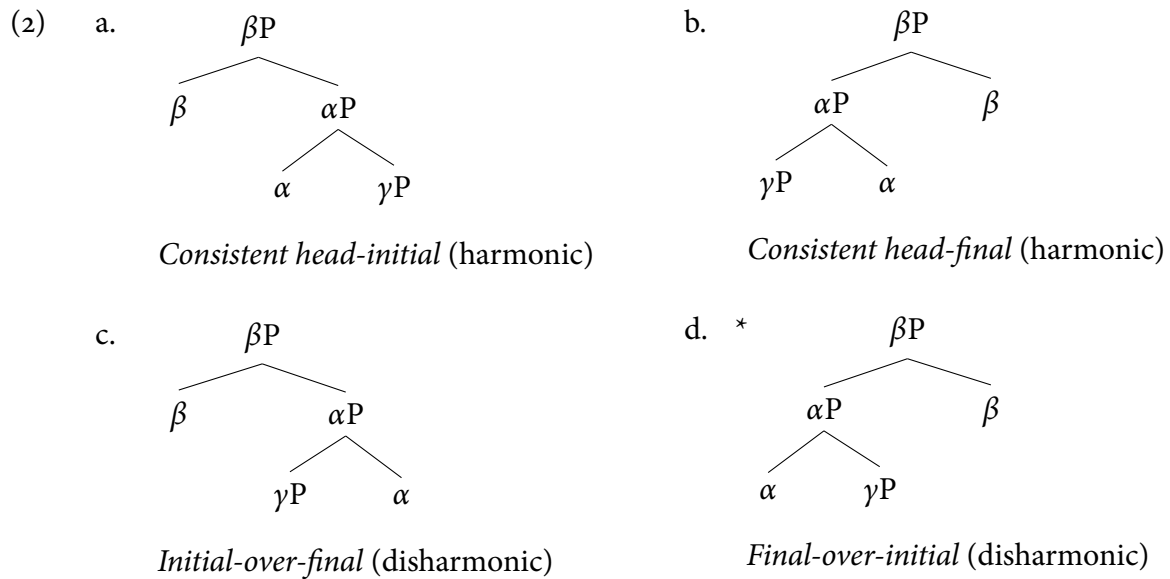
1 Introduction

Biberauer et al. (2014) argue that the following restriction on the linearization of phrase structure is a syntactic universal:¹

- (1) *The Final-over-Final Condition (FOFC)* (Holmberg 2000:124; Biberauer et al. 2014:171):
A head-final phrase αP cannot immediately dominate a head-initial phrase βP , if α and β are members of the same extended projection.

A consequence of this is that head-final phrases must select other head-final phrases (i.e. ‘if final, then final’). This means that, of the four logically possible abstract patterns, only three are predicted to be attested. In particular, the two harmonic orders, *initial-over-initial* (2a) and *final-over-final* (2b) and only one disharmonic order, *initial-over-final* (2c), are permitted.

¹The FOFC was originally proposed as an acronym for *Final-over-Final Constraint*. In Sheehan et al. (2017), *constraint* was replaced with *condition*, since ‘syntactic constraints are typically named after a construction where some operation or relation is not permitted, for example *Complex NP Constraint*’ (Holmberg 2017:2). Since the FOFC enforces, rather than prohibits, final-over-final structures, it seems more appropriately termed a ‘condition’. We therefore adopt this nomenclature in the following paper.



One of the original observations that led to the postulation of the FOFC came from the possible orders of auxiliaries, verbs and direct objects in Finnish. Holmberg (2000) noticed that Finnish allows for various permutations of auxiliaries and VP-internal constituents (3a–c), but crucially not the order V O AUX (3d).

(3) *3/4 orders possible in Finnish* (Holmberg 2000:128):

- a. Milloin Jussi [_{AuxP} olisi [_{VP} kirjoittanut romaanin]] ?
 when Jussi AUX written novel
 ‘When would Jussi have written a novel?’ (AUX V O)
- b. Milloin Jussi [_{AuxP} olisi [_{VP} romaanin kirjoittanut]] ?
 when Jussi AUX novel written
 ‘When would Jussi have written a novel?’ (AUX O V)
- c. Milloin Jussi [_{AuxP} [_{VP} romaanin kirjoittanut] olisi] ?
 when Jussi novel written AUX
 ‘When would Jussi have written a novel?’ (O V AUX)
- d. *Milloin Jussi [_{AuxP} [_{VP} kirjoittanut romaanin] olisi] ?
 when Jussi written novel AUX
 ‘When would Jussi have written a novel?’ (*V O AUX)

It is this configuration that corresponds to the one disharmonic order prohibited by the FOFC. Similar $\frac{3}{4}$ -patterns with regard to the order of V, O, and AUX have been documented for Basque (Haddican 2004:116) and Kaaps (Biberauer et al. 2010).

The FOFC not only constrains the possible linearization of VPs and auxiliaries within a single language, but also across languages. It has been observed that of the six logically possible word order permutations between the three elements AUX (including restructuring verbs), V and O, only five are attested across the Germanic languages (see a.o. Travis 1984; Kiparsky 1996; Fuss & Trips 2002). These are given in (4).

(4) *5/6 orders attested across Germanic* (Biberauer et al. 2014:173ff.):

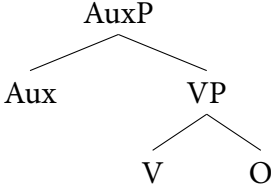
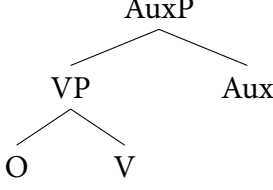
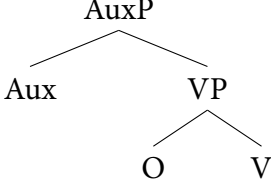
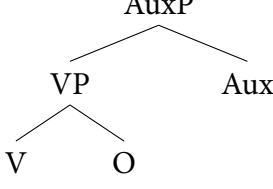
- a. ...dass Johann [_{AuxP} [_{VP} das Buch gelesen] hat]
 that Johann the book read.PTCP has
 ‘...that Johann has read the book.’ (German; O V AUX)

- b. ...oyb dos yingl [_{AuxP} vet oyfn veg [_{VP} zen a kats]]
 whether the boy will on.the way see a cat
 ‘... whether the boy will see a cat on the way.’ (Yiddish, AUX V O)
- c. ...da Jan [_{AuxP} wilt [_{VP} een huis kopen]]
 that Jan wants a house buy.INF
 ‘... that Jan wants to buy a house.’ (West Flemish; AUX O V)
- d. ...dat Jan het boek wil lezen.
 that Jan the book wants read.INF
 ‘... that Jan wants to read the book.’ (Dutch; O AUX V)
- e. ...dat hy die boek gegee het vir sy suster.
 that he the book give.PTCP has for his sister
 ‘... that he gave the book to his sister.’ (Colloquial Afrikaans; V AUX O)

All of these orders are compliant with the FOFC. Importantly, what we do not find is a language such as the hypothetical German’ in (5), where a final auxiliary embeds a head-initial VP.

- (5) *... dass Johann [_{AuxP} [_{VP} gelesen das Buch] hat]
 that Johann read the book has
 ‘that Johan has read the book.’ (German’; *V O AUX)

Under the assumption that the auxiliary directly embeds the VP, the missing order in both Finnish and German, namely V-O-AUX, corresponds exactly to the configuration prohibited by the FOFC, as indicated in (6) (Biberauer et al. 2008, 2014).

- (6) a. 
 Consistent head-initial (English)
- b. 
 Consistent head-final (German)
- c. 
 Initial-over-final (West Flemish)
- d. * 
 Final-over-initial (German')

The FOFC has since been argued to hold in a number of different empirical domains, e.g. sentence-final particles (Biberauer 2017a; Erlewine 2017), adpositions (Biberauer 2017b), adverbs (Sheehan 2017), NP-internal order (Holmberg 2000; Roberts 2017a), word formation (Myler 2009; Roberts 2017b) and extraposition (Biberauer & Sheehan 2012). As such, it constitutes an important potential universal constraint on word order. In this paper, we argue that the scope of the FOFC should be extended to nominalizations. In particular, doing so correctly derives the 3/4 pattern we find with overt VP nominalization in many West African languages, where VO order is avoided in nominalizations with suffixal nominalizers.

2 Word order in VP nominalizations

Many (West) African languages require a verb phrase to be nominalized in certain contexts. These contexts include focus fronting and embedding under certain types of predicates or aspect markers. The nominalization is often detectable by an overt morpheme that is attached to the VP in question. Consider the example of VP-fronting for focus from Buli (Gur, Niger-Congo) in (7) where the VP *mángò-kú dē* ‘eat the mango’ appears in the left periphery of the clause and bears the overt nominalizer *kā*. What is striking here is that the order of object and verb is OV, while the base order in a neutral declarative sentence is (S)VO, as shown by (7b).

(7) *Buli* (Hiraiwa 2005a:262; Hiraiwa 2005b:546):

- a. (Ká) [_{VP} mángò-kú dē]-kā àlì/àtì Àtìm dè diēm
 FOC mango-DEF eat -NMLZ C Àtìm ate yesterday
 ‘It is eating the mango that Àtìm ate yesterday (not e.g. buying a banana).’
- b. Àtìm [_{VP} dè mángò-kú-lá] diēm
 Àtìm ate mango-DEF-DEM yesterday
 ‘Àtìm ate that mango yesterday.’

Buli is by no means extraordinary in this regard. Other languages in which the word order inside the VP is usually VO also require a switch to OV when the VP is nominalized. In Dagaare (Gur, Niger-Congo) (8) and Ewe (Gbe, Niger-Congo) (9), this occurs in VPs which are nominalized in focus fronting constructions.

(8) *Dagaare* (Hiraiwa & Bodomo 2008:802,805):

- a. Ñ dà [_{VP} dá lá bós]
 1SG PST buy FOC goat
 ‘I bought a goat.’ (V O)
- b. [_{VP} Bós dáá]-ó lá ká n dà dà
 goat buy -NMLZ FOC C 1SG PST buy
 ‘It is buying a goat that I did (as opposed to e.g. selling a hen).’ (O V NMLZ)

(9) *Ewe* (Buell 2012):

- a. Ðèví lá [_{VP} dù àkò dú]
 child the eat banana
 ‘The child ate a banana.’ (V O)
- b. [_{VP} Mólì dù]-gé mè-lè
 rice eat -NMLZ 1SG-be.at
 ‘I am about to EAT SOME RICE.’ (O V NMLZ)
- c. [_{VP} Núkà dù]-m nè-lè?
 what eat -NMLZ 2SG-be.at
 ‘What are you eating?’ (O V NMLZ)

In Dangme (Kwa, Niger-Congo), formation of a gerund requires nominalization of the VP, and a concomitant shift from VO to OV order (10).

(10) *Dangme* (Ameka & Kropp Dakubu 2008:273,274):

- a. Ì [VP kǎné womi ɔ]
 1SG read book DEF
 ‘I read the book’ (V O)
- b. [VP womi ɔ kǎné]-mĩ
 book DEF read -NMLZ
 ‘reading the book’ (O V NMLZ)

Gengbe (Gbe, Niger-Congo) differs somewhat in requiring overt nominalization of VPs under certain aspect markers, e.g. the progressive marker *lè*. This results in OV order inside the complements of these markers (11) (also see Sande et al. to appear).

(11) *Gengbe* (Manfredi 1997:90; Aboh 2005:165f.):

- a. Mù [VP dù nú]
 1SG eat thing
 ‘I ate (something)’ (V O)
- b. Kwésí lè [VP mólú dù]-ò
 Kwesi AUX rice eat -NMLZ
 ‘Kwesi is eating rice’ (O V NMLZ)
- c. [VP Mólú dù]-ò yè Kwésí lè
 rice eat -NMLZ FOC Kwesi AUX
 ‘Kwesi is EATING RICE.’ (O V NMLZ)

Finally, in *Asante Twi/Akan* (Kwa, Niger Congo), VPs are nominalized in focus fronting contexts (12b), as well as when embedded under predicates such as ‘hate’ (12c) and ‘like’ (12d) (see Kobele & Torrence 2004).

(12) *Asante Twi/Akan* (Hein 2017:7; S. Korsah, p.c.):

- a. Kofí [VP á-si dán]
 Kofi PRF-build house
 ‘Kofi has built a house.’ (V O)
- b. [VP Dán sí](-é) na Kofí á-yó
 house build -NMLZ FOC Kofi PRF-do
 ‘Kofi has BUILT A HOUSE. (not e.g. bought a boat)’ (O V NMLZ)
- c. Me-kyiri [VP dan si](-e)
 1SG-hate house build -NMLZ
 ‘I hate building houses.’ (O V NMLZ)
- d. Ghánaní bíará pɛ [VP nam di](-e)
 Ghanaian every like fish eat -NMLZ
 ‘Every Ghanaian likes eating fish.’ (O V NMLZ)

It has been proposed that this word order change results from some kind of Object Shift that moves the object outside the VP (e.g. Manfredi 1997; Aboh 2004, 2005; Hiraiwa & Bodomo 2008).² While this works on a language-by-language basis, we argue that it crucially misses an important cross-linguistic generalization. Namely, the above languages all have suffixal nominalizers and

²An alternative view proposed by Hiraiwa (2005a) is that the object is pied-piping along with the verb under focus fronting of the predicate. However, this fails to offer an explanation for why the VP internal word order changes.

exhibit an obligatory word order change under nominalization. This is not true of other languages, however.

There are also VO languages that do not exhibit a word order switch under nominalization. Consider the following data from Limbum (Grassfields Bantu) (13), Mani (Mel, Niger-Congo) (14), and Yoruba (Niger-Congo) (15).

(13) *Limbum* (Becker & Nformi 2016:58, 74f.):

- a. Nwè fō àm [VP tí ngū]
 man DET PST3 cut wood
 ‘The man cut the wood.’ (V O)
- b. Á r-[VP yū msān] (cí) nǐ́nwè fō bí gī
 FOC NMLZ- buy rice COMP woman DET FUT1 do
 ‘The woman will BUY RICE.’ (NMLZ V O)

(14) *Mani* (Childs 2011:148, 219):

- a. Û ká [VP tók dómò mì]
 1SG PST wash shirt 1SG
 ‘I washed my shirt.’ (V O)
- b. Û- [VP bán wóm] kó mbòm wò bán-yè
 NMLZ- build boat PRO.FOC Mbom 3SG build-STAT
 ‘It is building a boat Mbom built a boat.’ (NMLZ V O)

(15) *Yoruba* (Manfredi 1993:19f.):

- a. Ajé [VP ra iwé]
 Aje buy paper
 ‘Aje {is buying/bought} {a book/books}.’ (V O)
- b. Rí- [VP rà iwé] ni Ajé ra iwé
 NMLZ- buy paper FOC Aje buy paper
 ‘It is book-buying that Aje {is doing/did}.’ (NMLZ V O)

Interestingly, these languages differ from those exhibiting an obligatory word order change in that the nominalizer is prefixal rather than suffixal. This is not the full picture, however. There are some VO languages with prefixal nominalizers that also exhibit OV order in nominalizations. Perhaps the clearest case is Krachi (Kwa, Niger-Congo). The discourse neutral word order in Krachi is SVO (16a), and it permits VO (16b), but importantly also OV order in nominalized VPs (16c) as required under focus fronting.

(16) *Krachi* (Kandybowicz & Torrence 2016:227f.):

- a. ɔky₁ wū [VP ε-dikε i-gyo]
 woman the PST-cook PL-yam
 ‘The woman cooked yams.’ (V O)
- b. Kε-[VP dikε i-gyo] y₁ ɔky₁ wū ε-dikε
 NMLZ- cook PL-yam FOC woman the PST-cook
 ‘The woman only cooked yams (i.e. she did nothing else).’ (NMLZ V O)
- c. Kε-[VP i-gyo dikε] y₁ ɔky₁ wū ε-dikε
 NMLZ- PL-yam cook FOC woman the PST-cook
 ‘It was COOKING YAMS that the woman did (not, say, eating rice).’ (NMLZ O V)

Thus, we see two possible word orders (regular VO and switched OV) with a prefixal nominalizer. The nominalizer *kɛ-* here exhibits clitic-like properties as it seems to attach to the whole VP and can ‘lean’ onto whichever VP-internal constituent follows it. In other languages, such as Yoruba and Igbo, the nominalizer is a verbal affix and has to attach to the verb. Nevertheless, these languages, like Krachi, still clearly exhibit a (sometimes optional) change from VO to OV order. In Yoruba, the nominalizing prefix *V-* (which harmonizes with the preceding vowel) is attached to the verb. In these nominalized VPs, both the standard VO order (17a) and the switched OV order (17b) is possible.

(17) *Yoruba* (Manfredi 1997:96):

- a. Mo fẹ́ [VP é-hun aso]
 1SG want NMLZ-weave cloth
 ‘I want to weave (some) cloth.’ (NMLZ-V O)
- b. Mo fẹ́ [VP aso ó-hun]
 1SG want cloth NMLZ-weave
 ‘I want to weave (some) cloth’ (O NMLZ-V)

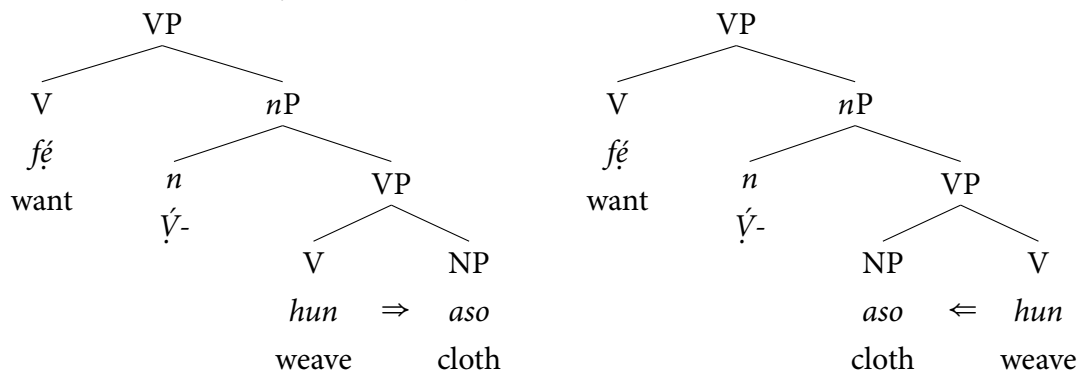
In Igbo, the neutral word order is SVO, as in embedded infinitival clauses (18a). As in Yoruba, nominalized VPs exhibit a switch to OV order and the nominalizing prefix appears attached to the verb (18b).

(18) *Igbo* (Manfredi 1997:97f.):

- a. Ó kúzhì-ri m [VP i-gbá igwè]
 3SG teach-ASP 1SG INF-move iron
 ‘S/he taught me to ride a bike.’ (NMLZ-V O)
- b. Ó mára-na [VP igwè a-gbá]
 3SG know-PERF iron NMLZ-move
 ‘S/he knows how to ride a bike.’ (O NMLZ-V)

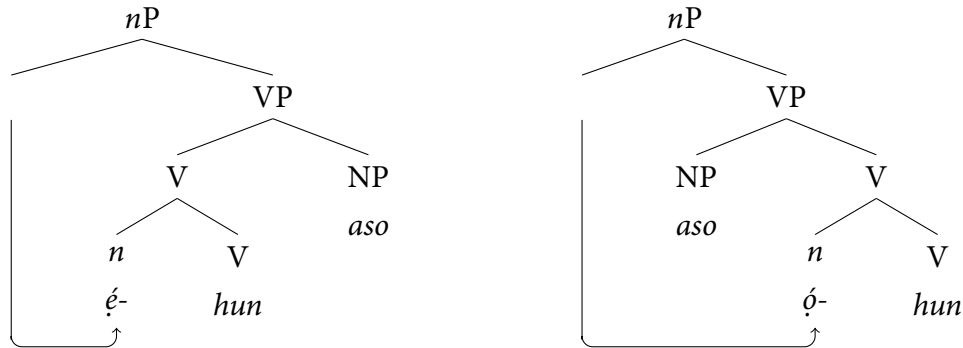
We argue that these structures are the same as in Krachi, i.e. they are underlyingly NMLZ-OV orders, with a later process of affixation to derive the surface O NMLZ-V pattern. For concreteness, we argue that merging a nominalizer leads to flexible linearization inside the embedded VP, i.e. the deletion of previous established linearization statements (see Sheehan 2013*b*; Richards 2016 on establishing linear relations in syntax).

(19) *Flexible linearization of verb and complement in Yoruba:*



Independent of the word order change, which is optional in Yoruba, but obligatory in Igbo verb, the affix in *n* must be attached to a verbal host. We treat this as postsyntactic Lowering (Embick & Noyer 2001) as shown in (20).

(20) *Postsyntactic lowering of prefixal nominalizer:*



On this view, Yoruba and Igbo also show the basic Krachi pattern of a (potentially optional) shift from VO to OV under a prefixal nominalizer.

The full typology of eventive VP nominalizations would thus look like (21).

(21) *Typology of eventive VP nominalization (incomplete):*

	Base order	Nominalized	
Akan	VO	OV-NMLZ	(Hein 2017)
Buli	VO	OV-NMLZ	(Hiraiwa 2005a,b)
Dagaare	VO	OV-NMLZ	(Hiraiwa & Bodomo 2008)
Dangme	VO	OV-NMLZ	(Ameka & Kropp Dakubu 2008:273f.)
Ewe	VO	OV-NMLZ	(Buell 2012)
Gengbe	VO	OV-NMLZ	(Aboh 2005:165f.)
Krachi	VO	NMLZ-OV	(Kandybowicz & Torrence 2016)
Igbo	VO	NMLZ-OV	(Manfredi 1997:97f.)
Yoruba	VO	NMLZ-OV	(Manfredi 1997:96)
Krachi	VO	NMLZ-VO	(Kandybowicz & Torrence 2016)
Limbun	VO	NMLZ-VO	(Becker & Nformi 2016)
Mani	VO	NMLZ-VO	(Childs 2011)
Yoruba	VO	NMLZ-VO	(Manfredi 1993)

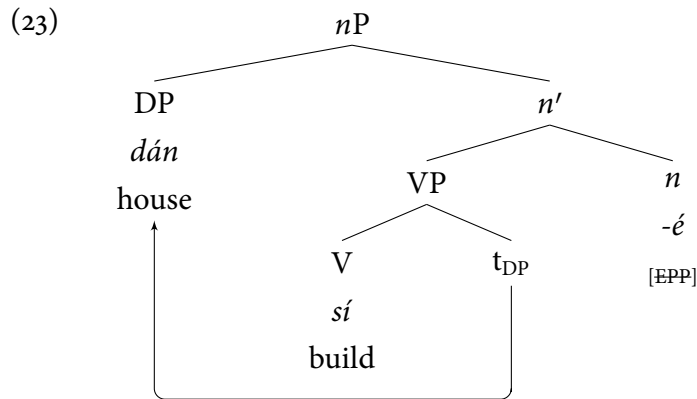
What (21) shows is that, while VO languages often retain head-initial VPs under nominalization with a prefix, we find that no VO language with a nominalizing suffix maintains head-initial order. Importantly, some VO languages with prefixal nominalizers do allow for OV order. This observation is stated as the generalization in (22)

(22) *Generalization:*

No language retains VO word order inside a nominalized VP if the nominalizer is a suffix.

It is worth noting that the change from VO to OV inside nominalized VPs has often been analyzed

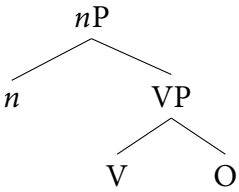
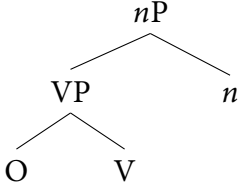
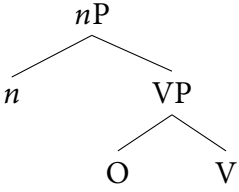
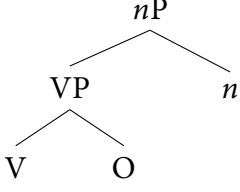
as *Object Shift*, i.e. movement of the object DP to a higher position above the verb (e.g. Manfredi 1997; Aboh 2004, 2005; Hiraiwa & Bodomo 2008). However, this approach fails to capture the above generalization. In general, Object Shift can be analyzed as an EPP feature on *n* triggering movement of the object DP into *n*'s specifier (23) (cf. Chomsky 2000; Hiraiwa 2001). This kind of analysis is shown below for example (12a).




The problem with this view, however, is that it gives us no obvious explanation for the suffix/prefix-asymmetry. It is unclear why an arbitrary movement-triggering feature should be seemingly obligatory if the head happens to be realized as a suffix, whereas optional or absent if it is a prefix. What we need is an explanation that captures why the change from VO to OV order is required only with a suffixal nominalizers. The following section argues that this explanation follows if we are dealing with a repair to a violation of the Final-over-Final Condition.

3 The Final-over-Final Condition in VP nominalization

In this section, we want to advance the proposal that the typological patterns we have seen with VP nominalization make sense in light of the Final-over-Final Condition (FOFC, Holmberg 2000; Biberauer et al. 2008, 2014) which rules out the final-over-initial configuration that underlies the VO-NMLZ order. As with auxiliaries in (6), we argue that the FOFC also constrains the possible linear orderings of V, O, and NMLZ inside nominalized VPs. If the nominalizer is initial, either order of V and O is licit (24a, c). This is why, in principle, both orders are possible in VP-nominalizations in VO languages with a prefixal nominalizer. However, when the nominalizer is head-final, FOFC prohibits the order V-O-NMLZ (24d). When such a sequence would arise, a re-linearization repair must take place.

- (24) a.  *Consistent head-initial*
(e.g. Yoruba)
- b.  *Consistent head-final*
(e.g. Akan)
- c.  *Initial-over-final*
(e.g. Krachi)
- d. *  *Final-over-initial*
(unattested?)

A way of conceiving of this is that linear precedence relations are at least partially encoded upon c-selection in the syntax (see Sheehan 2013*b*; Richards 2016; *pace* Kayne 1994). Certain lexical heads are parameterized as initial or final. We represent this with double arrows ‘ \Leftrightarrow ’. In a VO language, a linearization statement ‘ \Rightarrow ’ between a head and its complement is established upon creation of the VP. Some functional nominalizers, such as those in Krachi and Yoruba, have the property of altering or removing this linearization statement. This leads to no pre-established order between a verb and its complement, i.e. flexibility in their linearization (see Abels & Neeleman 2012, Abels 2016 on flexible linearization and Richards 2016 on *Untethering*).³ This modification of previously established linearization statements becomes obligatory, however, when a representation is generated that violates the FOFC. As (25) shows, if a head-final nominalizer is merged with a head-initial VP, the resulting representation is not compliant with the FOFC. The relevant repair is to remove the linearization statement between V and O allowing for flexible linearization. Consequently, the linearization OV is the preferred and indeed only word order compatible with the FOFC.⁴

- (25) * 

Treating the observed word order changes in nominalized VPs as a FOFC repair explains why it is obligatory in VO-languages with a suffixal nominalizer. It also captures the optionality of the switch in VO-languages with an initial nominalizer, since the FOFC does not constrain the

³We are thereby assuming that the word order permutations in question are derived by flexible linearization of heads and complements, rather than additional ‘roll-up’ movements (e.g. Cinque 2005; Biberauer et al. 2014). These approaches differ subtly in their scope, see section 4 for discussion.

⁴The option of reordering *n* and its complement is suboptimal due to the phonological specification of *n* as a suffix. Since the verb has no inherent prosodic specification for directionality, it can be more freely reordered across and indeed within languages.

linearization of such structures.

If correct, this analysis has some consequences for our view of the FOFC. Recall that the definition of the FOFC in (1) states that it holds inside an extended projection. This qualification is necessary since there are cases in which the scope of the FOFC would be too broad, e.g. in ruling out acceptable cases of head-initial DPs selected by head-final VPs, as in German (26).

- (26) Ich will [VP [DP das [NP Buch]] lesen]
 I want the book read
 ‘I want to read the book.’

Since DPs are part of a different extended projection from VPs, namely a nominal one, structures such as (26) fall outside the scope of the FOFC.

In order to maintain the present analysis of nominalized VPs, *n* and V must count as belonging to the same extended projection so that the observed FOFC repair is enforced. To this end, we assume that deverbal nominalizations constitute *mixed extended projections* (Borsley & Kornfilt 2000; Bresnan & Mugane 2006; Pietraszko to appear; *pace* Grimshaw 1991). One way of achieving this technically would be to assume that nominalizers act as ‘switches’ in the sense of Panagiotidis (2015:143). In other words, they turn one extended projection into another. For Panagiotidis (2015), a nominalizer has the features [*u*V, N], i.e. it selects a verbal projection and projects a nominal one. As long as extended projections are defined based on two heads bearing the same categorial feature (either selectional or not), then deverbal nominalizers will also count as part of the extended projection of V. All of this leads to the following consequence for the FOFC:

- (27) *Consequence for the FOFC:*

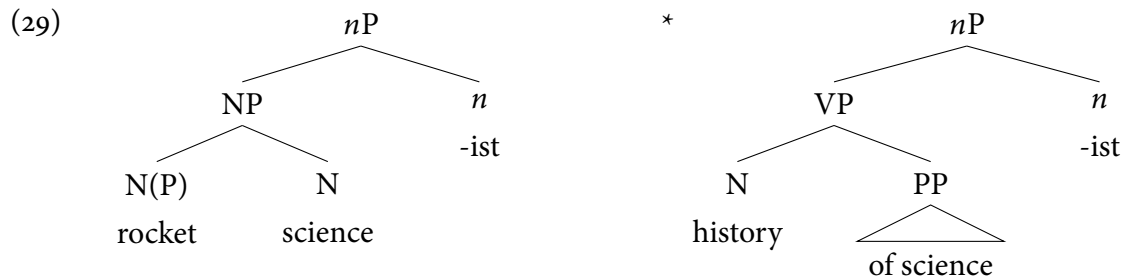
The FOFC applies inside a mixed extended projection (i.e. nominalizations)

This of course predicts that FOFC effects should be found in other kinds of nominalizations. So far, we have focused on eventive nominalizations. There is also reason to believe that the FOFC constrains agentive nominalizations (Myler 2009; Roberts 2017b:342f.). For example, consider canonical agentive nominalizations such as *truck driver*, which presumably contains the VP *drive truck* (e.g. Roeper & Siegel 1978; Fu et al. 2001; Alexiadou 2001; Bruening 2013). When the nominalizing suffix *-er* selects this VP, an illicit final-over-initial configuration is created (28). We can appeal to the same kind of linearization repair as we did for the eventive nominalizations above (indeed, the same would apply to gerunds like *truck driv-ing*). This explains why nominalization of *drive truck* must be *truck driver* and not **drive trucker*, despite *trucker* itself being possible.

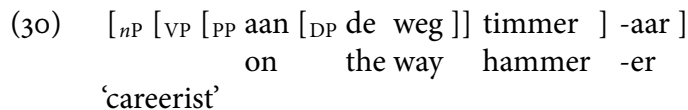
- (28) *
-
- The diagram shows two syntactic trees for the nominalization of 'drive truck'. Both trees are under a nominal projection (nP) with a nominalizer (n) and suffix (-er) attached to the VP. The left tree shows a VP branching into V (drive) and NP (truck), with an arrow pointing from the NP to the VP. The right tree shows a VP branching into NP (truck) and V (drive), with an arrow pointing from the V to the NP.

Further evidence for the activity of the FOFC in agentive nominalizations comes from observations made by Ackema & Neeleman (2004). Namely, the nominalizing suffix *-ist* can attach to a nominal

compound such as *rocket science* to form *rocket scientist*. However, *-ist* cannot combine with nouns taking complements, e.g. *history of science*, to form **history of scientist* (Ackema & Neeleman 2004:171). As (29) shows, *rocket scientist* is FOFC-compliant since compounds are presumably head-final, following Williams' (1981:248) *Righthand Head Rule* (also see Myler 2009). However, nominalization of a noun taking a genuine PP complement, as in **history of scientist*, results in a final-over-initial structure that is correctly ruled out by the FOFC.

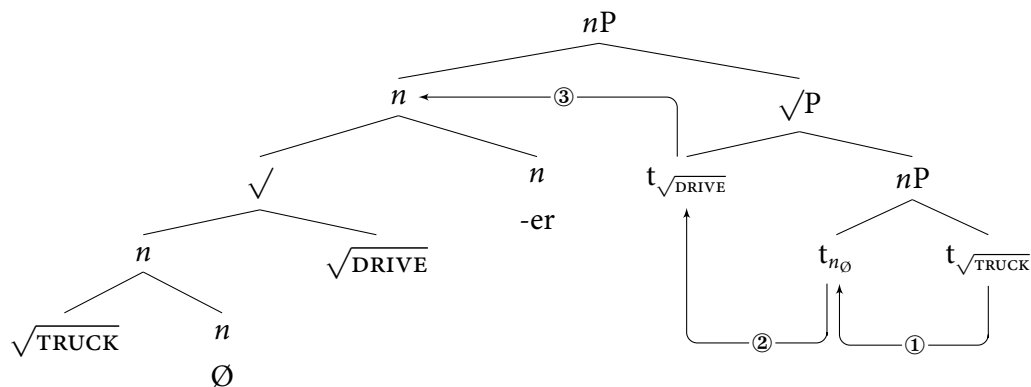


This is further bolstered by the observation by Ackema & Neeleman (2004:171) that heads taking PP complements can appear inside a nominalization, if the verb is head-final.⁵ In the Dutch example in (30), the suffix *-aar* embeds a head-final VP, a structure which respects the FOFC.



There are, of course, other approaches to the kind of nominalizations discussed here. In particular, agentive nominalizations of the *truck driver* kind are sometimes assumed to be the result of word formation via incorporation. In the spirit of Baker (1988), Harley (2009) argues that synthetic compounds are the result of noun incorporation via head movement (also see Punske 2016; Iordăchioaia et al. 2017). In the case of *truck driver*, this is formed by successive instances of head-movement to the *n* head (31). The OV order results from the way that the resulting complex head is linearized.

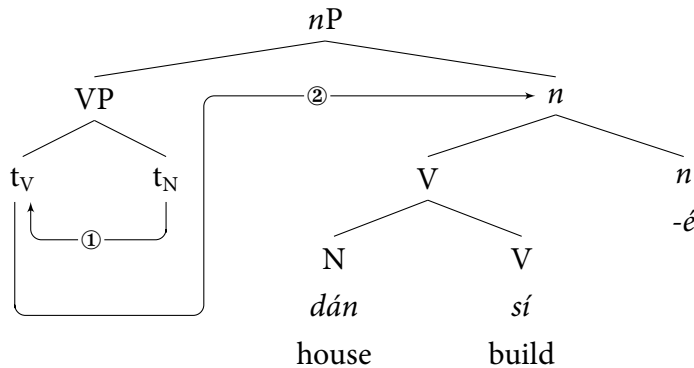
(31) *Incorporation analysis of synthetic compounds* (Harley 2009:136):



⁵Ackema & Neeleman (2004) offer a different explanation for the distinction between head-initial and head-final VPs in this regard. They assume that an affix that selects a phrase can only do so if it takes the head of that phrase as a host (Ackema & Neeleman 2004:164f.). We have seen counter-examples to this, e.g. in Krachi (16c). While their restriction can account for the headedness of phrases under suffixation, it is less clear that it captures why the restrictions are weaker with prefixation.

It is also possible to adopt a similar approach for the eventive VP nominalizations we discussed. An example such as (12b) would then have an analysis such as (32), where the noun first incorporates into the verb and this complex head subsequently moves to *n*.⁶

(32) *Incorporation approach to VP nominalization:*



One of the properties that is supposedly accounted for by a head-movement account is that only bare roots/*n* can act as goals for incorporation. Thus, **trucks driver* is ill-formed because it would require a Num-head to bear a feature triggering head movement (Harley 2009:141). Furthermore, an incorporation analysis is also assumed to derive the fact that complex phrasal material cannot appear inside such compounds (33) (also see Bresnan & Mchombo 1995).

(33) *No phrases in deverbal compounds* (Roeper & Siegel 1978:213)

- a. make [coffee] ⇒ coffee-maker
- b. make [some good dark coffee] ⇒ **good dark coffee-maker*

However, the exclusion of phrases from compounds is by no means absolute (see e.g. Botha 1981; Ackema & Neeleman 2004; Sato 2010; Bruening 2018). Indeed, the eventive VP nominalizations we are focusing on here show some degree of variation in the complexity of the nominal argument. For example, we see in Krachi (16) that the object can bear a plural marker, unlike in English (cf. **trucks driver*). In Buli, the object can be marked as definite (34).

(34) (Ká) [_{VP} mángò-kú dē]-kā àlì/àtì Àtìm dè dēm.
 FOC mango-DEF eat -NMLZ C Àtìm ate yesterday
 ‘It is eating the mango that Àtìm ate yesterday. (not e.g. buying a banana)’

(Buli; Hiraiwa 2005a:262)

Dagaare is even less restrictive and allows for a definite DP modified by an adjective and a demonstrative inside a nominalized VP (35).

⁶One might wonder whether the basic change from VO to OV under nominalization cannot simply be achieved by head movement from V-to-*n*. This is insufficient for several reasons. First, it has been argued by Ackema & Neeleman (2002) that there is a general restriction on rightward head movement that it cannot cross a dependent of that head (also see van Riemsdijk 1998). This rules out rightward movement of V to a head-final *n* position. This restriction has also been recently used as a rationale to derive the FOFC (Zejlstra 2016; Clem to appear). Furthermore, it is clear that the change from VO to OV with initial nominalizers cannot be derived by head movement to *n*, so something additional is required in any case.

- (35) [VP À bó-vèlàà ná dáá]-ó lá ká n (dá) dá.
 DEF goat-good DEM buy -NMLZ FOC C 1SG PST buy
 ‘It is buying that good goat that I did.’

(Dagaare; Hiraiwa & Bodomo 2008:805)

This would not be expected if these were genuine cases of noun incorporation (see Baker 2009:153). From this we conclude that the shift from VO to OV in nominalizations cannot be the result of incorporation via head movement. Some languages do seem to impose a ‘bareness’ requirement, however there is significant cross-linguistic variation in this regard. It is possible that the nominal object in deverbal nominalizations is subject to varying degrees of pseudo-incorporation, which require it to surface as a bare nominal (see Massam 2001).

4 Nominalized serial verb constructions

So far, we have only discussed nominalizations of transitive VPs containing a verb and a direct object, such as Dagaare (36). Recall that, due to Dagaare having a suffixal nominalizer, the word order inside the VP changes to OV when nominalized.

- (36) *VP nominalization in Dagaare* (Hiraiwa & Bodomo 2008:802, 805):

- a. Ñ dà [VP dá lá bóó]
 1SG PST buy FOC goat
 ‘I bought a goat.’
- b. [VP Bóó dáá]-ó lá ká n dà dà.
 goat buy -NMLZ FOC C 1SG PST buy
 ‘It is buying a goat that I did (as opposed to e.g. selling a hen).’

There are also more complex VP structures in some languages, often referred to as serial verb constructions. In Dagaare, these show the word order $V_1 O V_2$ where the direct object is shared between the two verbs (37).

- (37) *Verb serialization with shared object in Dagaare* (Hiraiwa & Bodomo 2008:796):

- a. Ò dà sé₁ lá **nénè** òò₂.
 3SG PST roast F meat eat
 ‘He roasted meat and ate it’ (V₁ O V₂)
- b. *Ò dà sé₁ lá òò₂ **nénè**.
 3SG PST roast F eat meat
 ‘He roasted meat and ate it’ (*V₁ V₂ O)

There have been a number of proposals for how to reconcile ‘object-sharing’ in serial verb constructions with a strict binary branching (Hale 1991; Collins 1997; Aboh 2009). However, Hiraiwa & Bodomo (2008) provide evidence from extraction that such an analysis is not adequate for Dagaare. As (38a) shows, it is possible to move the first verb (V₁) in the series together with the direct object. Furthermore, the direct object can also be fronted along with V₂ (38b). Finally, it is possible to extract both verbs together with the shared object (38c).⁷

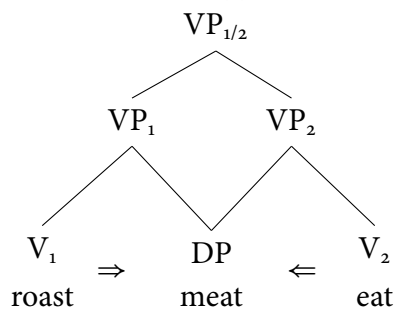
⁷Note that extracted verbs are doubled in their base-position, as is often found in predicate focus constructions

(38) *Extraction in SVCs in Dagaare* (Hiraiwa & Bodomo 2008:798):

- a. [_{VP₁} **Néñè** séé₁]-ó lá ká ó sé₁ ðð₂.
 meat roast -NMLZ F C 3SG roast eat
 ‘It is roasting meat that he did and ate (it)’ (extraction of DP+V₁)
- b. [_{VP₂} **Néñè** ðð₂]-ó lá ká ó sé₁ ðð₂.
 meat eat -NMLZ F C 3SG roast eat
 ‘It is eating meat that he roasted and did’ (extraction of DP+V₂)
- c. [_{VP_{1/2}} **Néñè** séé₁ ðð₂]-ó lá ká ó sé₁ ðð₂.
 meat roast eat -NMLZ F C 3SG roast eat
 ‘It is roasting meat and eating it that he did’ (extraction of DP+V₁+V₂)

These data suggest that the direct object can form a constituent both with V₁ and V₂, to the exclusion of the other verb. To capture this, they argue that object-sharing SVCs involve a ‘double-headed’ VP in the sense of Baker (1989) and Baker & Stewart (1999). Object sharing is then the result of a multidominant structure (e.g. Citko 2005, 2011; Gračanin-Yüksek 2013; Bachrach & Katzir 2017). These assumptions result in a structure such as the one in (39), where each verb takes the DP as its complement.⁸

(39) *Multidominance approach to sharing in SVCs:*



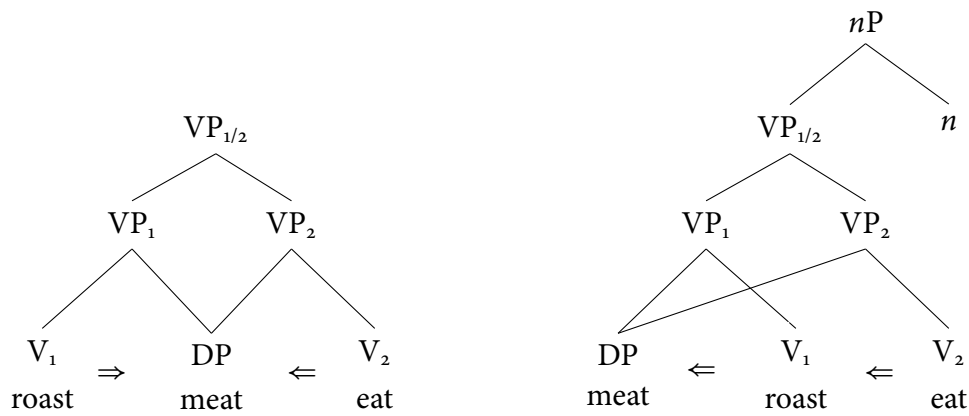
This structure now provides three phrasal constituents that can be targeted for movement, corresponding to the extraction possibilities that we saw in (38).

Note that the data in (38a,b) show the familiar word order shift from VO to OV inside the nominalized VP. Importantly, when the entire VP_{1/2} constituent is nominalized under extraction, we do not find the expected V₁ O V₂ order, but rather a shifted O V₁ V₂ pattern inside the VP. We argue that this follows from the structure in (39) and a FOFC-based analysis of OV order in nominalizations. The nominalizer attaches to the larger VP_{1/2} constituent, which consists of a head-initial VP₁ and a head-final VP₂ (40). This creates a FOFC-compliant structure with regard to V₂, but a banned final-over-initial configuration with regard to V₁. The prediction of the FOFC account is that a re-linearization repair should apply to VP₁, but not VP₂, resulting in VP₁ becoming head-final (40). Recall from (38c) that this is indeed what we find, namely a change of word order from V₁ O V₂ to O V₁ V₂.

(see e.g. Hein 2017, 2018). Hiraiwa & Bodomo (2008:804) assume that this construction involves movement in Dagaare since it is both unbounded and constrained by islands. Hiraiwa (2005b:551f.) argues that in Buli, which has a similar profile to Dagaare, predicate V(P) fronting is sensitive to islands and shows reconstruction effects.

⁸It is important to mention that Hiraiwa & Bodomo (2008) assume that the double-headed structure involves AspPs, since each verb in the series inflects for aspect. It is not strictly speaking necessary to have two syntactic projections to account for multiple affixation if there is something like ATB-lowering of affixes that is required for T with cases of low verbal coordination, e.g. *I hope that John [go-es and talk-s] to Mary* (de Vos 2005).

(40)



This has some further consequences for the FOFC. Recall from its definition in (1) that it mentions ‘immediate domination’. If double-headed XPs of the kind in (39) also fall under the scope of the FOFC, then immediate domination cannot be the correct structural relation. Alternative formulations that refer to some other notion such as *selection* or *minimal c-command* may be able to accommodate double-headed structures, while remaining sufficiently restrictive (see for example the more formal definition in (42) below).

The previously discussed data from nominalized serial verb constructions also have some consequences for the precise implementation of the FOFC. Biberauer et al. (2014) propose an LCA-based account of the FOFC (Kayne 1994), which is incompatible with structures such as (39). Instead, head-final structures must be derived by ‘roll-up’ movement of the complement of a head to its specifier. Concretely, Biberauer et al. (2014) propose that this is triggered by a caret diacritic on the categorial feature of that head. A head-final VP, for example, is derived by a [+V[^]] feature on the V head (41a), which triggers movement of its complement (41b).

- (41) a. [VP V_{[+V[^]]} DP]
- b. [VP DP [V' V_{[+V[^]]} —DP]]

The FOFC can be accounted for by assuming that this caret feature can reach a higher head by percolation from a lower head within the same extended projection. This is expressed in the following formal definition of the FOFC:

- (42) *The Final-over-Final Condition (formal statement)* (Biberauer et al. 2014:210):
 If a head α_i in the extended projection EP of a lexical head L, EP(L), has [^] associated with its [$\pm V$]-feature, then so does α_{i+1} , where α_{i+1} is c-selected by α_i in EP(L)

This means that an Aux head, for example, can only bear the [^] triggering roll-up movement if the head of the phrase it selects (V) also bears it. This crucially rules out the unwanted final-over-initial configuration (43).

- (43) *_{[AuxP [VP V_[+V] DP] [Aux' Aux_{[+V[^]]} —VP]]}

The Dagaare data pose a challenge to this implementation of the FOFC, however. Putting aside the constituency facts, which are already difficult to reconcile with strict binary branching, an

LCA-based approach could derive the V_1 O V_2 order we find with Dagaare serial verbs as follows. Given a structure in which V_2 selects V_1 , the desired word order can be derived by positing a caret only on the higher head (44). While this would ordinarily constitute a violation of the condition in (42), this can be avoided if we assume that V_1 and V_2 each belong to their own extended projections.

- (44) a. $[_{VP_2} V_{2[+V^*]} [_{VP_1} V_{1[+V]} DP]]$
 b. $[_{VP_2} [_{VP_1} V_{1[+V]} DP] [_{V'} V_{2[+V^*]} \text{---}_{VP_1}]]$
-

This derives the desired ‘object sharing’ configuration (V_1 O V_2). However, recall that when this VP is nominalized, the object must precede both verbs. Assuming that n belongs to the same EP as the VP it attaches to, it inherits the caret feature and triggers movement of VP_2 (45).

- (45) a. $[_{nP} n_{[+V^*]} [_{VP_2} [_{VP_1} V_{1[+V]} DP] [_{V'} V_{2[+V^*]} \text{---}_{VP_1}]]]]$
 b. $[_{nP} [_{VP_2} [_{VP_1} V_{1[+V]} DP] [_{V'} V_{2[+V^*]} \text{---}_{VP_1}]]] [_{n'} n_{[+V^*]} \text{---}_{VP_2}]]$
-

The problem now is that, while this gives us the head-finality of the nominalizer, it does not derive the correct word order within the VP (O V_1 V_2). We require head-finality of both VPs when the higher one is nominalized. This can only be achieved by assuming that both V_1 and V_2 belong to the same EP, leading to roll-up movement within VP_1 . However, recall that the basic order as derived in (44) crucially requires that they do not belong to the same EP. This therefore presents us with a seemingly irreconcilable paradox.⁹

This is not reconciled by positing a different base-generated structure for the verb series. For example, we could assume that V_1 is actually the hierchically higher of the two verbs (46a). Here, a head-initial V_1 would embed a head-final VP, which is permitted by the FOFC. The object sharing configuration is applied by movement of the object to Spec- V_2 (46), similar to the structure proposed by Collins (1997).

- (46) a. $[_{VP_1} V_{1[+V]} [_{VP_2} V_{2[+V^*]} DP]]$
 b. $[_{VP_1} V_{1[+V]} [_{VP} DP [_{V'} V_{2[+V^*]} \text{---}_{DP}]]]]$
-

The problem with this structure is again that there is no way to derive the correct order under nominalization, namely O V_1 V_2 . If we assume that n and V_1 do not belong to the same EP, then roll-up movement is possible, but offers not change to the internal word order of the VP (47).

- (47) a. $[_{VP_1} V_{1[+V]} [_{VP} DP [_{V'} V_{2[+V^*]} \text{---}_{DP}]]]]$
 b. $[_{nP} [_{VP_1} V_{1[+V]} [_{VP} DP [_{V'} V_{2[+V^*]} \text{---}_{DP}]]]] [_{n'} n_{[+V^*]} \text{---}_{VP_1}]]$
-

⁹It seems unsatisfactory for various reasons to say that V_1 and V_2 belong to the same EP only if VP_2 will be nominalized. The main problem is that it requires Look Ahead. In order to know whether to percolate the caret feature from V_1 to V_2 , we have to know whether VP_2 will later combine with a n . Since there is no local relation between the lower VP_1 and n , this is ruled out by a strict notion of cyclicity (e.g. McCawley 1984).

Even if we did apply movement in every phrase to derive a uniformly head-final structure, the respective order of the verbs is still incorrect (*O V₂ V₁), as shown in (48).

- (48) a. [VP₁ V_{1[+V]} [VP₂ DP [V' V_{2[+V']} —DP]]]
 b. [VP₁ [VP₂ DP [V' V_{2[+V']} —DP]]] [V' V_{1[+V']} —VP₂]]
 c. [_{nP} [VP₁ [VP₂ DP [V' V_{2[+V']} —DP]]] [V' V_{1[+V']} —VP₂]]] [_{n'} n_[+V'] —VP₁]]

We therefore conclude that there is no unproblematic way to derive nominalized serial verb constructions under an LCA-based approach. On the other hand, the multidominance structure proposed by Hiraiwa & Bodomo (2008), when combined with the re-linearization analysis developed above makes the correct predictions.

5 Typology

As shown in section 3, a FOFC-based analysis of word order in VP nominalization predicts 3/4 patterns to be attested. More precisely, of the two possible disharmonic word orders, only one should be possible, namely NMLZ-O-V. We saw that a few languages such as Krachi, Yoruba and Igbo seem to instantiate this pattern, as optional deviations from a base order of VO. We might expect to find more examples if we look at languages whose basic word order is OV. It turns out, however, that all of the OV-languages we could find exhibit head-final nominalizers. Nominalized head-final VPs have been reported in Korean (49), Southern Paiute (50), Khoekhoe (51) and Bzhedug Adyghe (52).

(49) *Korean* (Choi 2000:333; Cho & Kim 2002:679):

- a. John-i [VP Mary-lul manna-ss-ta]
 John-NOM Mary-ACC meet-PST-DECL
 'John met Mary.' (O V)
- b. [VP Sakwa-lul mek]-ki-nun John-i mek-ess-ta.
 apple-ACC eat -NMLZ-TOP John-NOM eat-PST-DECL
 'As for eating apples, John did.' (O V NMLZ)

(50) *Southern Paiute* (Givón 2011:229f.):

- a. 'Áapachi 'u [VP kwanachi 'uway paqha-qa]
 boy the eagle the kill-ANT
 'The boy killed the eagle.' (O V)
- b. [VP 'Inay kwanachi paqha]-ta ka-'ay-wa-tu 'ura-qa.
 this eagle kill -NMLZ NEG-good-NEG-NMLZ be-ANT
 'Killing this eagle was bad.' (O V NMLZ)

(51) *Khoekhoe* (den Besten 2002:25,37):

- a. Tita ge [VP ti ||naoba [goro gurin ei-!â] ge mú]
 1SG DECL 1SG.POSS uncle five years ago RM.PST see
 'I have seen my uncle five years ago.' (O V)

- b. [VP ||nãã'n hòá'nà ||nãũ]-s
 that all hear -NMLZ
 'hear all that' (O V NMLZ)

(52) *Bzhedug Adyghe* (Ershova 2015:99,103):

- a. Haçe-me s-ja-že.
 guest-PL 1SG.ABS-3PL.IO-wait
 'I'm waiting for guests.' (O V)
- b. [VP Haç'è-xe-m ja-je-že]-n Zarine jəʔ^wef.
 guest-PL-OBL 3PL.POSS-DAT-wait -NMLZ Zarina POSS.work
 'Waiting for guests is Zarina's task.' (O V NMLZ)

We have not yet been able to find any OV languages with a prefixal nominalizer, even though this is predicted to be possible by the FOFC account. This gap is perhaps not too surprising though, since head-final languages tend to be overwhelmingly suffixal (Hawkins & Gilligan 1988:230). What is more, disharmonic word orders are also claimed to be rarer in general (Biberauer & Sheehan 2012:209). This conspiracy of factors may mean that, although the order NMLZ-OV is theoretically possible, it never arises due to the overwhelming preference for suffixation. With this said, we have the more complete typology in (53).

(53) *Typology of eventive VP nominalization (complete):*

	Base order	Nominalized	
Bzhedug Adyghe	OV	OV-NMLZ	(Ershova 2015)
Jamsay	OV	OV-NMLZ	(Heath 2008)
Khoekhoe	OV	OV-NMLZ	(den Besten 2002)
Korean	OV	OV-NMLZ	(Cho & Kim 2002)
Southern Paiute	OV	OV-NMLZ	(Givón 2011)
Akan	VO	OV-NMLZ	(Hein 2017)
Buli	VO	OV-NMLZ	(Hiraiwa 2005a,b)
Dagaare	VO	OV-NMLZ	(Hiraiwa & Bodomo 2008)
Dangme	VO	OV-NMLZ	(Ameka & Kropp Dakubu 2008)
Ewe	VO	OV-NMLZ	(Buell 2012)
Gengbe	VO	OV-NMLZ	(Aboh 2005:165f.)
Krachi	VO	NMLZ-OV	(Kandybowicz & Torrence 2016)
Igbo	VO	NMLZ-OV	(Manfredi 1997)
Yoruba	VO	NMLZ-OV	(Manfredi 1997)
Krachi	VO	NMLZ-VO	(Kandybowicz & Torrence 2016)
Edo	VO	NMLZ-VO-NMLZ	(Stewart 2001)
Hausa	VO	NMLZ-VO	(Hartmann 2006)
Limbum	VO	NMLZ-VO	(Becker & Nformi 2016)
Mani	VO	NMLZ-VO	(Childs 2011)
Thai	VO	NMLZ-VO	(Jenks 2011)
Yoruba	VO	NMLZ-VO	(Manfredi 1993)

This emphasizes the strength of the empirical generalization that we find the 3/4 orders predicted by the FOFC, but crucially not the one illicit order.

6 Conclusion

In this paper, we have argued that the scope of the Final-over-Final Condition should be extended to nominalizations. The motivation for this comes from the consistent avoidance of VO order inside nominalized VPs with a suffixal nominalizer. We found no comparable restriction with prefixal nominalizers. We have argued that this directional asymmetry follows naturally under an explanation that invokes the FOFC, since the unattested order would constitute an illicit final-over-initial configuration. Extending the FOFC to nominalizations is somewhat problematic given the fact that it is assumed to only hold within an extended projection (Biberauer et al. 2014). This can be accommodated by assuming that nominalizations constitute mixed extended projections (Borsley & Kornfilt 2000), which also fall under the scope of the FOFC.

The FOFC-based explanation was also argued to make correct predictions about agentive nominalizations such as *truck driver* in English, namely that these can be built on head-final but not head-initial VPs. Further evidence was provided from nominalized serial verb constructions with shared objects. The observed change in order from $V_1 O V_2$ to $DP V_1 V_2$ follows under the symmetric sharing analysis of Hiraiwa & Bodomo (2008) and the assumption that the FOFC applies to each projection individually within a ‘double-headed’ structure. Again, this requires a slight relaxation of the locality condition of the FOFC with regard to immediate domination of phrases.

The FOFC is clearly a truly robust and important empirical finding, and its success in the domain of nominalization suggests that we have not yet exhausted its scope. With this said, many important questions about its precise consequences for the theory of grammar have not yet been answered conclusively (Sheehan 2013a; Pesetsky 2017); in particular, how the FOFC should be implemented. We suggested an approach involving flexible linearization, in lieu of a strictly LCA-based theory such as Biberauer et al. (2014). We argued that the LCA-based approach struggles to capture the more complex word order facts in nominalized serial verb constructions. Nevertheless, the conclusion is that the FOFC, whatever its technical implementation, can provide an insightful explanation for word order restrictions within nominalized VPs, further supporting its status as an important explanatory tool and a potential syntactic universal.

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