**A syntactic universal and its consequences**[*]

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**Abstract**

This paper investigates the Final-over-Final Constraint (FOFC): a head-initial category cannot be the immediate structural complement of a head-final category within the same Extended Projection. This universal cannot be formulated without reference to the kind of hierarchical structure generated by standard models of phrase structure. First, we document the empirical evidence, logically possible but cross-linguistically unattested combinations of head-final and head-initial orders. Second, we propose a theory, based on a version of Kayne's (1994) Linear Correspondence Axiom, where FOFC is an effect of the distribution of a movement-triggering feature in Extended Projections, subject to Relativized Minimality.

**Keywords**: Extended Projection, linearization, Relativised Minimality, word order, universal.

## 1. Introduction

In this paper, we investigate a putative language universal. Like much fruitful recent work, we build on the two principal currents of research on universals which have emerged in the past fifty years or so: the Chomskyan tradition, in which the existence of language universals is deduced from the existence of an innate predisposition to language acquisition, and the Greenbergian tradition, in which universals, or at least strong tendencies to common patterning, are observed in wide-ranging surveys of cross-linguistic data.

More specifically, while the Greenbergian programme has yielded many empirical results of real interest and relevance to the study of universals, many of the insights into

natural-language syntax which emerge from Chomskyan syntactic theory play a minor role, if any, in this work. In particular, many of the Greenbergian word-order generalisations (e.g. Greenberg's (1963) Universals 2-5) relate only to weakly-generated strings, paying no attention at all to hierarchical relations (cf. Chomsky 1965: 60-62 on the distinction between weak and strong generation). Nor do Greenberg's generalisations indicate the need for an approach to grammatical categories that goes much beyond traditional parts of speech; the possibility that categories may be broken down into classes by being decomposed into features plays little or no role in most typological work. The main goal of this paper is to argue for the existence of a hierarchical universal, one which cannot be stated in purely linear terms, but only in terms of strongly-generated structure and which, we believe, is best understood as applying to Extended Projections (Grimshaw 1991, 2001, 2005), a notion defined in terms of categorial features. We believe that the existence of this universal not only provides strong evidence for the hierarchical nature of natural-language syntax and the existence of Extended Projections, but also shows that the greatest insight into language universals may be gained by combining both the Greenbergian and the Chomskyan traditions (in line with Cinque in press).

Whitman (2008:234, 251) discusses the nature of hierachical universals (*hierarchical generalizations* in his terms). He defines such universals as describing the relative position of two or more categories in a single structure, where this position follows from the underlying hierarchical arrangement of constituents. For example, according to Whitman, the fact that Specifiers appear universally to the left of the head they specify is an instance of a hierarchical universal (cf. among others Pearson 2001 and Aldridge 2004 for evidence that apparently Spec-final VOS languages are also best analysed as Spec-initial). Whitman (2008:234) suggests that hierarchical universals are absolute, while implicational universals of the kind familiar since Greenberg (1963) are better conceived of as *cross-categorial*

*generalizations*, which, being the product of processes of language change, are typically statistical.

The purpose of this paper is to introduce, motivate and explain the **Final-over-Final Constraint** (henceforth: *FOFC*), a generalisation that we, *pace* Whitman (2008), take to be both a hierarchical *and* a cross-categorial universal. FOFC is a universal constraint on phrase-structure configurations, not statable in purely linear terms. Initially, we formulate FOFC as follows (see Holmberg 2000:124):[1]

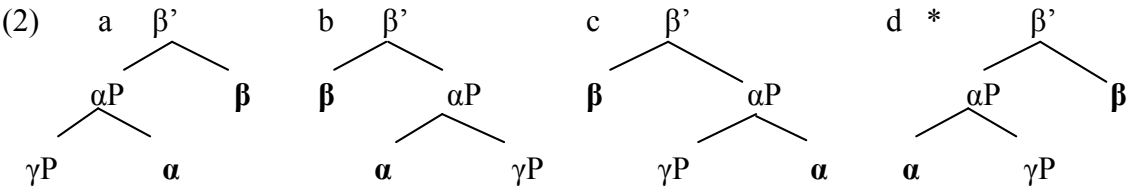
(1) **The Final-over-Final Constraint (FOFC) (informal statement)**

A head-final phrase αP cannot dominate a head-initial phrase βP where α and β are heads in the same Extended Projection.

The converse does not hold: a head-initial phrase αP may dominate a phrase βP which is either head-initial or head-final, where α and β are heads in the same Extended Projection.

Consider the logically possible complementation combinations among head-initial and head-final categories:

(2)




**Consistent head-final** (harmonic) | **Consistent head-initial**(harmonic) | **Initial-over-Final** (disharmonic) | **Final-over-Initial** (disharmonic)

As (2) shows, FOFC determines that three of the four logically possible combinations are allowed and one is nonexistent (within a single Extended Projection). The harmonic

configurations in (2a,b) are very common, while (2c) is somewhat less common but still occurs. In other words, harmony is preferred (as has often been observed: Greenberg 1963, Hawkins 1983, Dryer 1992, Baker 2008), but disharmony is allowed. Crucially, though, *only one kind of disharmony* is allowed.

In other words, the configuration (3) is ruled out, where αP is dominated by a projection of β, γP is a sister of α, and α and β are heads in the same Extended Projection:

(3) *[$_{\beta P}$ … [$_{\alpha P}$ … α γP ] β … ]

As we will show, this generalization holds across categories and across typologically widely divergent languages. It holds in the verbal Extended Projection (VP, TP, CP) as well as the nominal Extended Projection (NP, DP, PP). It also constrains diachronic change. It has a number of interesting and far-reaching consequences. For one thing, it entails that, in mixed systems at least, head-final order is more constrained than head-initial order, and, in that sense, it is also more marked than head-initial order. It is therefore pertinent to the controversial question whether one order is more 'basic' than the other (as debated by *inter alia* Kayne 1994, 2000, 2012 and Haider 1992, 1995, 1997a,b,c, 2000, 2012). We will argue that FOFC thus provides support for (a version of) Kayne's (1994) Linear Correspondence Axiom (LCA), one notorious consequence of which is that head-final order is derivationally more complex than head-initial order, and, in that sense, more marked.

As will be shown, FOFC explains, or is part of the explanation of, a range of cross-linguistic generalizations, including the following:

(a) The higher a head is in an Extended Projection, the less likely it is to be head-final. Thus, for example, OV order is more common cross-linguistically than clause-final

complementizers (this follows from the fact, documented below in section 2.3, that final Cs are not found in VO languages, but initial Cs are found in both VO and OV languages).

(b) In diachronic word-order change, change from head-final to head-initial starts at the top of the Extended Projection; for example, change from OV to VO is preceded by change from VP-T to T-VP, which is preceded by TP-C to C-TP. Conversely, change from head-initial to head-final starts at the bottom of the Extended Projection.

(c) In OV languages which have embedded finite clauses with an initial complementizer the embedded clause is always extraposed.

We will propose a formal account of FOFC in terms of Kayne's (1994) Linear Correspondence Axiom (LCA) combined with the hypothesis advanced by Chomsky (2000, 2001), that all movement is triggered by a special feature on heads.

(4) **The LCA**

$\alpha$ precedes $\beta$ if and only if $\alpha$ asymmetrically c-commands $\beta$, or if $\alpha$ is contained in $\gamma$, where $\gamma$ asymmetrically c-commands $\beta$ (adapted from Kayne 1994).

According to the LCA, head-final order must be derived by movement of the complement to a position asymmetrically c-commanding the head. If movement is always triggered by a feature (an 'EPP-feature' or an 'edge feature'; Chomsky 2001, 2007, 2008), the head in a head-final phrase must have a feature triggering movement of its complement, which a head-initial counterpart does not have. We can then understand FOFC as being an effect of 'spreading' of this movement-triggering feature from head to head along the spine of an Extended Projection to a designated head, which may be the highest head in the Extended Projection (yielding a harmonically head-final tree), but need not be (yielding a partially harmonic tree). We will argue that the domain of FOFC is, indeed, the Extended Projection,

roughly in Grimshaw's (1991, 2001, 2005) sense. This conclusion motivates the relevance of Grimshaw's notion for the investigation of universals, and arguably the concomitant notion that syntactic categories should be decomposed into features.

The paper is organised as follows: in section 2, we present FOFC and provide the principal empirical motivation for it; in section 3, we present and account for certain apparent counterexamples; in section 4, we present our theory of linear order and show how FOFC can be derived from it, applying the analysis to the data introduced in sections2 and 3. Section 5 concludes the paper.

## 2. The Final-over-Final Constraint (FOFC)

As mentioned in the Introduction, our key proposal is that FOFC is a universal. The import of the formulation of FOFC in (1) is that it rules out structures like (3), repeated below, where αP is the complement of β and γP is the complement of α, and α and β are part of the same Extended Projection. Note that, if head-final orders are derived in the manner described above, αP may have moved to its position in (3), leaving a copy to the right of β:

(3) *[$_{\beta P}$ … [$_{\alpha P}$ … α γP ] β … ]

Our principal empirical claim, then, is that configurations instantiating the schema in (3) are not found in the world's languages. We now present the evidence for this.

## 2.1 *V-O-Aux

### 2.1.1 *V-O-Aux in Germanic

Our initial observation comes from comparative Germanic. Looking across Germanic varieties, both synchronically and diachronically, we observe a very wide range of word orders, particularly at the clausal level and in VP. If we consider the three elements Aux,[2] V and O, we find all possible permutations of these, with one very striking exception: the order V-O-Aux is not found. This fact has often been noted; see, among others, Travis (1984:157-8), den Besten (1986/1989), Kiparsky (1996:168-171), Pintzuk (1991, 1999), Hróarsdóttir (1999, 2000), Fuss and Trips (2002). Given the analysis $[_{AuxP}\ [_{VP}\ V\ O]\ Aux]$ this construction violates FOFC, with $\alpha$ = V and $\beta$ = Aux (whether or not VP is in a derived position here). Let us look at the various permutations one by one.

First, O-V-Aux (*(John) the book read has*) is readily found. (5) illustrates this from German, extrapolating from main clauses, as is standard practice, in order to avoid the confound introduced by the verb-second (V2) phenomenon:

(5) ... dass Johann das Buch gelesen hat
that John the book read.PART has
'… that John has read the book'

This order is found, primarily in subordinate clauses of various kinds, in German, Dutch, Afrikaans, Yiddish, all German, Dutch/Flemish and Afrikaans dialects, Old English (OE) and Old Norse (ON). It is usually thought to derive from head-final order in both AuxP and VP, and thus respects FOFC.

Second, we find Aux-V-O (*(John) has read the book*). This is the head-initial order, different variants of which are found in Modern English and throughout Modern North Germanic. Given the standard analysis *[$_{AuxP}$ Aux [$_{VP}$ V O]]*, it respects FOFC trivially. It is also found in Yiddish (Santorini 1992), colloquial Afrikaans and older Germanic varieties (see, for example, van Kemenade 1987 and Pintzuk 1991, 1999 on Old English, Schallert 2010 and Sapp 2011 on earlier German, and Hoeksema 1993 on Middle Dutch) :

(6)a. Yiddish

... oyb dos yingl vet oyfn veg zen a kats

whether the boy will on.the way see a cat

'... whether the boy will see a cat on the way'

(Santorini 1992:597)

b. OE:

... þæt he mot ehtan godra manna

that he might persecute.INF good men

'... that he might persecute good men'

(*Wulfstan's Homilies* 130.37 – 38; Pintzuk 2002:282, 13b)

We may assume, for now, that the different word orders are base-generated. We will return below to the derivation of the different structures/orders and the role of FOFC in these derivations.

Third, we observe the order Aux-O-V (*(John) has the book read*).[3]

(7) a. West Flemish (Haegeman and van Riemsdijk 1986):

... da Jan wilt een huis kopen

that John wants a house buy.INF

'... that Jan wants to buy a house'

b. Zürich German (Haegeman and van Riemsdijk 1986):

... das de Hans wil es huus chaufe

that the Hans wants a house buy.INF

'... that Hans wants to buy a house'

c. OE:

... þæt hie mihton swa bealdlice Godes geleafan bodian

that they could so boldly God's faith preach.INF

'...that they could preach God's faith so boldly'

(*The Homilies of the Anglo-Saxon Church* I 232; van Kemenade 1987:179)

This order is also found in Middle Dutch (Hoeksema 1993), Old High German (Behaghel 1932), ON (Hróarsdóttir 1999:203ff.), and in numerous non-standard varieties of Dutch, of Swiss and Austrian German and also of Afrikaans (see Wurmbrand 2006 and Schmid 2005 for discussion and overview). Note that we appear to have the inverse of the configuration excluded by FOFC here, in that we plausibly have a head-initial AuxP (with the order Aux > VP) and, as complement to the Aux, a head-final VP. Initial-over-final structures are readily attested then, while final-over-initial, schematised in (3), is not. This is the central asymmetry that we observe.

Fourth, we find the order O-Aux-V (*(John) the book has read*).[4]

(8) a. Dutch:

... dat Jan het boek wil lezen

that John the book wants read.INF

'... that John wants to read the book'

b. OE:

... þe æfre on gefeohte his handa wolde afylan

who ever in battle his hands would defile.INF

'... whoever would defile his hands in battle'

(*Ælfric's Lives of Saints* 25.858; Pintzuk 1991:102)

This order is also found in all variants of Afrikaans and many nonstandard West Germanic varieties, but not in Standard German. Whatever the precise analysis of these sentences, there is no reason to think that there is a violation of FOFC here; to our knowledge, no derivation featuring an intermediate or initial V-O-Aux order has ever been proposed for examples like these.

A rarer, but still attested order is V Aux O (*(John) read has the book*). This has often been described as 'object extraposition' (cf. i.a. Reuland 1981, and den Besten and Rutten 1989). Here we illustrate with 'PP extraposition' in colloquial Afrikaans and OE:

(9) a. Colloquial Afrikaans:[5]

... dat hy die boek gegee het vir sy suster

that he the book given.PART has for his sister

'... that he gave the book to his sister'

b. OE:

... þæt ænig mon atellan mæge ealne þone demm

that any man relate.INF can all the misery

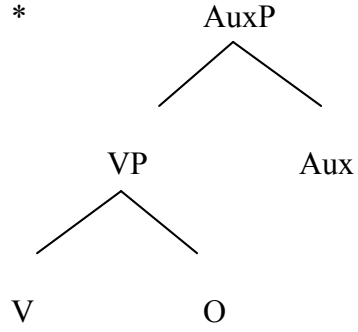
'... that any man can relate all the misery'

(*Orosius* 52.6 – 7; Pintzuk 2002:283, 16b)

Where the 'extraposed element is a CP, this order is obligatory in German, Dutch and Afrikaans (see also section 2.3 below). It is also found in ON (Hróarsdóttir 1999:201-2), and in earlier German and Dutch (cf. i.a. Bies 1996, Sapp 2011, and Hoeksema 1993). Whether we derive this in the 'traditional' fashion, by extraposition of the complement of V (cf. i.a. Evers 1975, Rutten 1991), or by a succession of leftwards movements, including possibly remnant VP-movement, from a head-initial underlying structure (cf. i.a. Zwart 1997, Hinterhölzl 2005), no analysis has been proposed that would not respect FOFC.

At first sight then, it seems that all possible word orders are found, that, across the range of varieties, synchronically and diachronically, anything goes. But this is not the case. As noted at the start of this section, the crucial observation is that **V-O-Aux is not attested**.[6] The missing order is the one that instantiates the FOFC schema in (3) above for α = V, β = Aux. In other words, the missing configuration is that in (10):

(10) *



Whether derived or base-generated, the structure in (10) is not found in Germanic.

In the cases we have seen in this section, FOFC is 'surface true' in the sense that strings made up of a head followed by its complement followed by a higher head are ruled out. We will see below that this is not always the case, which is not surprising given that FOFC is a structural constraint, not a constraint on surface word order.

### 2.1.2 *[VO] Aux in Finnish

The absence of V-O-Aux order is not restricted to Germanic. The same gap exists in Finnish (Holmberg 2000:128), Northern Saami (Marit Julien, p.c.), and Basque (Haddican 2004:116) and Late Latin, all languages that exhibit VO as well as OV order.

Holmberg (2000:128) shows that Finnish is basically Aux-V-O. But, under specific conditions, where the matrix C is [+focus] or [+wh] OV order is permitted. (See Holmberg 2000 and section 4.6 for more details.) Furthermore, under those conditions, O-V-Aux is permitted as an alternative to Aux-O-V. That is to say, the auxiliary may precede or follow the VP. However V-O-Aux is never allowed. The paradigm is illustrated in (11):

(11) a. Milloin Jussi olisi kirjoittanut romaanin? [Aux[V O]]
when Jussi would-have written novel
'When would Jussi have written a novel?'

b. Milloin Jussi olisi romaanin kirjoittanut? [Aux [O V]]
when Jussi would-have novel written
'When would Jussi have written a novel?'

c. Milloin Jussi romaanin kirjoittanut olisi? [[O V] Aux]

when Jussi novel written would-have

'When would Jussi have written a novel?'

d. *Milloin Jussi kirjoittanut romaanin olisi? *[[V O]Aux]

when Jussi written novel would-have

That is to say, the structure which violates FOFC is ruled out.

2.1.3 *[VO] Aux in Basque

Haddican (2004:116) observes the absence of FOFC-violating V-O-Aux structures in Basque:

(12) a. Jon-ek ez dio Miren- i egia esan [Aux [O V]]

Jon-ERG not AUX Miren-DAT truth say-PERF

'Jon has not told Miren the truth'

b. Jon-ek ez dio esan Miren -i egia [Aux [V O]]

Jon-ERG not AUX say-PERF Miren-DAT truth

'Jon has not told Miren the truth'

(13) a. Jon-ek Miren-i egia esan dio [[O V] Aux]

Jon-ERG Miren-DAT truth say-PERF AUX

'Jon has told Miren the truth'

b. *Jon-ek esan Miren- i egia dio *[ [V O] Aux]

Jon-ERG say-PERF Miren- DAT truth AUX

Here we see that Basque's 'basic' OV order may alternate with VO order in negative structures, where Aux surfaces before the contents of VP (12), but that the same possibility is not available in affirmative structures, where Aux follows the contents of VP (13).[7]

2.1.4 *[VO] Aux in Kaaps

Biberauer, Sheehan and Newton (2010) have shown that V-O-Aux orders are also unattested in language-contact situations. For example, in South Africa there is extensive contact between Afrikaans, an OV language with head-final order in IP and VP, and English, which, of course, has head-initial IP and VP. In the variety most heavily influenced by English, Kaaps, spoken by the so-called Coloured population in the Cape, we find a range of possible orders in subordinate clauses (where V2 is generally inoperative). However, the one order that we do not find is VOAux:

(14) a. … dat ek [$_{VP}$ R1400 van die Revenue gekry] het [[OV]Aux]

that I R1400 from the Revenue got have

'… that I got R1400 from the Receiver of Revenue'

b. … dat ek het [$_{VP}$ R1400 van die Revenue gekry] [Aux [O V]]

c. … dat ek het [$_{VP}$ gekry R1400 van die Revenue] [Aux [V O]]

d. *… dat ek [$_{VP}$ gekry R1400 van die Revenue] het *[[V O] Aux]

### 2.1.5 *[VO] Aux in Latin

Latin is generally analysed as an OV language with rather free word order, especially in literary classical texts (Harris 1978, Vincent 1988, Pinkster 1990, Salvi 2004, Devine and Stephens 2006, Clackson and Horrocks 2007, Ledgeway 2012). Given the fairly synthetic nature of its verbal morphology, it is uncertain that Latin had auxiliaries. However, one candidate construction is the perfect form of passives and deponents, formed from the perfective participle of the verb and the auxiliary *esse* 'to be'. Ledgeway (2012:255) specifically notes the dearth of auxiliaries in Latin and the concomitant difficulty of testing FOFC in this domain; he also notes, following Adams (1994a,b), that *esse* acts like a clitic in some respects, tending to appear in second position in the clause or enclitic to the negator *non*. This clearly adds a further difficulty, but let us, nevertheless, make the assumption that Latin *esse* was indeed an auxiliary from at least the Classical period (first century BCE – the end of the first century CE) onwards.

Citation forms of the perfect tenses of passives and deponents generally give the expected head-final order, e.g. *amatus sum* (loved-NOM.SG.M. be.1SG, 'I have been/was loved'), as would be expected for an OV language. It is, however, clear from the manuals (Gildersleeve and Lodge 1997, Ernout and Thomas 1953, Kühner and Stegmann 1955, Salvi 2004, Devine and Stephens 2006, Ledgeway 2012) and also from Danckaert (2012a,b) that the reverse order was also possible. Given the fact that the class of deponents included transitives (e.g. *sequor* – 'follow', *hortor* – 'encourage, urge', and *minor* – 'threaten'), and also that Latin allowed impersonal passives in which the logical direct object could appear in the accusative (see Keenan 1985, Keenan and Dryer 2007), and, moreover, that A-movement of the object

was not obligatory in passives, as in Modern Italian (Burzio 1986), V-O-Aux, where *O* is a logical object, bearing either accusative or nominative case, was clearly a possibility. Danckaert (2012b:3), however, highlights a surprising fact about the attestation of these structures: Late Latin (200 CE onwards) appears to conform to FOFC, exactly like the Germanic languages, Finnish and Basque do; in Classical Latin, however, there does appear to be a low, but nevertheless non-negligible level of V-O-Aux.[8] This is surprising since literary Classical Latin is generally believed to have been fundamentally OV (cf. Ledgeway 2012:225-235 for detailed discussion and references, including the suggestion that OV orders may have been a conservative feature of this variety of Latin consciously used by certain writers, notably Caesar), with VO ordering only becoming systematically available as a neutral order during later eras. As such, we would expect V-O-Aux ordering to be common in later rather than earlier Latin. The fact that the reverse is true strongly suggests that the V-O-Aux structures found in the Classical period may be of a "special" type not instantiating the schema in (3); we return to these structures in section 2.2 below. Here we note the diachronically very significant fact that Late Latin, a variety used at a stage during which VO order was very common, but during which head-final *esse* survived (cf. Danckaert 2012b:37-38), does not appear to permit V-O-Aux structures.

### 2.1.6 Conclusion

Our first piece of evidence for FOFC, then, stems from the cross-linguistic absence of V-O-Aux order, notably in the mixed systems of the West Germanic languages (including Kaaps), Old Norse, Western Finno-Ugric languages, and Basque; this order also appears to be largely absent in Latin. Since this word order instantiates the FOFC-violating structure (3), if FOFC holds as a universal, we understand why this order is absent.

FOFC also accounts for the fact that languages which, in principle, have the means to violate this constraint nevertheless do not do so (cf. the discussion in following sections for further illustrations of this fact). In the context of V-O-Aux structures, Holmberg (2000:134-135), drawing on the typological research discussed in Dryer (1992), discusses the cross-linguistic distribution of the form expressing volition ('want') in relation to V and O in VP. He shows that only 4 languages at first sight appear to permit the FOFC-violating [VO]-WANT order.[9] Upon closer inspection, however, it emerges that these languages also permit OV orders in certain contexts and that VO plus final WANT strings appear not to occur. Even in languages that exhibit the means to potentially violate FOFC, we do not observe FOFC violations, then.

Cases like Finnish or Kaaps, where a language allows both head-initial and head-final orders within vP/VP, are also particularly telling since they show clearly that FOFC is not just a typological fact, i.e. a fact about the cross-linguistic distribution of a particular order or structure, but that it is a constraint which is active in speakers' I-languages in that FOFC-violations are systematically avoided in a derivation that might otherwise be expected to allow them. Thus in Finnish and Kaaps VO and OV order both occur, as do Aux VP and VP Aux, but the FOFC-violating combination [VO] Aux is systematically avoided.

## 2.2 Apparent cases of *[ V O ] X*

Cross-linguistically, we therefore see that a mix of patterns is found, and, notably, that disharmonic orders of the 'verb projection raising (Aux-O-V) type are attested; but the mirror-image of verb projection raising seems to be missing. This kind of typological gap is striking, especially when attested in unrelated families,[10] and calls for an explanation. FOFC is not an explanation, but at least subsumes this gap under a broader generalisation.

As mentioned in section 2.1.1, in the cases we have discussed, FOFC is 'surface true' in the sense that strings made up of a head followed by its complement followed by a higher head are ruled out. This is not always the case, though. Thus for example, an apparent counterexample to FOFC comes from structures in Germanic involving 'low' final negation, like (16):

(15) a. Du verstehst mich (einfach) nicht [German]
you understand me simply not
'You (simply) don't understand me'

b. Jag såg den inte [Swedish]
I saw it not
'I didn't see it'

These examples look as though they instantiate the order V-O-Neg. If Neg is a head (as often thought since Pollock 1989), then this might seem to be a FOFC violation in that the verb and object, in that order, precede the Neg head. However, it is generally agreed that these structures feature a combination of verb-movement (most likely to C, in order to meet part of the V2 requirement) and object-shift out of VP to the left of negation. Thus the verb and object move separately and to separate target positions, with V moving to C (see den Besten 1983) and the object to Spec-vP (Chomsky 2001); other analyses of these operations are of course possible, but the point for our purposes is that there are strong arguments that V and the object do not form a single phrasal constituent in their derived positions, and that the negative is located in a lower hierarchical position than that occupied by these elements, and so FOFC does not apply here. V-O-Neg structures are not uniformly of the Germanic type, though, a point to which we return in section 3.2.

We now return to the apparent literary Classical Latin counterexamples to the generalization that *V-O-Aux is universal that were briefly mentioned in section 2.1.3 above. Kühner and Stegman (1955, Vol II:603) state that the regular head-final order V-Aux is typically found in the perfect tenses of passives and deponents in early Latin up to Plautus (2nd century BCE). In Classical Latin, particularly Cicero, however, the surface subject (i.e. the underlying object) can appear between V and Aux.

(16) a. ... adducta quaestio est
adduced-F.SG.NOM question-F.SG.NOM is
'... the question has been adduced'
(Kühner and Stegman 1955, Vol II:603)

b. ... secuti eum sunt admodum
follow.PL.M.NOM 3SG.ACC be.3PL.PRES fully/just about
quingenti Cretenses
500 Cretans
'About five hundred Cretans followed him'
(Livy, *ab urbe condita* 10:24.10; Danckaert p.c.)

c. ... damnetur is qui
condemn.PRES.SUBJ.PASS.3SG that.3SG.NOM who.3SG.NOM
fabricatus gladium est
manufactured. SG. M.NOM sword.ACC be.PRES.3SG
'He should be condemned, who manufactured the sword'
(Cicero *pro Rabirio* 7; Danckaert 2012b:28, (42))

In some of these cases, such as (16b), it is plausible that the participle has been fronted into the left periphery (a productive option, as Ledgeway (2012) shows; given the highly articulated left periphery and the productive fronting options that Classical Latin disposed of, documented by Ledgeway, this fronting does not necessarily entail that the participle is in a derived surface string-initial position). In this case, the configuration in (3) plausibly fails to arise because a head-initial VP has fronted into the CP-domain, where Latin CP is unambiguously head-initial (cf. Ledgeway 2012:150-8 for discussion and references); head-initial VP, then, is dominated by head-initial CP. The same is true for Sardinian Focus-fronting structures such as that in (17a), and, in the nominal domain, of possessive structures like English (17b), regardless of whether the possessor DP, *the girl from next door*, was First Merged in Spec-DP or whether it moved there:[11]

(17) a. Tunkatu su barkone asa [Sardinian]
shut the window have.2SG
'It's shut the window you have!' (Jones 1988:338)

b. the girl from next door's smile

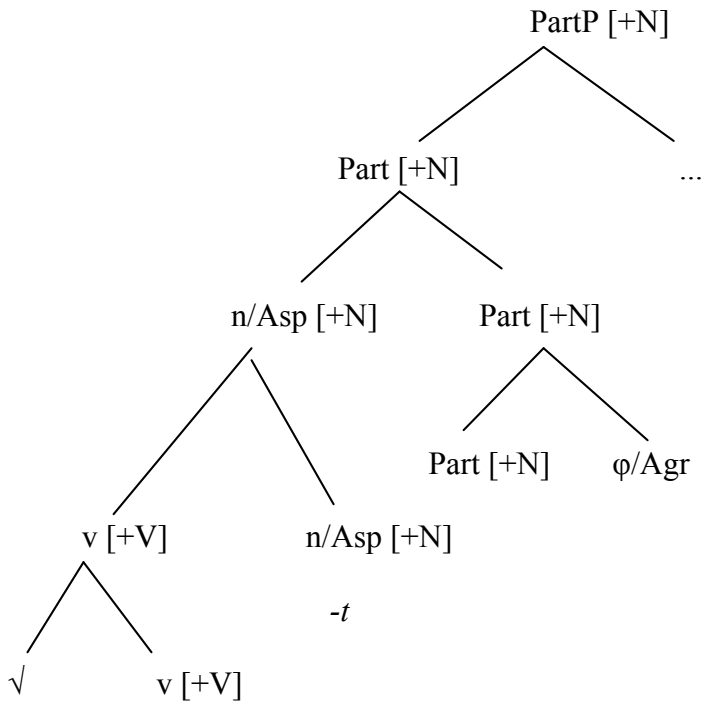
That A'-fronting cases of the type illustrated here, where a head-initial phrase fronts into the specifier of a head-initial phrase, do not fall foul of (3) will become clearer when we present our formal analysis of the constraint resulting in (3) (see section 4).

Returning to the Latin examples in (16): (16a) and (16c) would all be FOFC violations if they involved a head-initial VP dominated by a head-final AuxP, but, again, there is evidence that this is not the structure underlying these examples. This emerges most clearly if

we consider the transitive deponent case (16c), where V and O do not bear the same case; more specifically, V is nominative-marked, whereas O is accusative-marked. Taking into account standard minimalist assumptions about locality and Case assignment, this pattern is not possible if V and O both remain *in situ*: in this case, the expectation would be that v would Agree with both V and O, leading us to expect accusative-marking on both elements in (16c)-type structures.[12] If V raises out of VP, however, T may probe V, resulting in nominative case-marking. On the assumption that participle-placement is a parametrically defined and thus language-internally constant property (cf. i.a. Caponigro and Schuetze 2003, and, more generally, work following on from Emonds 1976, Pollock 1989), we would expect Latin participles always to undergo raising out of VP. As such, it is plausible to analyse the structures in (16) as involving a head-final VP dominated by a head-initial participle-hosting verbal projection, i.e. an instance of the inverse FOFC disharmonic structure in (2c). What still needs to be understood, though, is why this head-initial verbal structure may be dominated by a head-final Aux, instantiated by forms of *esse* in (16).

Remberger (2012) argues convincingly on both diachronic and synchronic grounds that the *–t-* component of Latin participles is properly nominal, and that Latin participles therefore were also nominal. (18), adapted from Remberger (2012:288, (36)), illustrates the proposed analysis:

(18)




In terms of this analysis, then, Latin participles have a verbal "core", dominated by a nominal functional domain; where they are dominated by a head-final tense-marking element as in (16b,c), therefore, we do not have a violation of (3) since V (=Part) is nominal, whereas the functional structure dominating it is verbal and therefore the two elements are not part of the same Extended Projection in the sense of Grimshaw (1990, *et seq.*). What this predicts is that languages in which participles combining with auxiliaries can independently be shown to constitute nominal entities will permit superficially FOFC-violating V-O-Aux structures. In this connection, we can note that there is no reason to take West Germanic participles to be nominal, and in fact if the participial prefix *ge-* is verbal, then we have direct evidence that the perfect/passive participles in these languages are verbal (see section 3.3 for further discussion of this point). Hence the absence of Prt-O-Aux order with perfect/passive participles in West Germanic comes under the general absence of V-O-Aux in these languages, as documented in section 2.1.1.

## 2.3 The cross-linguistic distribution of complementisers

Our second piece of evidence for FOFC also concerns clause-level syntax. This is the observation, originally due to Hawkins (1990a:256-7), that sentence-final complementisers are not found in VO languages (see also Dryer 1992:102; 2009a:199-205, Hawkins 2004, Kayne 2000: 320-321). Cross-linguistically, we find OV languages with both initial and final complementisers. Latin is generally taken to be an OV language (see the references given above), and has initial complementisers, as the following examples show (taking *ut* and *quod* to be complementisers):

(19) a. Ubii Caesarem orant [$_{CP}$ **ut** sibi
Ubii-NOM Caesar-ACC beg-3PL-PRES C selves-DAT
parcat]
spare-3SG-SUBJPRES
'The Ubii beg Caesar to spare them'

b. Accidit perincommode [**quod** eum nusquam
happened-3SG-PERF unfortunately C him nowhere
vidisti]
saw-2SG-PERF
'It is unfortunate that you didn't see him anywhere'
(see Roberts 2007:162-163 for sources and discussion)

On the other hand, Japanese is an OV language with final complementisers:

(20) Bill-ga [$_{CP}$ [$_{TP}$ Mary-ga John-ni sono hon-o watasita ] **to** ]

Bill-NOM Mary-NOM John-DAT that book-ACC handed that

itta (koto)

said (fact) ‘

‘Bill said that Mary handed that book to John’ (Fukui and Saito 1998:443)

And of course we can readily find VO languages with initial complementisers, English being an example.

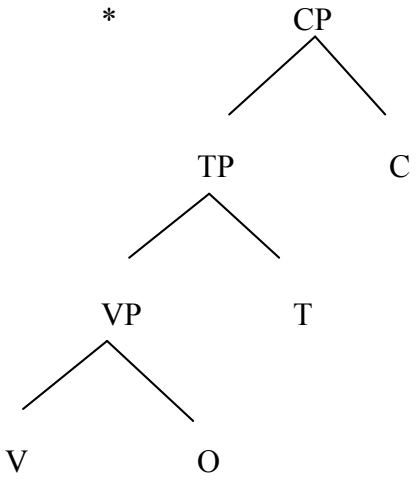
But the fourth logical possibility, VO languages with final complementisers, appears not to be attested. The *World Atlas of Language Structures* (*WALS:* Dryer and Haspelmath 2011) does not have a specific feature for the order of general clausal subordinators in relation to the clause they introduce, and so we cannot directly look for evidence there. However, the order of “adverbial subordinators” such as *although, when, while* and *if,* in relation to the clauses they introduce is covered (Map 94A; Dryer 2011b). It is possible that some, if not all, of these elements are complementisers; however, Dryer (2011b) is explicit on the point that “care was taken not to include general markers of subordination”. Nonetheless, in the languages investigated, the skewing is evident. Combining Map 94A with Map 83A (Dryer 2011a), 305 languages have VO and initial subordinators and 91 have OV and final subordinators. Placing the subordinators in C, then, we observe cross-categorial harmony in the majority of cases. More importantly for our purposes, there is a very clear asymmetry in the disharmonic orders: 61 languages have OV and initial subordinators, but *only two* are said to show the combination of final subordinators with VO: Buduma (Afro-Asiatic) and Guajajara (Tupi-Guaraní). Dryer also notes that subordinating suffixes are found, particularly in OV languages. In fact, there is only one VO language with subordinating suffixes (the Australian language Yindjibarndi), as against 56 OV languages with subordinating suffixes.

We can observe, then, that in this respect the data is significantly skewed.[13] The small number of counterexamples clearly requires closer investigation, but the overall asymmetry in the distribution of logically possible combinations of orders is clear.

In terms of the schema in (3) there are in fact two ways of ruling out final Cs in VO systems. On the one hand, we could have a head-initial VP inside a head-final TP and CP:

(21) a. *$[_{CP}\ [_{TP}\ [_{VP}$ V O ] T ] C ]

b.

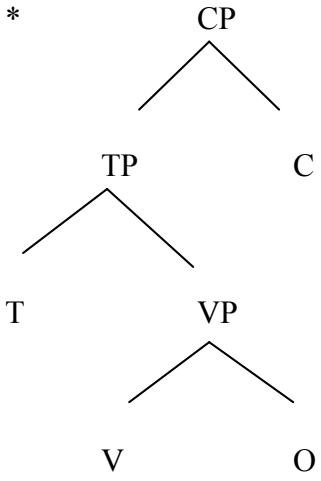



This instantiates the schema in (3) for α=V and β=T, and so constitutes a FOFC violation of the same type as the VOAux orders considered in the previous section.

Alternatively, we could have a head-initial TP inside a head-final CP:

(22) a. *$[_{CP}\ [_{TP}$ T $[_{VP}$ V O ]] C ]

b. *




This structure instantiates (3), and hence violates FOFC, for α = T and β = C. This is the second piece of evidence in favour of FOFC.

We can in fact make a further observation in this connection, which constitutes the basis of a further piece of evidence for FOFC: OV languages with initial complementisers systematically extrapose their CP complements (the significance of this is in relation to FOFC was first pointed out by Sheehan 2008). We can in fact see this in the Latin examples in (18), where the subordinate CP is in postverbal position, apparently the typical order in Latin (cf. Devine and Stephens 2006:124-125, Ledgeway 2012:242ff.). This is also true of German, where finite CPs must be postverbal, while raising complements, which we analyze as TPs (following Chomsky 1981), are not (cf. Biberauer and Roberts 2008):[14]

(22) a. Er weisst, dass sie kommen.
he knows that they come.PL
'He knows that they're coming.'

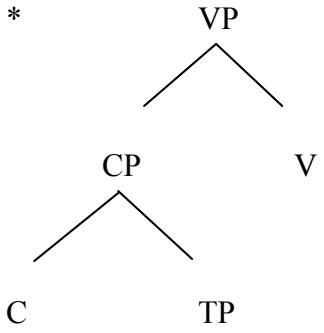
b. ... dass Hans sich zu rasieren schien.

that Hans self to shave seemed

'… that Hans seemed to shave himself.'

The same is true in many other OV languages, including Afrikaans, Bengali, Dutch, Hindi, Iraqw, Mangarrayi, Neo-Aramaic, Persian, Sorbian, Turkish, etc. (cf. Biberauer, Sheehan and Newton 2010 for further details and exemplification; Dryer 2009a). This oddity of the word order appears to be a FOFC-compliance strategy. If the head-initial CP were to appear in the complement position of the head-final V we would have a structure like (24):

(24) *




This structure violates FOFC for α=V and β=C. In fact, as noticed by Koptjevskaja-Tamm (1988, 1993) (see also Givón 2001), OV languages tend to have either postverbal finite CP clausal complements, or preverbal nominalised clauses. As mentioned in section 2.2, preverbal nominalisations are exempt from FOFC since the nominalisation forms a distinct Extended Projection from that headed by V; we will return to this point in more detail in sections 3 and 4. A third possibility, not noticed by Koptjevskaja-Tamm, is a preverbal finite clausal complement with a final complementizer: this of course is a harmonic order and therefore FOFC-compliant. It seems, therefore, that there is a cross-linguistic conspiracy to

avoid the structure in (24), with even languages that, in principle, have the means to violate FOFC not doing so (cf. also Holmberg 2000).

A related point, which may be of some importance, is that failure to overtly realise the complementiser does not appear to be a strategy facilitating (non-scrambled; cf. note 14) preverbal head-initial CPs (Josef Bayer, pers.comm.). This can be seen in Hindi, a language which, like English, allows complementisers to delete (cf. Bayer 2001:15), as shown in (25):

(25) a. He knows (**that**) they are coming.

b. usee (**yah**) maluum hai [**ki** vee aa rahee haiN]
3S-DAT this known is that 3PL come PROG are
'He/she knows that they are coming'

c. *usee [(**ki**) vee aa rahee haiN] maluum hai
3S-DAT that 3PL come PROG are known is
'He/she knows that they are coming' (Davison 2007:177)

Question particles initially also appear to be good candidates for C-elements. As we shall see below, though, VO languages quite readily allow a range of final particles that appear to instantiate C-related categories, including Q-particles and force particles of various kinds, apparently violating FOFC. We will therefore consider these cases in section .2 below.

Coordinating conjunctions are another kind of clause-introducer. Zwart (2005) investigates 214 languages and finds no "true" final co-ordinating conjunctions in head-initial languages (cf. his Table 3, and also Zwart 2009). This is consistent with our general claim here.

The absence of V-O-...C orders cross-linguistically is our second piece of evidence for FOFC.

## 2.4 The nominal domain

Turning from the clausal to the nominal domain, we find three further pieces of evidence for FOFC, two direct and one indirect. The direct evidence comes from Finnish nominals and Latin gerunds (see also Holmberg 2000 on the former, and Ledgeway 2012 on the latter). We look at Finnish first.

As a predominantly head-initial language, Finnish has postnominal complements and adjuncts, including relative clauses. Finnish has postpositions, though. An NP consisting of a noun with a PP complement or adjunct will typically look like (26) and (27), respectively.

(26) a. käynti nurkan takana
visit corner-GEN behind
'the/a visit around the corner'

b. [$_{NP}$ käynti [$_{PP}$ nurkan takana]]

(27) a. raja maitten välillä
border countries between
'the/a border between the countries'

b. [$_{NP}$ raja [$_{PP}$ maitten välillä]]

Some Finnish adpositions can be either prepositions or postpositions. This is the case with *yli* 'across'.[15]

(28) a. yli rajan
across border

b. rajan yli
border across
both: 'across the border'

If the NP complement of *yli* itself has a postnominal complement or adjunct, the prepositional option is still fine, but the postpositional option is ungrammatical (compare (29b) and (27)):[16]

(29) a. yli [rajan maitten välillä]
across border countries between
'across the border between the countries'

b. *[rajan maitten välillä] yli
border countries between across

Taking adpositions to be in the same Extended Projection as their nominal complements, at least in languages like Finnish, this is an effect of FOFC: the head-final PP must immediately dominate a head-final phrase, but the NP complement of *yli* in (28b) has a postnominal complement.[17]

Finnish has the option of expressing adjuncts prenominally, with the help of a variety of suffixes. An alternative to (27a) is (30), where ADJ is an adjectival suffix:

(30) maitten välinen raja

countries between-ADJ border

'the/a border between the countries'

This NP may be combined with a preposition or a postposition, e.g. *yli* 'across'.

(31) a. yli [maitten välisen rajan]

b. [maitten välisen rajan] yli

both: 'across the border between the countries'

(31a) observes FOFC trivially as the dominating PP is not head-final, and (31b) observes FOFC as the head-final PP immediately dominates a head-final NP.

Summarizing:

- Finnish has both prepositions and postpositions.
- N can precede a complement or adjunct PP.
- When it does, the NP cannot itself be the complement of a postposition, due to FOFC.[18]
- The violation can be rescued by fronting the complement or adjunct.

This is, then, another case showing that FOFC is a constraint which is active in speakers' I-languages: the FOFC-violating combination *[[N PP] P]* is systematically avoided, even though the building blocks, a head-initial NP and a head-final PP, are in frequent use. Furthermore, the violation can be avoided in a given derivation, by shifting the complement of the noun to the left.

Our second piece of evidence for FOFC in nominals comes from Latin. Following Elerick (1994), Ledgeway (2012:252-255) shows that gerundive complements to Nouns or Prepositions strongly tend to follow either harmonic order, i.e. either *[ N/P [ $V_{Ger}$ O ]]* or *[[ O $V_{Ger}$ ] N/P ]*, although the non-FOFC-violating disharmonic order *[ N/P [ O $V_{Ger}$ ]]* is also attested. On the other hand, the FOFC-violating disharmonic order *[[ $V_{Ger}$ O ] N/P ]]* is hardly attested at all (see Ledgeway's Table 5.7, p. 252). Assuming that the gerundive V is really a nominal element, it will fall in the same Extended Projection as N/P and therefore this configuration falls under FOFC as we have formulated it.

The third piece of evidence for FOFC in nominals is more indirect, stemming from Cinque's (2005) account of Greenberg's Universal 20. Greenberg (1963:87) stated his Universal 20 as follows: "When any or all of the items (demonstrative, numeral and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite". Thus Greenberg stated that these adnominal elements appear in the following orders in relation to each other and to N:

(32) a. Dem > Num > A > N

b. N > Dem > Num > A

c. N > A > Num > Dem

For simplicity, let us disregard adnominal APs, and hence the relative order of A and N (AP is probably not a unified category; cf. Cinque 2005:315-316, note 2, 2010b). (32a) will then have the following structure, assuming that Dem and Num are heads (see also Shlonsky 2004:1482), a harmonically head-initial structure:

(33) [$_{DemP}$ Dem [$_{NumP}$ Num NP ]]

(32c) is the harmonically head-final mirror image of (33):

(34) $[_{DemP}\ [_{NumP}$ NP Num] Dem ]

The order (32b), according to Cinque, occurs in "few/very few languages". Another order, not acknowledged by Greenberg, but which also, according to Cinque, occurs in "few/very few languages" is (35):[19]

(35) Dem >N> Num

These orders all observe FOFC. Consider, however, the following word order, attested in "few languages" according to Cinque (2005:320) (see also Roberts (forthcoming, a) for further discussion of these languages):

(36) *Num > N > Dem

This word order could be derived by NumP-movement to SpecDemP, taking the order in (3) to be first-merged:

(37) $[_{DemP}$ [Num NP] [ Dem t ]]

But this is apparently not a licit derivation. We can now answer Cinque's (2005:325) question: "Why is movement of phrases other than NP unavailable?" This movement leads to

a FOFC violation, in that the derived structure in (37) instantiates (3) for α=Num and β=Dem, and taking Num and Dem to belong to the same Extended Projection.[20]

Cases such as (38a,b) may, however, appear to pose counterexamples to Universal 20 and FOFC.

(38) a. y tair plaid arall hyn [Welsh]
the three parties other these
'these three other parties' (Willis 2006:1831)

b. na trì leabhraichean mòra seo [Scottish Gaelic]
the-pl three books big-pl this
'these three big books' (D. Adger (pers. com.))

This order is also found in Semitic and other languages, and Num>A>N>Dem, with the possibility of an initial determiner-element, is found in various creoles (Bislama, Berbice Dutch, Sranan; cf. Haddican 2002, cited in Cinque 2005:320, notes 15, 16; see also Roberts (forthcoming, a)). If these orders are derived by NumP-movement to SpecDemP, they will violate FOFC. Note, however, that they feature an initial definite determiner. In many, perhaps most, languages with both determiners and demonstratives Dem is in complementary distribution with D (consider English, for example): Dem occupies either D or SpecDP. However, consideration of a wider range of languages shows that UG makes available at least two Dem positions, one high (D or SpecDP), and one a low post-nominal position, which is what we see in (38a,b). Universal 20, we assume, concerns the high Dem/D position (see Roberts forthcoming, a, and the references given there). The Celtic languages and the others mentioned after (38) have "low" demonstratives, and so the structure of (38) is as in (39),

rather than (33), with N or NP raising at least to SpecnP, or perhaps higher depending on the position of the AP:

(39) $[_{DP}$ D $[_{NumP}$ Num $[_{nP}$ Dem n NP ]]]

Cases like (38a,b) are therefore not derived by NumP-movement into SpecDP, they do not violate Universal 20 so conceived, nor FOFC (see again Roberts (forthcoming, a) for more on "low" demonstratives and Universal 20 in relation to FOFC).

## 2.5 Diachronic evidence

FOFC is a constraint on synchronic grammars. Since we take it to represent a universal constraint on synchronically possible word orders, we predict that no system can change into a FOFC-violating system. FOFC-violating systems fall outside of the range of possible outcomes of syntactic change. This is a consequence of the general fact that, as Kiparsky (2008:23) puts it: "If language change is constrained by grammatical structure, then synchronic assumptions have diachronic consequences."

More specifically, if FOFC is an absolute universal, then word-order change must proceed along certain pathways. Change from head-final to head-initial order in the clause must go "top-down", in that CP must be affected first, followed by TP, followed by VP, as follows:

(40) [[[O V] T] C] → [C [[O V ]T]] → [C [ T [ O V]]] → [C [T [V O]]].

Conversely, head-initial to head-final change must go "bottom-up", starting at VP before affecting TP, and then affecting TP before affecting CP:

(41) [C [ T [ V O ]]] → [C [ T [ O V ]]] → [C [ [ O V ] T ]] → [[[ O V ] T ] C].

Any other sequence of changes in either case will lead to an intermediate synchronic system which violates FOFC at some stage. Consider, for example, what would happen if, starting from a uniformly head-final system like the first one shown in the series in (40), VP changed headedness first. This would give rise to an [[[V O] T ] C] system; as we saw in section 2.1.1 and section 2.1.2 above, such systems are not found. If they were possible outcomes of natural processes of change, presumably such systems would be found; FOFC explains their absence synchronically and, therefore, diachronically. Furthermore, as we saw in section 2.1.4, even contact-induced change does not bring about FOFC-violating structures.

Direct diachronic evidence concerning these trajectories of change is not easy to come by, given the paucity of long-term attestation of most of the world's languages. Such evidence as we have concerning the earliest stages of Germanic supports our position, though. The earliest attested stages of Germanic (Gothic, Old English and Old Norse) show C-IP order:

(42) a. ... ef han hefði þat viljað fága
if he has it wanted clean.INF
"... if he had wanted to clean it"
(ON: *Finn*; Hróarsdóttir 1999:203)

b. ... þæt hie mihton swa bealdlice Godes geleafan bodian

that they could so boldly God's faith preach.INF

"... that they could preach God's faith so boldly"

(OE, from (7c) above: *The Homilies of the Anglo-Saxon Church* I 232; van Kemenade 1987:179, 7b)

c. ... domjandas thata thatei ains faur allans geswalt

thinking this that one for all dies

"... thinking this, that one may die for all"

(Gothic: Longobardi 1978, Ferraresi 1991:30-35)

See also the Latin examples in (19). These languages all have apparently mixed order in IP and VP (see above for OE and ON; Ferraresi 1997 on Gothic; Devine and Stephens 2006, Harris 1978:18ff., Ledgeway 2012, Salvi 2004 and Vincent 1988:59ff. on Latin). Later IP and VP became head-initial in English, Mainland Scandinavian and Romance. There is in fact evidence from the history of English that the order in IP changed from head-final to head-initial before that in VP (examples from Biberauer, Newton and Sheehan 2009:8; Biberauer, Sheehan and Newton 2010):

(43) *Head-initial TP, head-final VP:*

... Þat ne haue [$_{VP}$ noht here sinnes forleten ]

who NEG have not their sins forgiven

'who have not forsaken their sins'

(11th century: *Trinity Homilies* 67.934)

(44) *Head-initial TP, head-initial VP:*

... oðet he habbe [$_{VP}$ iȝetted ou al þet ȝe wulleð ]

until he has granted you all that you desire

'... until he has granted you all that you desire.

(c1215: *Ancrene Riwle*)

Work on the history of Yiddish by Santorini (1992) and Wallenberg (2009) suggests that exactly the same thing happened in the history of Yiddish. In this case, we also have synchronic evidence of the fact that the order of headedness within VP must have changed last since head-final auxiliaries are impossible in the modern language, while head-final VPs are able to alternate with head-initial VPs (see again Santorini 1992 and Wallenberg 2009 for discussion).

Biberauer, Sheehan and Newton (2010) also observe that OV to VO change from Latin to French appears to have followed the same pattern, with Ledgeway (2012, chapter 5) showing in great detail that the same seems to hold true for ongoing word-order change in Latin to Romance, again a change from head-final to head-initial order. In this connection, Ledgeway states "both complementisers and adpositions are the only categories to show a fixed head-initial order since our earliest texts" (Ledgeway 2012:205), and, with head-initiality established in the topmost CP and PP layers, it is "free to percolate down harmonically to the phrases that these in turn embed" (Ledgeway 2012: 242).

The same holds for Finnish and Saami. Finno-Ugric languages further east are strictly head-final, with O>V>T>C order, reflecting the original Finno-Ugric, and indeed Uralic, pattern (Abondolo 1998). But Finnish and Northern Saami, two of the westernmost languages in the family, have C>TP strictly, with T/Aux>VP and V>O as unmarked orders, but

allowing VP>T/Aux and O>V as marked options (Marit Julien, pers. com. on Northern Saami; see section 4.4 below on Finnish).

Further evidence comes from Niger-Congo languages that have undergone a VO to OV change that is limited to VP (cf. Nikitina 2008 for discussion and references), and the Ethiopian Semitic languages, which have undergone a change from the typical Semitic head-initial pattern to a largely head-final pattern under the influence of Cushitic. See Biberauer, Newton and Sheehan (2009) and Biberauer, Sheehan and Newton (2010) for detailed discussion of these and other case studies corroborating the above pathways.

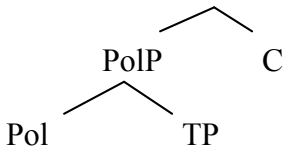
FOFC affects change in another way too, in that it also restricts borrowing options, i.e. change triggered by "external" factors. Biberauer, Newton and Sheehan (2009) and Biberauer, Sheehan and Newton (2010) discuss a case study focusing on the borrowing/innovation of a clause-final complementiser. They report that, among Indo-Aryan languages which had borrowed a final complementiser, only those languages not featuring an initial question-marking polarity marker (Pol) developed a final complementiser. The relevant data is summarised in Table 1 (based partly on information in Davison (2007)):

**Table 1:** Placement of Polarity heads and subordinating complementizers in South Asian languages

| Type | Position of Pol | Position of C | Languages |
|---|---|---|---|
| A | Initial | Initial Only | Hindi-Urdu, Panjabi, Kashmiri, Sindhi, Maithili, Kurmali |
| B | Final/Medial | Initial and Final | Marathi, Gujarati, Assamese, Bangla, Dakhini Hindi, Oriya, Nepali (and some North Dravidian languages, e.g. Brahui) |
| C | Final/Medial | Final Only | Sinhala (and most Dravidian languages) |
| **D** | **Initial** | **Final** | **Unattested in the area** |

In many Indo-Aryan languages, C (a complementizer) can co-occur with Pol (a question particle), in which case we find the orders C>Pol>TP (e.g. Hindi-Urdu), and TP>Pol>C (e.g. Marathi), indicating that this interrogative-oriented Pol is hierarchically below C (cf. Laka 1994).[21] The gap in (44D) then follows from FOFC, since the structure would be as in (45):

(45) *




This structure instantiates the schema in (3) for α=Pol and β=C, and as such is a further example of FOFC. So here we observe that FOFC may constrain borrowing; see again Biberauer, Newton and Sheehan (2009) and Biberauer, Sheehan and Newton (2010) for further discussion.

We are not aware of any detailed studies in a generative framework of changes in head-complement order in the DP. Nonetheless, the prediction FOFC makes is clear. If change from head-final to head-initial order in the nominal must go "top-down", then ON>NO should follow all other changes, in that DP must be affected first, followed by other DP-internal functional projections, followed by NP, and conversely for change from NO to ON. Some indication regarding the latter sequence of changes can be gleaned from Greenberg's (1980) study of word-order change in the Ethiopian Semitic languages. Here we see GenN + Prepositional order in 14th-century Amharic changing to GenN + Postposition order in Harari. If Gen here corresponds to the complement of N, this is the FOFC-compliant order of changes (see also Croft 2003:250ff, Roberts 2007:343-345).

Interestingly, Finnish appears to exhibit the opposite order of changes: both an innovating NO order and Postpositions are found in the sense that they co-occur in the language, but they do not combine to form a FOFC-violating structure, as pointed out above in section 2.4. This shows us that languages can change "in the wrong order", as it were, as long as they have structural alternatives to the potentially problematic structure (most likely through either partial retention of a conservative structure or through concomitant innovation of a novel structure).

## 2.6 A more general prediction

A more general prediction that FOFC makes is that there will be more instances of head-final orders in structurally lower parts of the clause and more head-initial orders in the higher parts. A special case of this prediction is that we should find many languages which combine initial subordinating complementisers with verb-final order, while we should find no languages with the inverse order. As we saw in section 2.3, this is true (on clause-final

particles in VO languages, see section 3.2). Unfortunately, the data in the nominal domain is not at all clear.

Arguably another case is the predominance of postpositions in the world's languages compared to the above-mentioned predominance of complementizers: Dryer (1992) shows that postpositions are found in 119 genera out of 196 (i.e. in roughly 61% of genera).[22] His (1989) research also showed that OV order dominates in 111 genera (i.e. it surfaces in 58% of the genera considered at the time) A further prediction is that the very deepest embedded structures will strongly tend to be head-final. If suffixes are heads of complex words, then word-internal structure appears to be just like this, cf. the "suffixing preference" of Hawkins and Gilligan (1988), which is discussed in relation to FOFC in Roberts (forthcoming, b).[23]

## 2.7 Conclusion and Summary

We see evidence of FOFC in the absence of certain logically possible word-order patterns in the clausal domain (sections 2.1.1-2.1.5, 2.3), in the nominal domain (section 2.4), and also in diachrony (section 2.5). We maintain that this suffices to take the constraint seriously, as a possibly universal constraint on disharmonic structures. We summarise the FOFC violations we have observed so far in (46):

(46)

| | |
|---|---|
| *V-O-Aux | *$[_{AuxP}\ [_{VP}\ V\ DP\ ]\ Aux\ ]$ |
| *V-O-C | *$[_{CP}\ [_{TP}\ T\ VP\ ]\ C\ ]$ or *$[_{CP}\ [_{TP}\ [_{VP}\ V\ O\ ]\ T\ ]\ C\ ]$ |
| *C-TP-V | *$[_{VP}\ [_{CP}\ C\ TP\ ]\ V\ ]$ |
| *N-O-P | *$[_{PP}\ [_{DP/NP}\ D/N\ PP\ ]\ P\ ]$ |
| *Num-NP-D(em) | *$[_{D(em)P}\ [_{NumP}\ Num\ NP\ ]\ D(em)\ ]$ |
| *Pol-TP-C | *$[_{CP}\ [_{PolP}\ Pol\ TP\ ]\ C\ ]$ |

We will look more closely at these cases in what follows, and in certain cases revise our assumptions about the precise structures involved (some of this will be in the Appendix; see below). For now, though, (46) can be taken as a convenient summary of the observations made so far, and the common pattern underlying them.

We have also noted that FOFC is not just a typological generalization, but plays a role in the I-language of speakers, in that FOFC-violations are systematically avoided in a single derivation. This is shown most clearly in languages where head-final and head-initial orders both occur within some Extended Projection, but the FOFC-violating combination of head-initial and head-final orders is systematically avoided.

Having presented a range of empirical evidence for FOFC and dealt with some apparent counterevidence (notably in section 2.2), we now consider some potential evidence that the pattern we claim to underly (47) is not fully general. We will maintain that this pattern, instantiated the general ban on the configuration in (3), is in fact exceptionless once the data is fully considered.

## 3. The role of the categorial feature [±V] and the Extended Projection

### 3.1. Nominal complements of verbs

A head-initial DP or PP may be immediately dominated by a head-final VP in many OV languages, e.g. German, as in (47):

(47) a. Johann hat [$_{VP}$ [$_{DP}$ einen Mann] gesehen ].
John has a man seen
'John has seen a man'

b. Johann ist [$_{VP}$ [$_{PP}$ nach Berlin ] gefahren ].
John is to Berlin gone
'John has gone to Berlin'

In purely configurational terms, the examples in (47) instantiate the schema in (3) for α = D/P and β = V. However, they are grammatical. Clearly, the difference between these cases and those considered in section 2 has to do with the fact that α and β are categorically distinct and hence in different Extended Projections. It is for this reason that our formulation of FOFC consistently makes reference to Extended Projections: FOFC holds of pairs of categories that belong to the same Extended Projection. Here and in section 4 we will develop this idea more systematically.[24]

Instead of referring to Extended Projections, an alternative hypothesis as to what makes (47) crucially different from the cases discussed above might be that the preverbal constituents are arguments/referential expressions, assigned Case and a θ-role by the verb, which would make them opaque to FOFC. That this cannot be right is shown by the contrast between CP and DP complements. As discussed in section 2.3 above, CP complements are sensitive to FOFC: CPs with an initial complementizer are not acceptable in preverbal position in OV languages. In this they minimally contrast with DPs:

(48) a. *...dass Johann niemals [$_{CP}$ dass er eigentlich ein angenommenes
that Johann never that he actually an adopted
Kind sei] besprochen hat. [German]
child be.SUBJ discussed has

b. ...dass Johann niemals besprochen hat [$_{CP}$ dass er eigentlich ein
that Johann never discussed has that he actually an
angenommenes Kind sei].
adopted child be.SUBJ
'...that Johann has never discussed the fact that he is actually an adopted child.'

The well formed counterpart of (48a) has the bracketed CP extraposed, as in (48b). The CP complement is an argument of the verb, thus argumenthood is clearly not the crucial property. Significantly, a clause embedded under a noun is possible in preverbal position in German. So we have the minimal contrast between (48) and (49):

(49) a. ...dass Johann niemals [$_{DP}$ der Verdacht [$_{CP}$ dass er eigentlich ein
that Johann never the suspicion that he actually an
angenommenes Kind sei]] besprochen hat.
adopted child be.SUBJ discussed has
'...that Johann has never discussed the suspicion that he is actually an adopted child.'

b. ...dass Johann niemals der Verdacht besprochen hat [$_{CP}$ dass er
that Johann never the suspicion discussed has that he
eigentlich ein angenommenes Kind sei].
actually an adopted child be.SUBJ

Here, too, the embedded CP may be extraposed, as in (b), but in this case it is optional (although preferred in spoken German). Moreover, predicative nominals behave just like argument nominals, as shown by (50):

(50) ... dat Johan [$_{NP}$ minister van buitelandse sake] geword het. [Afrikaans]
that Johan minister of foreign affairs become has
'...that Johan has become minister of foreign affairs.'

Here the bracketed constituent is not an argument, but a predicate noun phrase, a bare NP which in this case contains a postnominal complement, apparently insensitive to FOFC.

These facts indicate that a crucial property is **categorial identity,** rather than argumenthood or referentiality: FOFC does not apply to a verbal head taking a nominal complement. Furthermore, the fact that VP, AuxP, TP and CP pattern together, against DP, NP, and PP supports our assertion that the crucial notion is **Extended Projection**, in roughly the sense of Grimshaw (1991, 2001, 2005). Informally, the Extended Projection of V is VP, vP, TP, and CP, and any other projections along the 'spine' of the tree between VP and CP (such as AspP, AuxP, etc.). The Extended Projection of N is NP, DP, and any other projections between them along the spine of the tree, such as NumP, QuantifierP, and ClassifierP, as well as PP (subject perhaps to cross-linguistic variation, and/or to variation in the class of "Ps"; see the papers in Cinque and Rizzi 2010 for recent discussion). Assume that

the defining characteristic of the Extended Projection of V is the categorial feature [+V], while the defining characteristic of the Extended Projection of N is [–V]. That is to say, each head along the spine of the tree from V to C (i.e. v, Asp, Aux, T, ...) includes [+V] among its features, and each head along the spine of the tree from N to P (Num, Q(uantifier), Classifier, D, ...) includes [–V] among its features.

We can now modify the formulation of FOFC as follows:

(51) *[$_{\beta P}$ … [$_{\alpha P}$ … α γP ] β … ]

where

(a) αP is immediately dominated by a projection of β, and

(b) α and β have the same value for [±V].

Under this formulation, (52) instantiating the configuration (48a) will violate FOFC, since CP and V share the value [+V], while (53) observes FOFC, as DP and V have different values for [±V].

(52) [$_{VP}$ [$_{CP}$ dass ...] V ]

(53) [$_{VP}$ [$_{DP}$ der Verdacht [$_{CP}$ dass ...]] V ]

We now have an explanation for Koptjevskaja-Tamm's (1988, 1993) observation that OV languages either have embedded finite clauses which are extraposed, or they have no embedded finite clauses but nominalizations instead: these are two ways to comply with FOFC. Extraposition avoids placing a head-initial complement under a head-final VP, and the

complement in (53) has the status of a nominalised clausal complement of V , complying with FOFC by virtue of clause (51b).

Clearly, this analysis entails that we view regular *that*-complementisers, and therefore the CPs they head, as verbal rather than nominal, *pace* Grimshaw (and hence, again *pace* Grimshaw, as part of the same Extended Projection as both the embedded and the selecting verb, making our notion of Extended Projection similar to Kayne's 1983 notion of g-projection). An alternative possibility, which would bring us closer to Grimshaw's view, is explored in detail by Biberauer and Sheehan (2012), who also discuss in detail how CP extraposition is formally achieved in head-final languages, a matter we leave aside here

## 3.2 Particles

One prominent class of potential counterexamples to FOFC involves sentence-final particles in otherwise head-initial languages. The following are representative examples from the CP-domain:

(54) a. Hongjian xihuan zhe ben shu **ma**? (Mandarin, Li 2006:13)
Hongjian like this CL book Q
'Does Hongjian like this book?'

b. KO\kú yrO/ Kòfí **à**? (Gungbe, Aboh 2004:318)
Koku call-PERF Kofi Q
'Did Koku call Kofi?'

c. B- da'uh Gye'eihlly gueht èee
PERF-eat Mike tortilla Q
'Did Mike eat tortillas?' (San Lucas Quiaviní Zapotec; Lee 2005:91)

It is tempting to analyse these particles as Cs (see Paul forthcoming for an argument that this is the right approach). If so, we would have instances of final Cs in VO languages, and hence counterexamples to the generalisation put forward in section 2.3 above (FOFC would be violated for α=V and β=C here). Although many cases involve putative C-elements like those in (54), final particles, however, also occur in phrases of a variety of types: i.a. Aspect, Mood, Negation, Polarity, Specificity, Force. Often, the languages with these types of particles are "repeat offenders", with multiple FOFC-violating elements (see Dryer 2009b for discussion).

Focusing on the clause-final, seemingly C-related particles, we take it to be significant that we do not find this kind of order with true subordinating Cs of the kind discussed in section 2.3 (cf. also the Indo-Aryan data involving complementisers and polarity items in section 2.5). Subordinating Cs seem to be invariably clause-initial in VO languages, including in languages which have some clause-final particles. Consider (55): [25]

(55) a. Tân mua gi the? (Vietnamese)
Tan buy what Q
'What did Tan buy?'

b. Anh đã nói (rằng) cô ta không tin
PRN ANT say that PRN NEG PRT believe
'He said that she didn't believe (him)'

In a survey of about 80 VO languages with final question particles, Bailey (2010, 2012) observed that these particles are very often optional (this is true of Mandarin *ne* and *ma*, for

example). Presumably this is possible because the question force is signalled by some other means, such as intonation. Conceivably, then, in the languages in question there is an abstract head in the left periphery encoding question-force, triggering question-intonation in the languages that have it, which is optionally doubled or, in the case of languages with numerous question particles (cf. i.a. Lee 2005, 2006 on San Lucas Quiaviní Zapotec), made more precise by a final overt particle.[26]

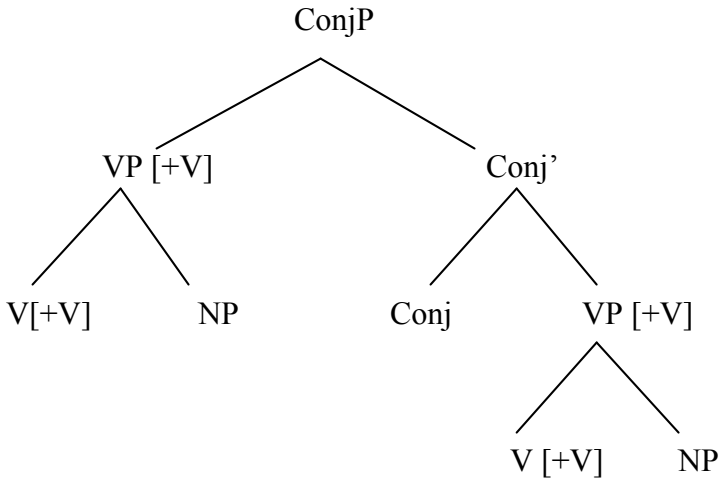
As also discussed by Bailey (2010, 2012), at least some of the apparently FOFC-violating final question particles may actually be initial negative disjunctions of an elided disjunct clause. The structure of these yes/no-questions would be *[Q [TP [OR-NOT ~~TP~~]]]*, where ellipsis of the second TP, identical with the first TP, leaves the negative disjunction as an apparently clause-final particle (see also Aldridge 2011, Yaisomanang 2012). The question force would be supplied by an abstract higher Q-morpheme (see Ladusaw 1992, Zeijlstra 2004 for a similar proposal in relation to negation). The most obvious evidence in favour of this analysis is that in many languages question particles are homophonous with, or clearly derived from, either a negation or a combination of negation and disjunction. This is considerably more common in the case of final question particles than initial question particles (see Bailey 2010, 2012, and Bencini 2003 for discussion).[27]

If these are partially disguised coordinate structures, then there is no FOFC violation for the same reason that there is no FOFC violation in any coordination of head-initial phrases, as in (56), for example (assuming the structure of coordination in Kayne 1994, Johannesen 1998, and Zhang 2009):

(56) He has $[_{ConjP}$ $[_{VP}$ finished his tea] [and $[_{VP}$ eaten his biscuit]]].

Consider again the definition of FOFC in (51). Given that *and* can coordinate XPs of all kinds, without interfering with the selection relationships into which coordinated elements can enter (a verb can select a coordinated nominal as readily as it can select any other nominal), the conjunction *and*, and conjunctions more generally that similarly coordinate XPs of various kinds, will not have the same value for [±V] as (either of) the two conjuncts. As such the head-initial first conjunct in (56) is dominated by an acategorial head, which is spelled out by *and*.This is illustrated in (57):

(57)




Where *Conj* is a disjunction marker functioning as a Q-particle, as proposed by i.a. Jayaseelan (2008), Aldridge (2011) and Bailey (2012), and the second conjunct is deleted, no FOFC violation results. See Zwart (2005, 2009), discussed above in section 2.3, for evidence that conjunctions are different from most other heads in not showing any cross-linguistic head-complement order variation. As will be discussed below, this is a direct consequence of these elements being unmarked for [±V] below.

Acategoriality also seems to be the key consideration determining the availability of many final negation/concord-marker structures in languages with at least partially head-initial clausal syntax (cf. Cinque 1999) for discussion of negation as a "syncategorematic"

category). Like coordination markers in many languages, negation markers do not appear to c-select specific complements, and, as such, cannot be associated with an independent categorial specification. To the extent that the Central African and Austronesian V-O-Neg languages discussed by Dryer (2009b) and Reesink (2002) can be shown to have "promiscuous" negation markers of this kind, we can understand their apparent ability to violate FOFC: if Neg lacks a categorial specification, V-O-Neg structures instantiate a further case of the structure schematised in (57), with *Neg* replacing *Conj*. Further, Biberauer (2009, 2012) shows how this analysis may also be extended to head-final negative concord markers in languages with head-initial XPs. In the case of Afrikaans, the availability of clause-final and "high Pol"-instantiating[28] *nie*$_2$ despite the fact that Afrikaans, like other West Germanic languages, has a head-initial CP, can be understood as a consequence of this element's acategoriality: *nie*$_2$ does not only double sentential negation, in which case it realises a CP-peripheral Pol head, but it also doubles constituent negations targeting DPs, PPs, APs, and so on; since this doubling does not affect the selectability of the relevant consistuents, it is best analysed as an acategorial XP-peripheral Pol head (we return to the peripherality of this and similar elements, which mirrors that of the coordinators discussed above, in section 4.3.1 below). As such, it, too, does not violate FOFC. Similar analyses can be extended to "promiscuous" focus and topic markers, as discussed in Biberauer (forthcoming, b).

Also relevant to the case of optional (and thus, typically, emphatic) peripheral concord markers[29] and optional discourse-related markers more generally is the consideration that many of these can be shown not to be fully integrated with the structures they are associated with. So, for example, the optional clause-final negative reinforcer ("concord marker") *não* in Brazilian Portuguese, which may also surface independently of the clause-internal negator that it typically doubles, is clearly not integrated into the CP-domain as it cannot license NPIs (cf. Bailey 2012 for discussion of Q-particles which, similiarly, cannot

license NPIs; see Biberauer and Cyrino 2008a,b for discussion of the Brazilian Portuguese facts).

So far, then, we have seen that there appear to be a range of apparently FOFC-violating clause- and XP-final particles that, upon closer inspection, do not violate FOFC on account of the fact that they are acategorial elements. This generalization across a very diverse range of elements once again underlines the validity of appealing to the notion of Extended Projection in characterising the nature of FOFC. We leave to further research the wider empirical question of the extent to which this analysis can be shown to extend to apparently FOFC-violating particles in general.

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### 3.3 Verb clusters and IPP in West Germanic

In section 2.1.1, we observed that two-member verbal clusters in West Germanic always obey FOFC. However, there is one class of verb clusters which is potentially problematic. These are those involving the so-called "231 order;" in this terminology, $n + 1$ is the complement of $n$, and the left-to-right order of integers indicates the surface order of the verbal elements making up the verb cluster. Hence "231" indicates a structure of the type *[[ v V ] Aux]*, a clear FOFC violation if V is the complement of v (these labels are purely illustrative here). Walkden (2009) points out that this order is attested in West Flemish:

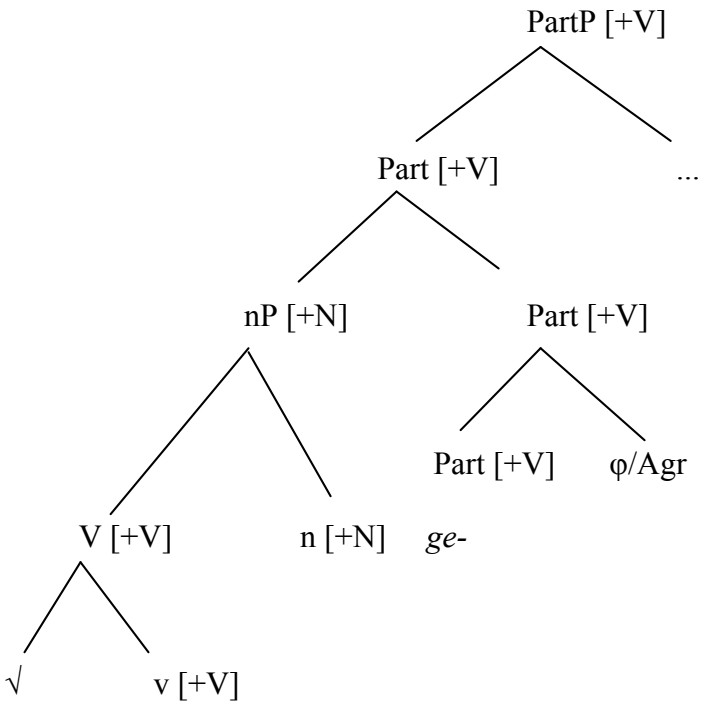
(58) ... da Valère willen dienen boek lezen eet
that Valère want-INF that book read-INF has
'... that Valère has wanted to read that book'

In this example, *willen dienen boek lezen* is arguably a head-initial complement (of unclear category – see below) of head-final *eet*. Taking into account data cited in Schmid (2005), Barbiers (2005), and Brandner and Salzmann (2011, 2012), and, additionally, newly collated Afrikaans data, Biberauer and Walkden (2010) discuss the considerable extent to which these structures are found in various Swiss German, Dutch and Afrikaans varieties (cf. also Abels 2012).

The 231 order seen in examples like (58) is only a problem, however, if the three verbs in the construction all belong to the same Extended Projection. There are various indications, however, that this is not the case (see Biberauer forthcoming, c for full discussion).

Firstly, we consider it to be both striking and significant that the linearly initial verb (*2* in *231*) bears surprising morphology in nearly every example of 231 order known to us: infinitival morphology instead of the participial morphology otherwise required by the perfective auxiliary (see below on the apparent exceptions to this). This is the much-studied phenomenon known as *Infinitivus Pro Participio* (*IPP*). One proposal regarding the origin of this phenomenon is that it initially involved structures featuring a participle lacking the characteristic Germanic perfective *ge-* (cf. i.a. Zwart 2007 for discussion). These *ge*-less participles were then reanalysed as infinitives. Building on the well-established idea that infinitival morphology is nominal (see in particular Kayne 2000:283ff) and the proposal in Remberger (2012), discussed in section 2.2 above, this change can be understood as entailing the removal of what is in Germanic a verbal projection, *ge-* typically being thought of as a perfective verbal prefix (cf. Streitberg 1891 for the original proposal).[30] Consider how Remberger's postulated participial structure, given in (18) above, might apply to Germanic:

(59)




Importantly, n in Germanic generally is not associated with Asp, as it is in Latin (cf. the *–t* ending in (18)), the [perfective] component being encoded on the higher verbal affix instead.[31] Where acquirers encounter IPP forms, which historically featured *ge*-less participles or were created by analogy to these forms, then, they postulate a structure in which the highest verb (e.g. the perfect/past auxiliary in (58)) selects a defective [+N] nP complement. FOFC is therefore respected as the structurally lowest verbs (*2* and *3*) are separated from the auxiliary in *1* by an intervening [+N] projection. The lowest verbal pair, in turn, exhibits head-initial rather than head-final order as a result of the fact that *2* is necessarily a verb-raiser (or restructuring verb – cf. i.a. Wurmbrand 2001, 2004, Cinque 2006), which therefore forces raising of the infinitival verb in its defective complement clause to the highest verbal projection in that XP (cf. Kayne 1991 and Roberts 1997, who discusses raising to non-finite T in this context; *pace* Cinque 2006).

As noted in Biberauer and Walkden (2010), the most prolific 231-permitting systems, the various varieties of Afrikaans, exhibit 231 structures featuring a range if more recently

innovated *2*-verbs. These include a future-related auxiliary *gaan* ('go') and various so-called "linking verbs", two of which are illustrated in (60) (cf. also de Vos 2006 for discussion):

(60) a. ... dat hy die boek loop$_2$ koop$_3$ het$_1$
that he the book walk.INF buy.INF have.FIN
'... that he went to buy the book'

b. Hy loop (*gou) koop gou die boek (*koop)
he walk.FIN fast buy.INF fast the book
'He goes and buys the book quickly' (pseudo-coordination reading)

c. Hy gaan (*gou) loop (*gou) koop gou die boek
he go.FIN fast walk.INF fast buy.INF fast the book
'He goes and walks and buys the book quickly' (pseudo-coordination reading)

d. ... dat hy gou die boek gaan$_2$ loop$_3$ koop$_4$ het$_1$
that he fast the book go.INF walk.INF buy.INF have.FIN
'... that he goes and walks and buys the book quickly'

As (60b) clearly shows, verbs *2* and *3* in structures of this type necessarily undergo V2 together: it is impossible to separate them with an adverb and it is also impossible to strand the non-finite verb (here, lexical *koop* – 'buy') in post-object position As comparison of (60c) and (60d) shows, the addition of a further linking verb, *gaan* ("go"), which is distinct from future *gaan*, increases not only the size of the head-initial cluster, but also the size of the cluster that undergoes V2. The relevant verbs also front together in predicate-doubling and

VP-fronting structures (cf. Biberauer 2009), further supporting the idea that they function as a unit more generally. In these cases, then, it would appear that verbs *2* and *3* are not syntactically distinct in the way that heads forming part of an Extended Projection typically are. We leave aside here the question of precisely how this should be formally captured (but see Biberauer forthcoming, c), noting only that these structures do not appear, in violation of FOFC, to involve a head-final XP (here: AuxP) dominating a head-initial XP (here: the XP associated with verb *2*).

What we have seen in this section, then, is once again that structures that superficially appear to violate FOFC do not, upon closer inspection, actually seem to do so.

## 4. Linear order and movement

### 4.1 Introduction

Having illustrated FOFC as an empirical generalisation, we now turn to a consideration of the formal mechanisms underlying the general ban on structures of the form in (3), which we repeat here for convenience:

(3) *$[_{\beta P} \ldots [_{\alpha P} \ldots \alpha \ \gamma P ] \ \beta \ldots ]$

The observation that (3) is not allowed sets a challenge for any account of linearization: the theory of linearization should predict (a) the preference for harmony and (b) the fact that only one disharmonic order is allowed. In other words, it should predict FOFC.

Within Principles-and-Parameters theory, the Head Parameter, regulating the linear order of head and complement, is standardly taken to explain the preference for cross-

categorial harmony. In fully harmonic languages, all heads have the Head Parameter set the same way, either the head preceding the complement or the head following the complement (see Koopman 1984, Travis 1984, Fukui and Saito 1998, Richards 2004). The fact that not all languages are consistently head-initial or head-final means that the parameter must be relativized to categories: some heads may deviate from the general setting of the Head Parameter, allowing disharmony in the phrase structure.[32] However, on its own this does not offer any explanation for why there should be a difference between the two kinds of disharmonic structures instantiated by (3) and its inverse where the head-initial category is structurally higher than the head-final one. We therefore have to look elsewhere for an explanation of FOFC.

### 4.2 An LCA-based account of linearization

Consider again FOFC, this time the 'original' formulation (1):

(1) **The Final-over-Final Constraint (FOFC) (informal statement)**

A head-final phrase αP cannot dominate a head-initial phrase βP where α and β are part heads of in the same Extended Projection.

On the other hand, a head-initial phrase may dominate either a head-initial or a head-final phrase. As we pointed out above, this entails that, at least in mixed systems, head-final order is more constrained than head-initial order, and in that sense more marked than head-initial order. What we should look for is, thus, a theory of the relation between structure and linear order in which head-final order is, in the relevant fashion, more marked than head-initial order. One such theory is Kayne's (1994) antisymmetry theory, including the Linear

Correspondence Axiom (LCA). In the following, we will argue that FOFC is indeed indirectly an effect of the LCA, in conjunction with certain other theoretical postulates currently widely assumed within minimalist syntactic theory.

The presentation will proceed as follows: first we will present the LCA and the corollary that head-final order is derived by complement movement. This leads to the hypothesis that phrase-final heads involve a movement-triggering feature. FOFC will then be seen as an effect of 'spreading' or inheritance of this feature from the lexical head up, from head to head within the Extended Projection, observing standard locality conditions on head-to-head relations. In section 4.3.2, we compare this theory with an alternative theory, with all the same components as the LCA-based theory except the LCA itself. We will argue that this theory does not, in fact, represent a simpler or more elegant alternative to the LCA-based theory.

We state the LCA as follows:

(61) **The LCA**

α precedes β if and only if α asymmetrically c-commands β or if α is contained in γ where γ asymmetrically c-commands β.

In our formulation of the LCA, we depart from Kayne's original formulation but follow the basic ideas of bare phrase structure in taking α and β to be potentially both terminal nodes and lexical items; in particular, we do not regard lexical items as constituents of categories. We define c-command as follows:[33]

(62) a. α c-commands β iff α is a category and β is contained in the sister of α.

b. α asymmetrically c-commands β iff α c-commands β and β does not c-command α.

Consider the standard X' structure, as in (63):

(63) $[_{XP}\ \alpha\ [_{X'}\ X\ \beta\ ]]$

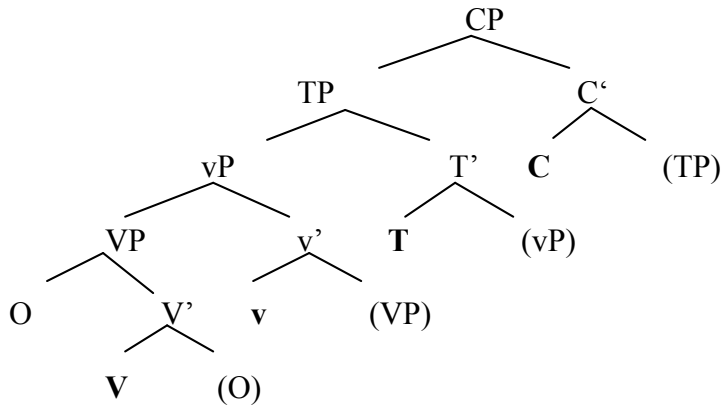
Given (61) and (62), the specifier, α, precedes the head X, since that head is contained in α's sister. As long as β has internal structure, X will precede it, since X asymmetrically c-commands anything contained in β (and containment dependencies cannot "cross"). If β has no internal structure, X and β cannot be ordered as either they c-command each other, or there is no c-command relation (this depends on whether "contain" is reflexive; see note 33). Further specifiers and adjuncts will be ordered amongst themselves, because they will all be in asymmetric c-command relations with one another, and will always be to the left of the "core" X' containing X and β, given the definitions in (61) and (62).

Since movement is always 'upward', a moved element will always asymmetrically c-command its trace or copy.[34] The LCA then guarantees that movement is always leftward. It is worth noting that surface linear order is, quite independently of LCA-related assumptions, very often in part the result of (leftwards) movement of one kind or another (A-movement, A'-movement, or head movement). The proposal here, as in Kaynian work more generally, is that surface head-final order is also always the result of movement. In order to precede a given head, a complement must move from the position as sister of that head to a position where it asymmetrically c-commands the head (Kayne 1994:47-48). Head-initial order, on the other hand, can (but need not) be derived without any movement. That is to say, within a single XP, head-final order in XP is derivationally more complex than head-initial order in

XP, in the sense that it must involve a step of movement that head-initial does not absolutely require. This, we contend, is essentially why it is more constrained than head-initial order.

Furthermore, as also originally proposed by Kayne (1994:52-53), consistent head-final order is derived by "roll-up" (successive leftward movement of complements and categories containing moved complements). The derived structure of a "roll-up" derivation in CP looks as follows (the internal structure of the copies of the rolled-up categories is not indicated for ease of exposition):

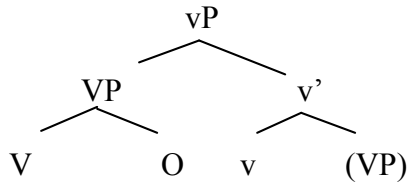
(64)




The LCA applied to this tree yields the string O>V>v>T>C. This is a harmonically head-final structure. A harmonically head-initial structure arises where no complement-movement takes place (in the simplest case). Most importantly for our purposes, disharmonic orders result when some complements, and/or elements contained in those complements, undergo movement and others don't. If movement of an XP is always triggered by a property of some head, then what FOFC shows is that the distribution of the movement-triggering property is constrained, so that only one type of disharmony is allowed. More precisely, a typical FOFC violation will arise when a superordinate head triggers movement of its complement, but inside that complement the head does not trigger movement of *its* complement. Suppose, for

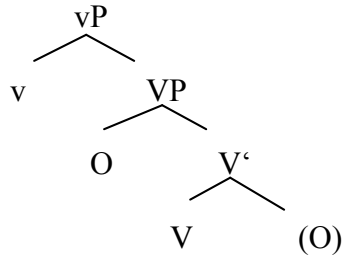
example, that v triggers VP-movement but V does not trigger object-movement. Then we have the structure in (65):

(65)




If v can contain an auxiliary, then this gives surface V>O>Aux order (assuming O has internal structure, as mentioned above), the FOFC violation discussed in section 2.1. On the other hand, if V triggers movement of its complement, and v does not, we arrive at the FOFC-compliant disharmonic structure shown in (66):

(66)




Hence, if a superordinate head does not trigger movement, but the head of its complement does, the result is permissible, non-FOFC-violating disharmony. Note that this means that disharmonic languages are always partially harmonic: there is a node in the disharmonic Extended Projection such that above that node, they are harmonically head-initial, and below that node, they are harmonically head-final. This generalisation is a direct consequence of FOFC.

We are now in a position to take a crucial step forward in understanding FOFC. It emerges from the above discussion that head-final order can be derived by complement-

movement, as long as, when iterated, complement-movement starts at the bottom of the tree, and iterates monotonically up the tree. The iterations can stop at any point (as designated in the grammar of the language), as long as the stopping is "permanent," i.e. as long as complement-movement does not "start again" in a higher position within the same Extended Projection. This is an informal, movement-based statement of FOFC. We now have to make the statement more formal, and explain exactly why complement-movement should be constrained in this way.

## 4.3. Our proposal

### 4.3.1 FOFC, feature copying and movement

It should be clear from the previous section that our account of FOFC relies on movement, and in particular on the way in which movement is triggered. Accordingly, we adopt the following idea:

(67) Movement is triggered by a general movement-triggering feature. We use ^ (caret) as a symbol for this feature.

We take ^ to be a purely formal, arbitrary diacritic. In itself, it has no semantic content, and no connection to phonological or morphological properties beyond simply causing movement. Moreover, although it can be seen as a kind of formal feature, ^ differs in several important respects from formal features like φ-features. Unlike φ-features, which are arguably best seen as attribute-value pairs, it is privative, it has no internal structure, it cannot

be valued or in any obvious way "checked off", and, as already mentioned it has no semantic or morphophonological effects.[35]

The idea that movement is triggered by a purely formal diacritic is widespread in the current literature. In different versions, and with different notations, it appears in, among others, Müller and Sternefeld (1993), Chomsky (2000, 2001, 2008), Pesetsky and Torrego (2001) and Roberts and Roussou (2003); the idea of a "spell-out" diacritic associated with certain positions is also found in the representational system proposed in Brody (1995).

Very much in the spirit of Müller and Sternefeld (1993), we take it that the properties of different types of movement depend on the features that ^ is associated with. Where the movement-trigger ^ is associated with the uninterpretable φ-features of an active Probe, for instance finite T, it gives rise to A-movement; in this respect it replaces the EPP features of Chomsky (2000, 2001). Where ^ is associated with a phase head, for instance C, it triggers A'-movement (see Chomsky 2008:144). Finally, and most important for our purposes, where ^ is associated with the categorial, Extended Projection-defining feature [±V], 'Linearization movement' (*L-movement* henceforth) takes place, i.e. movement of the sister of a head as seen in the previous section.[36] Examples of the different types of movement triggers are:[37]

(68) a. $T_{[u\varphi, \hat{}]}$ triggers movement of the goal of the probe [uφ] to SpecTP;

b. $C_{[EF \hat{}]}$ triggers A'-movement to SpecCP;

c. $V_{[+V \hat{}]}$ triggers movement of the sister of V to SpecVP.

We can now state FOFC in terms of movement more formally:

(69) If a head $\alpha_i$ in the Extended Projection EP of a lexical head L, EP(L), has ^ associated with its [±V]-feature, then so does $\alpha_{i+1}$, where $\alpha_{i+1}$ is c-selected by $\alpha_i$ in EP(L).

Where $\alpha_i$ is L, (69) holds trivially, in the absence of a head $\alpha_{i+1}$. The hypothesis that the movement-triggering feature accompanies the Extended Projection-defining feature [±V] can explain why head-final order spreads from the bottom up, starting at the base of the Extended Projection: any property associated with [±V] will be a property of the lexical head L which defines the Extended Projection; this follows from what we take to be the intuitive notion of Extended Projection as the "inheritance" of core properties of the lexical head through the functional superstructure associated with that head. We define Extended Projection as in (70). As the definition involves the notion *spine*, we begin by defining this notion.[38]

(70) A sequence of nodes $\Sigma = (\alpha_1, ..., \alpha_n)$ is a *spine* if and only if

(i) $\alpha_n$ is a lexical category and an X°; and

(ii) for all $\alpha_i <_n$ in $\Sigma$, either

$\alpha_i$ is a projection of, and immediately dominates $\alpha_{i+1}$, or

$\alpha_i$ is an X°, and the sister of $\alpha_{i+1}$.

This definition states that a lexical head, its projections, any category immediately dominating a projection of the lexical head and any category immediately dominating such a category, as well as any head which is a sister of such a category, can be part of the spine. Call a spine whose final member is $\gamma$, the *spine from* $\gamma$. We can now define Extended Projection as follows:

(71) Π is the Extended Projection of L if and only if Π is the maximal subsequence of Σ(L), the spine from L, such that

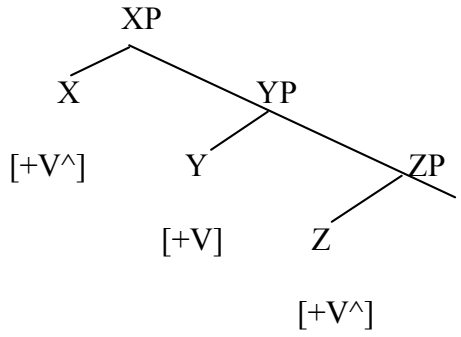
(i) $L \in \Pi$, and

(ii) if $\alpha \in \Pi$, then $\alpha$ and L have the same value for [±V].

Assume that for instance v c-selects [+V], and therefore merges with V(P). Assume, however, that v is not inherently valued [+V], but that this feature "spreads" to v from its sister VP.[39] This can be iterated at the T-level, making T [+V], whatever other features it has, and so on for C as well. So we see that [+V] spreads through the functional heads making up the core Extended Projection, thereby defining the Extended Projection in accordance with (71ii). What is most important for our purposes concerns the interaction of ^ with selection. If a given head can select [+V] and inherit [+V], exactly the same applies in a system with [+V^]. In this situation, a higher head may select [+V] and inherit [+V] without ^, but, *crucially, no head can inherit ^ without inheriting [+V]*. The assumption behind this is that ^ cannot be selected alone, since it is not a categorial feature. Parametric variation in word order can then be encoded in terms of the highest head in the Extended Projection which selects [±V^].

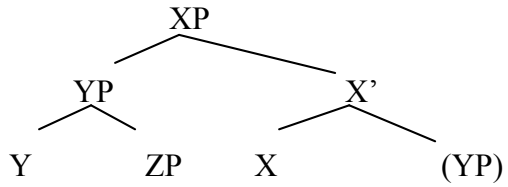
It now follows that if X c-selects Y, and X and Y share the same value for [±V], if X is ^ then Y is also ^. FOFC is thus a consequence of the locality of c-selection. The configuration (72) is ruled out:

(72)




The resulting structure, once movement has applied to (72), would be (73), a head-final phrase XP immediately dominating a head-initial phrase YP (itself containing a head-final ZP), i.e. a FOFC-violation, and a structure not attested among the world's languages, if we are right.

(73)




Since FOFC is a consequence of the locality of c-selection, we can ask what makes this relation so local. We propose that this is an effect of Relativized Minimality, which we state as follows:

(74) **Relativized Minimality** (adapted from Rizzi 2001):

In a configuration X...Y...Z where X asymmetrically c-commands Z, no syntactic relation R can hold between X and Z if Y asymmetrically c-commands Z but does not c-command X, and R potentially holds between X and Y.

By Relativized Minimality, X in (72) cannot enter a selection relation with Z directly, hence ^

cannot spread to X from Z. Hence the FOFC-violating structure (73) cannot be derived. ^ can only spread to X if it also spreads to Y.

Thus FOFC is a result of the following syntactic conditions:

(75) (a) Head-finality is a consequence of the movement-trigger ^ being paired with the categorial feature [±V], which enters the derivation with the head of the Extended Projection.

(b) The movement-trigger ^ can spread with [±V] from head to head along the spine of the Extended Projection, subject to parametric variation.

(c) C-selection relations are subject to Relativized Minimality.

An interesting and, we think, desirable consequence of this approach to Extended Projections is that functional heads only have one categorial feature: what they c-select is what they are, in categorial terms. Lexical heads, on the other hand, have their intrinsic categorial feature and a distinct c-selection feature, e.g. a canonical transitive verb is [+V] and [__+N]. the richer specification of lexical categories can be directly connected to the fact that they have s-selection properties, which functional heads are typically thought to lack.

Some comment is also necessary in relation to (75c). As originally argued by Chomsky (1965), c-selection/subcategorisation is subject to a sisterhood condition. In terms of bare phrase structure, this can be implemented by taking c-selection to be a constraint on (external) Merge. However, consider the case of negation in many languages: typical positions for clausal negation are between C and T (e.g. Italian, Spanish) or between T and v (Germanic). In general, C, T and v make up the clausal Extended Projection, and we have selection for T by C and v by T. We do not want to say that the c-selection properties of these heads are different in negative clauses. If we take negation to lack categorial properties, then,

if c-selection is subject to Relativised Minimality, the negation head will be invisible to selection. It also follows from the account of FOFC given above that negative particles will form a class of systematic exceptions to FOFC, which, as far as we are aware, is true. The same logic can be carried over to topic and focus markers associated with selected constituents and thus, arguably, to particles of these kinds and to acategorial particles more generally (see also the discussion of conjunctions in section 3.2). A question that arises, of course, is how acategorial elements like negation, topic, focus and coordination markers can be merged into a structure when they are never c-selected by another element. Biberauer (forthcoming, c) suggests that elements of this type are, for this reason, always the last of the elements in a given lexical array to be merged, meaning that we predict them to occupy peripheral positions in relation to phasal domains (assuming lexical arrays to define such domains). In the specific case of elements which can plausibly be thought to lack formal features entirely – basic coordination elements are a case in point (see section 2.3) – it might then be expected that these elements are always head-initial: they lack the features required in terms of (68) above to host movement-triggering and thus potentially head-finality-generating ^.[40]

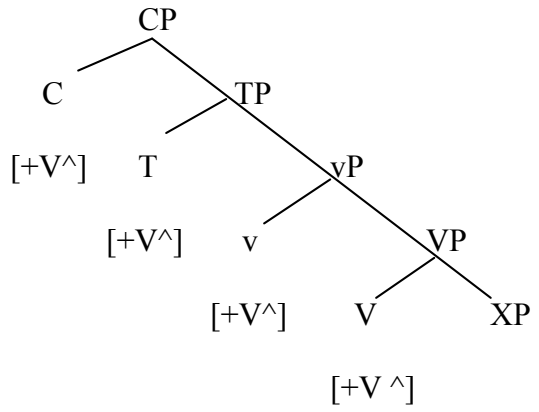
Before we demonstrate in more detail that the FOFC-violations discussed in section 2 can be explained by this theory, let us first consider an alternative theory which does not rely on the LCA.

### 4.3.2 An alternative: linearization without movement

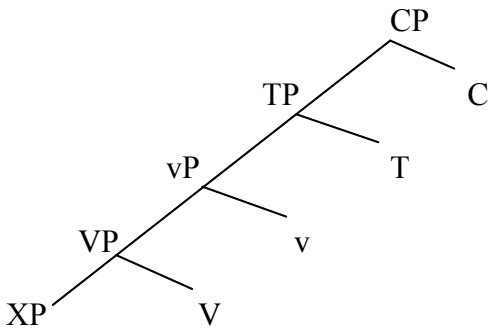
Consider the following theory, which has exactly the same elements as the theory above, except that ^ is not seen as a feature triggering movement, and thus affecting linear order only indirectly by virtue of the LCA, but as a 'direct linearization' feature. On this alternative

theory, the feature ^, associated with the feature [±V] of a head would be a PF instruction to linearize the head to the right of its sister. More precisely, according to this theory, a head H may or may not have ^ associated with its categorial feature [+V] or [–V]. In the absence of ^ (the unmarked case), H is linearized to the left of its sister. With ^, H is linearized to the right of its sister. As in the theory described in section 4.3.1, the feature [±V], with or without ^, originates on the lexical head, and the same spreading of [±V] and ^ along the spine as described in section 4.3.1 is assumed, with FOFC an effect of locality of selection between heads, and violations of FOFC ruled out by Relativized Minimality. Thus a tree with the distribution of ^ in (76a) will have the structure/order in (76b), as a result of the linearization instruction associated with [+V] (in the absence of any syntax-internal movement reordering the constituents):

(76) a.




b.




A tree where a functional head has ^ paired with [±V] but the head of the Extended

Projection does not is impossible, if [±V] spreads together with ^ along the spine of the Extended Projection. A tree where a functional head has ^ paired with [±V] but the next functional head down the spine does not is impossible due to Relativized Minimality. Thus, as in the theory sketched in 4.3.1, FOFC-violations are underivable.

On the face of it, (76b) is structurally simpler than its LCA-based counterpart (64). However, we contend that the theory behind (76) (call it the "direct linearization theory") is not simpler or more elegant than the theory behind (64) (antisymmetry theory) as a theory of the mapping between structure and linear order. First and foremost, in the direct linearization theory the premise that head-final order is marked and head-initial order the default is purely a stipulation; this just happens to be the case in all languages of the world. In antisymmetry theory, it is explained by the LCA, a principle which also explains a number of other pervasive universal properties of grammar, including why specifiers typically (arguably always) precede the head, and why movement is typically (arguably always) leftwards. Given the LCA, head-final order requires movement, hence a movement trigger, to shift the complement to a position where it asymmetrically c-commands the head, while head-initial order does not require complement movement (though other movements are possible). Second, movement is obviously important as a factor determining constituent order in a variety of structures: passives, wh-movement, topicalization, scrambling, etc. Thus, under direct linearization, order will be determined by movement *and* direct linearization. Under antisymmetry, order can be determined by movement alone, given the LCA. Related to this, under direct linearization, languages operate with both movement and linearization diacritics, whereas on the LCA-based view, only the former are required.

We take this to be reason enough to prefer antisymmetry over direct linearization. However, the hypothesis that FOFC is an effect of a feature originating on lexical heads which spreads up the spine of the Extended Projection, subject to Relativized Minimality, can

be seen as independent of antisymmetry. See Biberauer & Sheehan (2010) for further discussion of the shortcomings of a non-LCA based approach to linearization.

## 5. Some outstanding issues

A number of outstanding issues have been relocated to an Appendix REFERENCE? LINK?. In the relocated section we first demonstrate that each of the FOFC-violations summarised in section 2.7 is indeed accounted for by the mechanisms we have postulated. One configuration discussed there requires special attention, that is when a head with categorial feature value α takes (or appears to take) a complement with the same feature value α, potentially raising an issue for the Relativized Minimality-based account of FOFC which we have proposed. Another outstanding issue discussed in the Appendix is that of optional head-finality, as found in, for example, Finnish. The main observation which must be accounted for is that when the option of head-finality is taken, the grammar operates exactly as it does in languages with obligatory head-finality. Yet another issue taken up in this connection in the Appendix is the 'leakage' from pre-head to post-head position, observed in varying degrees in head-final languages/projections.

Another important issue relocated, for reasons of space, to the Appendix is that of alternative theoretical accounts of FOFC. We discuss, briefly, an alternative account in terms of processing, based on Hawkins (1990a, 1994, 2004, in press), as well another recent theory addressing FOFC within an optimality-theoretic model, Philip (in press).

## 6. Conclusions

In this paper, we have provided empirical motivation for FOFC, as an exceptionless syntactic

universal, and we have presented our account of it in terms of (variants of) existing theoretical proposals.

In section 2, we presented FOFC and provided the principal empirical motivation for it. In section 3, we presented and accounted for certain apparent counterexamples. In section 4, we presented our theory of linear order and showed how FOFC can be derived from it and we applied that analysis to the data introduced in sections 2 and 3. The central elements in our account of FOFC are:

(90) (i) the antisymmetric analysis of head-final orders;
(ii) the general movement-triggering diacritic ^;
(iii) the notion of Extended Projection;
(iv) the strong locality condition on selection, which derives from Relativised Minimality.

Assuming that our data is correct, and that we have not missed some significant and intractable set of counterexamples, our analysis can be seen as supporting the postulates in (91). In particular, our analysis motivates the relevance of Grimshaw's notion of Extended Projection for the investigation of universals, and arguably the concomitant notion that syntactic categories should be decomposed into features. It additionally supports the postulation of an antisymmetric analysis of surface head-final orders.

In FOFC, then, we seem to have a generalisation which gives an empirical indication regarding the nature of the language faculty.

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[1] Emonds (1976:19) put forward a similar constraint, the *Surface Recursion Restriction*: phrases to the left of a head inside an XP have to be head-final under certain conditions (cf. also Williams' 1981 *Head-Final Filter*). As Emonds points out (p.c.), the Surface Recursion Restriction does not make identical predictions to FOFC, but it is somewhat similar. We are grateful to Norbert Corver and Henk van Riemsdijk for drawing our attention to this and to Joseph Emonds for helpful discussion and references. David Pesetsky (p.c.) further drew our attention to Hale, Jeanne and Platero (1977:385), who observe a case of FOFC in

Papago/Tohono O'odham, and propose a surface structure constraint on the distribution of a #-boundary in order to account for it (see their (25), p. 391).

[2] 'Aux' may either be an auxiliary or a verb capable of triggering clause-union/restructuring. We use the generic label 'Aux' for these heads here.

[3] At least since Haegeman and van Riemsdijk (1986), this order has been known as 'verb projection raising'.

[4] This corresponds to what has been known, since Evers (1975), as the 'verb-raising' order in Dutch.

[5] Afrikaans data cited without sources is 'constructed' data, which has, however, been checked with a minimum of three native-speakers, all of whom readily accepted the structures indicated as grammatical.

[6] See section 3.3 on a restricted class of three-verb clusters which at first sight appear to undermine this generalisation, in that they appear to show $[_{AuxP1}\,[_{AuxP2}\,Aux_2\ VP\ ]\ Aux_1\ ]$ order. Nonetheless, the generalisation as stated holds of all two-verb clusters.

[7] In the case of Basque, as in the other cases discussed, we are making assumptions about the analysis of these word orders which are, we think, reasonable, but obviously not incontestable. We cannot actually be certain that, for example, [ [V O] Aux] is the only analysis of (14b), and that therefore FOFC is the reason why it is ill-formed. A referee observes that we are here treating FOFC as if it were a necessarily 'surface-true' generalization, à la Greenberg's word order universals, while claiming that it is a hierarchical universal. We will see later that FOFC is not always a surface-true generalization. On the other hand, if it were not the case that FOFC is quite often surface-true, we would probably not have discovered it in the first place.

[8] In addition to the core texts systematically studied by Flobert (1975) – four from the Classical period, and one from the Late Latin period – Danckaert's corpus consists of

1,175,031 words, of which roughly half (560,534) come from the Late Latin period. The Classical Latin component of this corpus features 45 V-O-Aux structures, mostly from the works of Livy. See section 2.2 for further discussion.

It is worth noting that we ignore here the modal-containing V-O-Aux structures discussed in Danckaert (2012a,b) on the grounds that the putative Aux in this case fairly uncontroversially instantiates the head of a distinct clause (it can be independently modified, negated, etc.).

[9] To the extent that the form expressing "want" need not be an auxiliary, this gap cannot be fully explained by appealing to FOFC, but it is, nonetheless, striking.

[10] This does not seem to be just an areal effect, since Basque, although spoken in Europe, is not part of the European *Sprachbund* suggested in Haspelmath (2001) which he designates 'Standard Average European'.

[11] In this latter possessive case, it is also clear that the initial DP realising the possessor (here: *the girl from next door*) defines its own Extended Projection, which is distinct from that of the possessum (here: *smile*)

[12] If transitive deponents are associated with a non-defective phasal domain, the expectation would further be that V would not be available for probing by T since VP would, in terms of Chomsky's (2000) PIC, be spelled out upon completion of the vP phase (see Richards in press for discussion of the effects of phasal spellout on the realization of Case/case). Even if it undergoes movement to the edge of vP, however, T would not be expected to be able to probe V (or O), given the prior Agree operation involving v.

[13] There are a number of other combinations which are somewhat indeterminate in relation to our concerns. For example, Dryer defines a "mixed" category for subordinators, which includes the combination of initial and final, as well as clause-internal (often second position) and suffixal. There are 31 VO languages with mixed subordinators, and clearly

these need to be investigated. Furthermore, some languages are taken to have no dominant order among OV and VO: 4 of these have mixed subordinators, 3 have suffixal subordinators and 2 have final subordinators. The numbers are small in every case, but again these cases should be investigated more closely.

The numbers of languages discussed here do not add up to 660. The reason for this, as explained in *WALS* is that when features are combined (here 94A Order of Adverbial Subordinator and Clause and 83A Order of Object and Verb) "the numbers for languages in each row or column do not necessarily add up to the total number of languages for the respective feature value. This is due to the fact that the sets of languages for two features are typically not identical" (see wals.info/feature/combined).

[14] There are contexts in which it is possible for initially-headed CPs to surface preverbally in West Germanic and other OV languages, namely where these CPs have undergone A'-movement, either to clause-initial position (cf. Koster 1978, Alrenga 2005, on sentential subjects) or to a clause-internal position, which may superficially appear to be the complement position. As Barbiers (2000) notes, however, this preverbal position can be shown to be higher than that associated with the unmoved preverbal complement, CPs located in this position being to the left of VP-adverbs and satisfying the same diagnostics as scrambled elements.

[15] Finnish adpositions assign either genitive or partitive case to their complement. *Yli* assigns genitive, hence *rajan* in (28a) and *välisen* in (31a) as opposed to the citation forms *raja* in (27) and *välinen* in (30).

[16] It is not crucial that the offending complement (or adjunct) in (29b) is a PP. We see the same effect when the complement is a clause (the postposition *jälkeen* assigns genitive; see previous footnote).

(i) päätöksen jälkeen

decision after

'after the decision'

(ii) päätös pitää kokous

decision hold meeting

'the decision to hold a meeting'

(ii) *päätöksen pitää kokous jälkeen

decision hold meeting after

[17] In fact there are reasons to think that the apparent complement of *rajan* ("border") in these examples is a reduced relative, hence an adjunct. If so, the ungrammaticality of (28b) shows that FOFC also applies in cases where the sister of a lexical head is an adjunct (as countenanced by our definition in (1) and (3)). If we mark it explicitly as a relative clause, it is still excluded in postnominal position, when the NP is embedded under a postposition:

(i) *rajan [joka kulkee maitten välillä] yli

border which goes countries between across

Intended: 'across the border which runs between the countries'

Similarly, in the case of verbs taking a locative adjunct, FOFC applies just as it does with complements. Compare (i) with (11d):

(ii) *Milloin Jussi [$_{VP}$ uinut [$_{PP}$Englannin kanaalin yli]] on?

when Jussi swum England's Channel across has

Intended: 'When has Jussi swum across the English Channel?'

A difference between (some) complements and adjuncts, is that adjuncts "have more ways to avoid FOFC", so to speak, since they are generally less rigidly ordered than complements.

Thus, in the case of the relative clause, it can occur to the right of the higher postposition (cf. Sheehan 2011, in press a,b and Biberauer and Sheehan 2012 for discussion).

(iii) rajan yli [joka kulkee maitten välillä]

[18] "Circumpositions", found *inter alia* in West Germanic, in the Gbe languages of West Africa and in Iranian contact varieties, appear to be somewhat different some from the Finnish pre/postpositions discussed here. These are illustrated in (i):

(i) a. in den Laden rein [German]
in the.ACC store R-in
'into the store'

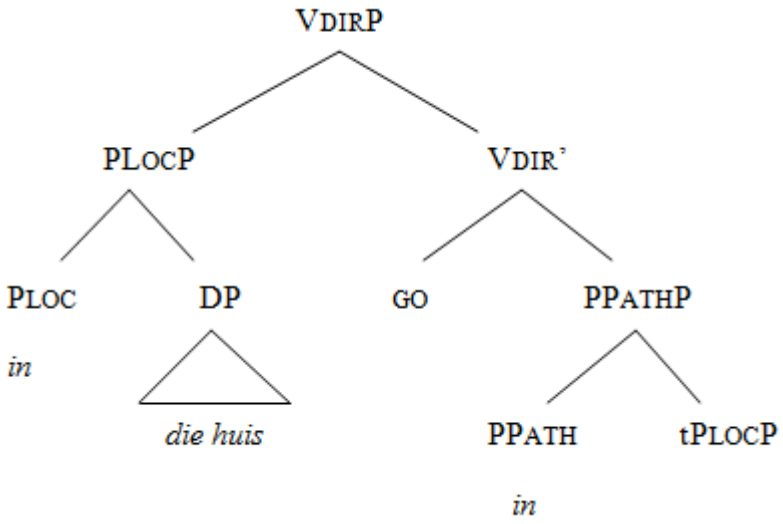
b. onder de brug door [Dutch]
under the bridge through
'under the bridge (path)'

c. in die huis in [Afrikaans]
in the house in
'into the house'

Here it appears that we have a head-initial PP in the complement of a postposition, in violation of FOFC: in each case, the postpositional element expresses directional meaning, which is universally encoded higher within the adpositional domain than the locative meaning encoded by the preposition (see the contributions in Cinque and Rizzi 2010 for recent discussion). However, the postpositions in these constructions appear to be a rather non-uniform set of elements, including adverbial or particle-like intransitive prepositions (see Svenonius 2003a,b, 2006, 2007, 2009, 2009 2010). In cases where they cannot plausibly be viewed as integrated with the head-initial PP, they would not be heads taking the preceding PPs are their complement, and hence no challenge to FOFC. Where integration seems likely, as in the cases illustrated above, it is striking that closer inspection of the relevant structures

reveals that the preposition is dominated by a complete extended projection including the equivalent of a CP-domain, while the postposition is not (cf. i.a. Aelbrecht and den Dikken 2011, Djamouri, Paul and Whitman, in press, and Biberauer, forthcoming for detailed discussion of relevant cases). This means that the postposition is defective and, as we shall argue in section 3.2 in relation to defective elements more generally, not part of the Extended Projection of its PP/DP complement. In the specific case of West Germanic structures such as those illustrated in (i), it is also highly plausible to assume, as Noonan (2010) does, that the defectiveness of the postpositional element in fact entails that it is integrated within a verbal projection headed by silent GO in roughly the manner schematised below (see Noonan 2010 for the full structure; cf. also van Riemsdijk 2002 for entirely independent arguments in favour of the existence of silent GO in West Germanic varieties, and also, more generally, the oft-noted difficulty of distinguishing adpositions and particles in these systems – cf. i.a. Neeleman 1994, den Dikken 1995, and Zeller 2001, and de Vos in press; see Biberauer, forthcoming, a for detailed discussion):

(ii) a. in die huis in [Afrikaans]
in.LOC the house in.DIR
'into the house'




Strikingly, independently occurring postpositions in West Germanic are always directional (cf. Biberauer 2006, Aelbrecht and den Dikken 2011). Assuming them to take the form in (ii), it also becomes possible to understand the presence of postpositional elements in systems which, like Germanic, have head-initial DPs.

[19] Cinque proposes that (35) is derived by NP-movement to SpecNumP, applied to the underlying structure (33) (which Cinque, following Kayne 1994, takes to be the universal underlying structure), deriving (i):

(i) $[_{DemP}$ Dem $[_{NumP}$ NP [ Num t ]]]

(34) is then derived by a further movement of the NP, to SpecDemP:

(ii) $[_{DemP}$ NP [Dem $[_{NumP}$ t [ Num t ]]]]

Cinque treats these cases as involving NP-movement as he does not assume any head-movement. He takes putative complements of N to be NP-external (see Cinque 2005:327, note 4).

[20] Typical clausal specifiers (raised subjects, shifted objects) are in a distinct Extended Projection from the clausal functional categories and hence do not induce FOFC violations. Possessor arguments in DP are categorially non-distinct from the nominal they are embedded in, though, and as such we expect them to be sensitive to FOFC, which they are not, in English, for example: *the author of the book's agent*. We take this to be a 'freezing' or 'multiple spell-out' effect (cf. Uriagereka 1999).This will arguably also exempt A'-moved categories from FOFC (and in fact also subjects and shifted objects regardless of their categorial identity). See section 4.3.1 for discussion of the notion Extended Projection.

[21] Not all Pol-heads appear to be structurally dominated by C, however, a possibility that Laka (1994) in fact allows for: for her, it is a matter of parametric variation whether Pol surfaces within the IP- or within the CP-domain. Consideration of the distribution of question particles clearly shows that these elements are dominated by C (see also Bailey 2012); investigation of the behaviour of clause-final negation and negative concord markers, such as that in Biberauer (2009, 2012) and Biberauer and Cyrino (2008a,b), however, suggests that these elements are, where they derive from structurally "high" elements like anaphoric negation or other speaker-/hearer-oriented discourse markers, very typically merged above C, at the very periphery of CP, Here they may (for example, Afrikaans *nie*$_2$) or may not (for example, Brazilian Portuguese *não*) be integrated with the clausal Extended Projection, with the result that we do not always expect high negation markers to be superficially FOFC-compliant. See section 3.2 for brief further discussion of why this difference between CP-internal and CP-peripheral Pol might obtain.

[22] This may be particularly interesting if one considers that adpositions may be reanalysed as complementisers (cf. Roberts and Roussou 2003, van Gelderen 2004, 2010 for disucssion and references). Given what is known about the distribution of head-final complementisers, it would appear that postpositions in head-initial languages systematically fail to undergo this diachronic process, another case of a FOFC-violating option being avoided, this time in the diachronic domain

[23] If we adopt the general approach to morphology articulated in Marantz (1997), typified by the slogan that, within the word, the structure is "syntax all the way down," then we would expect that FOFC holds at and below the word level. The issue has been investigated in Myler (2009), who finds some evidence that this is the case. This supports Marantz's thesis, as well as providing further evidence for FOFC; see Roberts (forthcoming, b).

[24] It should be noted, though, that among languages which have head-final VP, but head-initial PP most appear to systematically avoid having PP in preverbal position, typically resorting to extraposition instead, as reported in Sheehan (2008). Why this should be is a matter that we leave aside here as the empirical point of central relevance to the present discussion is the fact that head-initial PPs in systems like West Germanic unproblematically surface in preverbal position.

[25] Cf. also Taiwanese *kong* (Simpson and Wu 2002), Mandarin *shuo* (Wang et al. 2003), and Cantonese *waa* (Yeung 2006), as well as the sentence-final particles in certain Northern Italian Dialects (Munaro and Poletto 2006).

[26] This appears to be a more generally attested pattern in languages. Consider, for example, the Jespersenian doubling that so frequently arises in negative contexts, the so-called "forked modality" structures discussed by Cheng and Sybesma (2003), and the

"definiteness" doubling found in many systems, including the Celtic cases discussed in section 2.4 above.

[27] For example the SVO language Thai has a range of final question particles, which, according to Yaisomanang (2012), are all derived by ellipsis from a disjunctive structure. The question (i) is derived from (roughly) the underlying structure (ii) with two disjoined Polarity Phrases (PolP). The question particle *mǎy* in (i) is in fact the spell-out of *rʉ̌ʉ* 'or' and *mây*'not', taking the segmental form of the negation and the tone of the disjunction.

(i) nát khàp rót mǎy?
Nath drive car Q
'Does Nath drive?'

(ii) [Q [$_{IP}$ nát I [[$_{PolP}$ khàp rót] rʉ̌ʉ [$_{PolP}$ mây khàp rót]]]]

[28] See note 21.

[29] As discussed in Biberauer (2009, 2012), speaker/hearer-oriented tags and anaphoric negation elements represent an underdiscussed source of negative reinforcement markers of the kind most famously associated with Jespersen's (1917) work. Where they occur as final elements in (partially) head-initial systems, these structurally "high" elements naturally pose a potential challenge to FOFC and can treated along the lines proposed here.

[30] This proposal has been challenged, but plausible alternatives retain the assumption that *ge-* instantiated a verbal suffix. As noted in section 2.2, the systematic unavailability of Latin-type V-O-Aux structures involving participles also suggests that Germanic participles, unlike their earlier Latin counterparts, are [+V].

[31] This variable distribution of clausal features on adjacent heads is precisely what is expected, both system-internally and crosslinguistically, if a "spanning" approach of the type recently discussed in Distributed Morphology terms in Bjorkman (2011) and in Nanosyntactic terms by Svenonius (2012) is on the right track.

[32] As discussed by Baker (2008), although few languages are consistently head-initial or head-final, harmony is still preferred, so that languages cluster at both ends of the scale where the endpoints are consistently head-initial and consistently head-final.

[33] If "contain" is irreflexive all c-command is asymmetric, and (63b) is not needed.

[34] As pointed out by Chomsky (2001:37) (and by a reviewer), this is not obviously true of head-movement, if this involves adjunction of one head to another. Roberts (2010) proposes a general approach to head-movement which deals with this and various other technical issues concerning this operation.

[35] This raises the question of the status of ^ at the interfaces. It may be that LF simply ignores this element, since it has no denotation; unlike ignoring an unvalued/uninterpretable φ-feature, this has no deleterious effects. In PF, ^ has an effect, in that the head associated with it must have a category in its specifier (although that category may be a copy and so undergo deletion at some point).

[36] Here we assume that head movement is not triggered by ^, either because it is not part of core syntax (Chomsky 2001:37-38), or because it is the consequence of a particular type of Agree relation, that where the Goal is defective in relation to the Probe in that its formal features are included in those of the Probe (see Roberts 2010 where this idea is developed). Hence ^ only triggers phrasal movement.

[37] The phase head-related EFs discussed here should not be confused with the generalised Merge features, also designated *Edge Features*, ascribed to every lexical item in Chomsky (2007, 2008): as languages do not differ in respect of the fact that their lexical items may undergo External Merge/EM, whereas they do differ in respect of whether already-merged, and thus EF-bearing, items can trigger movement (Internal Merge/IM), it may be necessary to draw a distinction here (*contra* Chomsky 2007:17, 2008:144; cf. Kandybowicz 2008, 2009 for a proposal along these lines). We leave open the possibility that non-Agree-

driven movement simply involves a head associated with two EFs, i.e. an EM-triggering EF which bears a further IM-triggering EF as a secondary feature.

[38] Thanks to an anonymous *LI* reviewer for clarifying and correcting these definitions.

[39] Here we depart from widespread assumptions regarding the relation between v and V. Whilst it is sometimes assumed that v determines the verbal nature of the lexical root V (cf. Chomsky 2001), we are claiming that the lexical root allows its verbal feature to be copied by v. Here we follow Myler (2009), who makes a distinction between the clausal v, which we are dealing with here, and sub-word-level verbalising v, which renders a root verbal.

[40] If the Merge-triggering EF can host ^, this is, of course, no longer true.