Limiting Synchronic and Diachronic Variation and Change:
The Final-over-Final Constraint[*]

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This paper explores a synchronic grammatical constraint, the Final-over-Final Constraint (henceforth: *FOFC*; Holmberg 2000, Biberauer, Holmberg & Roberts 2007, 2008), and its predictions for diachronic change. As an absolute principle, FOFC rules out the possibility of a head-final phrase dominating a categorially non-distinct head-initial phrase. This predicts that change from head-final to head-initial order must proceed from the top down (starting with the complementizer), whereas change from head-initial to head-final order must proceed bottom-up (starting with the lexical verb). Case studies from English, Afrikaans, and Ethiopian Semitic appear to support these predictions. Building on the account in Biberauer, Holmberg & Roberts (2007, 2008), it is proposed that FOFC is an effect of phase-harmony, whereby if a phase head bears a linearization diacritic (signalling head-finality), then all the categorially non-distinct heads visible to it must also bear this diacritic. According to standard versions of phase theory, this account predicts that FOFC should hold across phase boundaries. This fact, however, creates an apparent 'paradox' for the theory of word-order change proposed, making it appear impossible for final structures to become initial or vice versa. The paper highlights empirical evidence to show how languages avoid this potential barrier to word-order change, which does indeed seem to progress as FOFC would predict.

Key words: language contact, language change, phase, syntactic typology, universal, word order

1. Introduction

Early typological studies found overwhelming correlations between the linear alignment of certain 'operands' (e.g. verbs, adpositions) and their respective 'operators' (e.g.

objects, adpositional complements) (cf. Greenberg 1963, Lehmann 1973, Vennemann 1974). Hawkins (1983:646) took this as evidence of a preference for 'Cross Category Harmony', whereby all the 'operands' in a given language would preferably align themselves in the same way. In generative terms this was captured by the Head Parameter (cf., inter alios, Travis 1984), which may be formulated as follows:

(1) Head Parameter
Heads X PRECEDE/FOLLOW their complements

a. **X′**   b. **X′**

   X   **Comp**   **Comp**   **X**

PRECEDES → HEAD-INITIAL   FOLLOWS → HEAD-FINAL
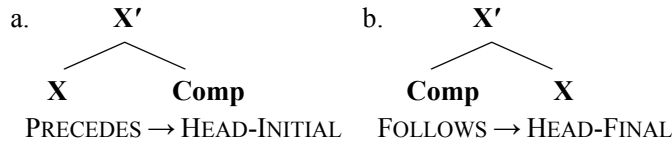
While there are unequivocally typological trends towards 'harmony' between certain grammatical categories, relatively few languages seem to be truly harmonic across the board (cf. Dryer 1992:fn 17). Moreover, historical data show that word-order change proceeds on a category-sensitive basis rather than in 'one fell swoop' (cf. §4 below). The Head Parameter, whatever its instantiation in the grammar, must therefore be relativized to categories (cf. Hawkins 1983, Huang 1994), or perhaps even to individual lexical items (cf. Bayer 1999, 2001, Kayne 2005a).

Nonetheless, it is by no means the case that all disharmonic orders are equally possible. In fact, while the order in (2c) is relatively common, the order in (2d) is unattested in many syntactic domains where αP is the complement of β and γP is the complement of α. While a head-final phrase can be dominated by either a head-final or head-initial phrase, a head-initial phrase cannot be dominated by a head-final phrase:

(2) Harmonic and disharmonic combinations
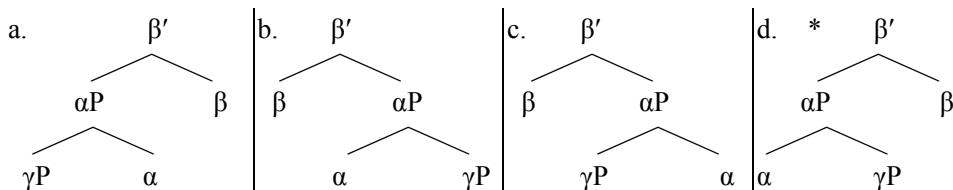
a. β′   b. β′   c. β′   d. * β′

  αP   β   β   αP   β   αP   αP   β

γP   α   α   γP   γP   α   α   γP

Holmberg (2000:124) terms this the *Final-over-Final Constraint* (FOFC):

(3)   The Final-over-Final Constraint (FOFC) (first version)
      If α is a head-initial phrase and β is a phrase immediately dominating α, then β must be head-initial. If α is a head-final phrase, and β is a phrase immediately dominating α, then β can be head-initial or head-final.

We shall review some of the broad empirical support for this generalization in §2. In §3, we provide an account of FOFC in terms of phase harmony, building on work by Biberauer, Holmberg & Roberts (2007, 2008; henceforth: *BHR*). Among other things, this work highlights the importance of distinguishing phrases headed by what can broadly be thought of as 'verbal' elements as opposed to those headed by broadly 'nominal' elements. Section 4 then discusses the predictions that FOFC makes for diachronic change. It will be argued that these predictions are supported by historical changes in the word orders of English, Afrikaans, and Ethiopian Semitic. Section 5 focuses on an apparent 'barrier to change paradox', which results from the theoretical possibility that FOFC should hold across phase-boundaries. In this regard, we shall discuss the borrowing of initial complementizers into largely head-final languages. It will be proposed that the 'barrier to change paradox' is resolved via the embedding of CPs in nominal structure, as FOFC fails to hold between the clausal and nominal spine. Section 6 concludes, raising some issues for future research.

2. The synchronic evidence for FOFC

A body of work by BHR (2007, 2008) and Biberauer, Newton and Sheehan (to appear) has unearthed a number of syntactic contexts reflecting the pattern in (2), where one disharmonic order (2c) is attested, but the FOFC-violating order in (2d) is not. We mention only two such contexts here, referring the reader to the works cited for further examples.

2.1 Polarity heads and complementizer placement

Biberauer, Newton & Sheehan (to appear) show that the order *[Pol TP] C, where Pol is a polar question particle, is virtually unattested cross-linguistically. Assuming, following Laka (1994) & Rizzi (2001), that the head housing polarity is lower than that housing complementizers, this represents a FOFC-effect. Moreover, in the closely related Indo-Aryan languages, exactly those languages which have an initial question polarity (Pol) head lack a final complementizer (cf. Davison 2007). As an illustration,

compare Hindi-Urdu and Marathi. Hindi-Urdu has an initial polarity head *kyaa* and lacks a final complementizer of any kind (the forms included here to illustrate this are equivalent to final complementizers found in related languages):

(4) Hindi-Urdu
a. **kyaa** aap   wahaaN   aa-be-Ngii?[1]
    POL   you   there   go-FUT-2PL
    'Are you going there?' (Davison 2007:182)
b. *use   [[vee aa   rahee haiN] **yah/ kah-kar**] maaluum hai
    3SG-DAT 3PL come PROG are   this/ say-PART   known   is
    'He/she knows [that they are coming].' (Davison 2007:178)

Marathi, on the other hand, has a final polarity head and both initial and final complementizers:

(5) Marathi
a. [[to kal   parat aalaa   **kaa(y)] mhaaNun asa**]
     he yesterday back come.PST.3M.SG POL   QUOT   such
    raam malaa witSaarat hotaa
    Ram   I.DAT ask-PROG   be.PST.3M.SG
    'Ram was asking me [whether/if he came back yesterday].'
b. raam maalaa witSaarat hotaa   [**ki** to kal   parat
    Ram   I.DAT   ask.PROG   be.PST.3M.SG that he yesterday back
    aalaa   **kaa(y)**
    come.PST.3M.SG POL
    'Ram was asking me [whether/if he came back yesterday].'
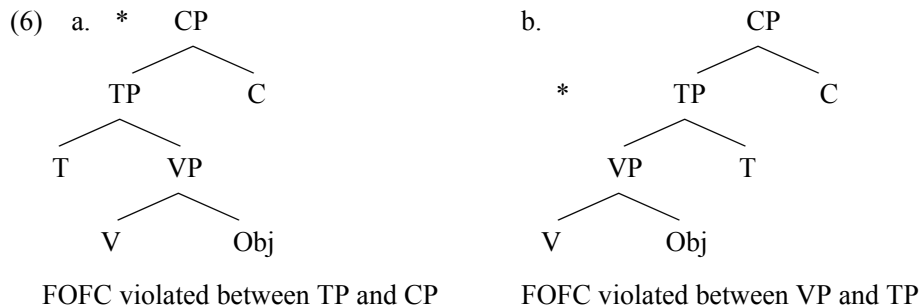   (Davison 2007:184, attributed to R. Pandharipande)

Cross-linguistically, while there are many languages with a final polarity head and an initial complementizer, there are very few with the FOFC-violating order (cf. Dryer 2005a, 2005b and see Biberauer, Newton & Sheehan to appear for further discussion). Moreover, the four languages which, according to Dryer (2005a, 2005b), allow the FOFC-violating combination all have clausal nominalization, which appears to render

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[1] The abbreviations employed in this paper are as follows: ACC=accusative; AFF=affirmation; AOR=aorist; AUX=auxiliary; DAT=dative; DEF=definite; DEP=dependent; ERG=ergative; F=feminine; FUT=future; GEN=genitive; IMPF=imperfective; M=masculine; NOM=nominative; NEG=negation; PART=particle; PASS=passive; PERF=perfective; PL=plural; POL=polarity; POSS=possessive; PRES=present; PROG=progressive; PST=past; QUOT=quotative; SG=singular.

them immune to FOFC. We return to the importance of nominalization in relation to FOFC in §3.2.

2.2 An asymmetry in complementizer placement

Further support for FOFC comes from a well-known asymmetry in complementizer placement, namely the lack of *[VO] …C. This can be seen to be another FOFC-effect once it is observed that FOFC holds transitively up a spine. Because a head-initial phrase cannot be *immediately* dominated by a head-final phrase, it is actually the case that it cannot be dominated *at all* by a head-final phrase. This means that head-finality must begin at the bottom of the clausal spine. As such, FOFC also accounts for the fact that VO languages cross-linguistically do not have clause-final complementizers (cf. inter alios Dryer 1992:102, 2009a, 2009b, Hawkins 1990:256-257, 2004, Kayne 2000: 320-321, Cinque 2005, Zwart 2009). As the structures in (6) show, VO-C structures are ruled out transitively, as a final C in a VO language necessarily violates FOFC at some point in the derivation:

(6) a. *   CP
              / \
           TP   C
          / \
         T   VP
             / \
            V   Obj

     FOFC violated between TP and CP

     b.   CP
              /   \
        *   TP   C
            / \
          VP   T
         / \
        V   Obj

     FOFC violated between VP and TP

The effects of FOFC are not just limited to the domains mentioned here; BHR discuss a range of further structures excluded by FOFC, not only in the clausal domain, but also in the context of nominals, thereby underlining the general nature of the gap characterized by (3).

3. Deriving FOFC from phase harmony (BHR 2007, 2008)

3.1 The FOFC-conforming cases

BHR propose that FOFC can be accounted for by appealing to three (in two cases, slightly modified) Minimalist assumptions regarding linearization. These are, firstly, that linearization is cyclically determined by phase heads in accordance with (the initial/strict

version of) the Phase Impenetrability Condition (henceforth *PIC*; cf. Chomsky 2000:108). This is given in (7):

(7) The Minimalist Inquiries PIC
In a phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations.
i.e. [$_{ZP}$ … Z^0 [$_{XP}$ … X^0 [$_{HP}$ **… [H^0** [$_{YP}$ …. Y^0 [$_{WP}$ … [W^0 …
[where only **bold material** — here, H^0 and its edge (i.e. specifier(s)) — is accessible to X^0, Z^0, etc; material in outline font has already been sent to Spellout]

Crucially, BHR assume that completion of a phase leads to the **radical removal** of the material in the spellout domain (i.e. the phase head's complement, e.g. VP, TP, etc.) from the computation. Thus VP is, for example, no longer present in the computation after the completion of the vP phase, with the result that it cannot be moved into the TP-domain if vP undergoes movement to Spec-TP; by the time that T is merged, the complement of vP (VP) has been sent to Spellout, whereafter it is linearized immediately. This means that a VP which has not undergone movement into the vP-edge will be spelled out as a clause-final VO-string.

BHR's second assumption is Kayne's (1994) Linear Correspondence Axiom:

(8) The Linear Correspondence Axiom/LCA
Asymmetric c-command determines linear precedence

Finally, their third assumption is that any head may independently bear a linearization diacritic (designated ^ here, but the precise label of the diacritic is immaterial).[2] This linearization diacritic serves to trigger Kaynian "roll-up" (i.e. comp-to-spec movement; cf., inter alios, Julien 2002 and Aboh 2004 for discussion) as a direct consequence of selection (see note 3); crucially, it is therefore distinct from the Edge Feature/EF which Chomsky (2008) assumes to trigger A′-movement, a point to which we return below. As it involves movement of a head's complement to its specifier, it will also be distinct

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[2] BHR refer to an EPP-feature, i.e. the diacritic assumed to be responsible for movement operations in the Probe-Goal-Agree approach of Chomsky (2000, 2001). What is crucial for present purposes is that the diacritic relevant to the formalization of the FOFC constraint is not specifically tied to an agreement-related (i.e. internally searching) feature; instead, it should be thought of as closely connected to selection (i.e. External Search; cf. also Julien 2002). As such, its non-equivalence to the features triggering A′-movement also falls out straightforwardly (see main text for further discussion).

from A-movement, although see Biberauer & Richards (2006) and Biberauer & Roberts (2006, 2009) for discussion of an approach to piedpiping which entails that A-movement and "roll-up" movement need not always be *superficially* distinct.

The assumption that any head, regardless of its phase-head vs. non-phase-head (henceforth *phasal* vs. *non-phasal*) status, can bear ^ is essential to accommodate the numerous clearly non-phasal elements that appear to dictate their own linearization properties on an item-specific basis (cf. the discussion in §1 above and the references cited there). This is another point to which we return below (cf. §3.2).

Given the assumptions outlined above, BHR propose the following (interim) formal characterization of FOFC (cf. (3) above):

(9)   Preliminary formalization of FOFC
      If a phase head PH has ^ (i.e. a linearization diacritic signalling the need for roll-up movement and thereby producing a head-final structure), then all the heads in its complement domain must have ^.[3]

This formalization calls to mind Chomsky's (2008) "spreading" proposal, in terms of which phase heads dictate various properties of the heads in their domain. BHR's proposal is specifically that a marked linearization feature (i.e. ^) also numbers among the features that phase heads can pass on (though see note 5). Applying (9) to the vP phase, we therefore arrive at the following set of predictions regarding possible and impossible word orders:

(10) a.   v^   V^   →   [$_{vP}$ [$_{VP}$ O V] v]   (consistent head-final order)
     b.   v   V^   →   [$_{vP}$ v [$_{VP}$ O V]]   (disharmonic non-FOFC-violating order)
     c.   v   V   →   [$_{vP}$ v [$_{VP}$ V O]]   (consistent head-initial order)
     d. *v^   V   →   [$_{vP}$ [$_{VP}$ V O] v]]   (FOFC-violating order)

(10a) instantiates the case where the ^-bearing phase head (v) "spreads" its marked linearization property to the V in its complement domain, in accordance with (9); (10b) represents the case where V independently bears ^, but the phase head does not, a

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[3] As Biberauer (2008) notes, it is crucial for the accurate formalization of the constraint imposed by FOFC that head-*final* rather than head-*initial* order be signalled via a special diacritic. Head-finality is therefore *marked* in the appropriate sense. Evidently, this notion of *markedness* need not entail that head-finality is less common or somehow less economical than head-initiality: just like the *absence* of a diacritic, the *presence* of a diacritic provides an unambiguous instruction to the computational system as to what is required of it; additional stipulations are required to establish *presence* of something that could be absent as "more costly" (cf. also Mobbs 2008).

scenario which is ruled in by the third of our assumptions above; (10c) represents the case where all heads lack ^; finally, (10d) instantiates the FOFC-violating structure, where v has not "spread" its linearization diacritic to the head in its domain.

(9) readily rules out the unattested VO-Aux orders (cf. §2.1 above). If the auxiliary spells out the phase head (v), (10d) directly accounts for the impossibility of VO-Aux as this ordering entails a ^-less V (i.e. V lacking the head-finality diacritic) which is selected by a ^-bearing v (i.e. v bearing the head-finality diacritic). As (11) illustrates, this is precisely the configuration which is ruled out by (10d):

(11) *   vP
            _____
          VP   v′
        _____   _____
       V   O   v^   (VP)
                 (Aux)
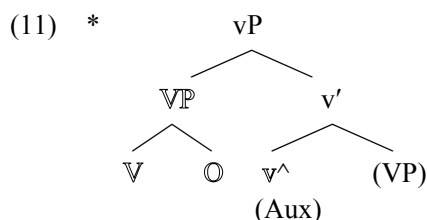
If auxiliaries are in fact T-elements, (10d) must be an intermediate stage of the derivation as T is a head merged in the higher (i.e. CP) phase. Taking into account the workings of the PIC (cf. (7)) and BHR's radical spellout assumptions, this means that the initial VP must move to Spec-vP in order to avoid being removed from the computation at the end of the vP-phase. This is, however, precisely the illegitimate structure in (11). Direct movement of the initial VP from its first-merged position to Spec-TP is ruled out by the operation of radical spellout: only the edge of vP will in fact be available for movement following completion of the vP phase, with VP-internal V and O having already been spelled out. This means that the only remaining possibility is that the initial VP moves to v's edge under the impetus of an Edge Feature (EF). This feature is, however, typically associated with "edge semantics" of the sort previously ascribed to A-bar movement (cf. Chomsky 2008), with the result that we would expect EF-driven VP-movement to vP's edge only to be possible where an appropriate interpretive effect arises. This rules out "neutral" VO-Aux structures, as desired, and also "neutral" VP-fronting more generally, a state of affairs which raises questions about the derivation of V-initial languages permitting VOS orders which have sometimes been said to feature VP-fronting (cf. in particular the relevant contributions in Carnie & Guilfoyle 2000 and Carnie, Harley & Dooley 2005).[4] Crucially, however, it rules in structures like the VO-Aux structures found in Slavic (cf. Migdalski 2006 for discussion) and the in many ways equivalent VP-fronting found in English (cf. Huang 1993).

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[4] Worth noting here is that Massam (2005) argues that what appear to be verbs in Niuean at least are not in fact "verbal".

(9) can also be seen to account for the non-occurrence of final complementizers in VO languages: for the reasons outlined in connection with VO-Aux structures, (10d), once again, necessarily constitutes an intermediate step in the derivation of a VO-C structure. As this step is illegitimate, we would expect VO-C orders universally to be ruled out.

BHR further show how (9) also accounts for the disharmonic word orders found in the nominal domain, but we shall leave this aside here. What seems clear is that (9) is able to account for the absence of a range of FOFC-violating structures. What it cannot do, as it stands, is to account for the (apparent) counter-examples, however. We now turn our attention to these.

3.2 Accounting for the exceptions to FOFC

Although, as we have seen in the preceding sections, there is substantial evidence in support of FOFC, there are also a number of constructions that appear, on the surface at least, to violate it. If FOFC is indeed a universal principle of grammar, our formal characterization of FOFC, (9), must be able to account both for FOFC-respecting and the apparently FOFC violating structures. The apparent exceptions to FOFC can be divided into three main classes, each discussed below.

The first class of exceptions involves embedded nominal complements. According to Dryer (1992:104), head-initial DPs are as common in OV languages as head-final DPs are in VO languages. As such, there is no evidence of any asymmetry between the two disharmonic combinations, suggesting that FOFC does not hold between DP and V. This is reinforced by the fact that many familiar, well-studied languages display (apparent) FOFC-violations of this type. Consider the following example from German:

(12)   German
       Er hat [$_{VP}$[$_{DP}$ ein Buch] gelesen]
       he has   a   book   read
       'He read a book.'

On the basis of these data BHR propose that exceptions to FOFC differ from the FOFC-obeying structures in that they involve a *categorial distinction* between the dominating and dominated category, or, in technical terms, between the phase head and the phase-internal head-initial category. This is very clear for the German DP-V case: while V is clearly verbal, DP is nominal. In light of this observation, BHR propose the revised formalization of FOFC in (13):

(13) Revised formalization of FOFC (non-final version)
    If a phase head PH has a ^, then all the heads in its complement domain
    from which it is non-distinct in categorial features must have ^.

This revision entails that phase heads do not determine the linearization properties of *all* the heads in their domain, but merely of those heads which are *categorially alike*. (14) schematizes a range of cases conforming and not conforming to FOFC as formulated in (13), with *n/N* and *v/V* simply being intended as an interim cover-term to distinguish categorially like vs. unlike heads:

(14) a. n^   N   -- FOFC violation
      b. v^   V   -- FOFC violation
      c. n^   V   -- FOFC compliance
      d. v^   N   -- FOFC compliance

To the extent that apparently FOFC-violating structures can be shown to involve a categorial difference, we need not view them as counter-examples to the universal principle proposed by BHR. These authors suggest various apparent counter-examples that may appear to be explained via this route, but this solution does not seem very satisfactory in all cases.

    If we turn now to the second class of exceptions, namely prepositional complements to V, it is by no means clear that these can be accounted for by postulating categorial distinctness, as in (13). In terms of prepositional phrases, for example, the FOFC-violating order, [[P DP] V], is typologically much rarer than the other disharmonic order, [V [DP P]], but certain well-studied languages nonetheless allow prepositional phrases (particularly argumental ones) to surface in the preverbal position, giving an apparent FOFC violation. German, once again, is such a language:

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

For (13) to account for the distribution of PPs, we must show that PPs (at least in FOFC-violating languages such as German) are nominal. This is by no means straightforward.

    Turning to clausal complements to V, we face a further problem with the constraint stated in (13). Sheehan (2008) (cf. also the discussion in §5 below) observes that FOFC in fact holds across phasal boundaries. As a result, the "complement domain" in (13)

cannot just be interpreted as the categorially alike material contained in the Lexical Array associated with the phase head in question (e.g. V and all the verbal heads associated with 'first phase' syntax—cf. Ramchand 2008—in the case of v): if that were the case, a further constraint would be required to ensure that any CP dominated by head-final (i.e. ^-bearing) v/V likewise consists of ^-bearing verbal heads. Instead, Biberauer (2008) proposes that the "complement domain" must be interpreted in "spine" terms (cf. also Biberauer & Sheehan 2008). This proposal can be expressed as follows:

(16)   Revised formalization of FOFC (final version)
       Within a clausal or nominal extended projection, if a phase head bears ^, then all the categorially alike heads in its complement domain (i.e. those making up the "spine" of the projection in question) must have ^.

In terms of this formalization, then, the linearization properties of the heads forming the "backbone" of the clausal spine (which we might think of as an essentially verbal projection—cf. Brody 1998) are dictated by phase heads v and C, with a ^-bearing clausal phase head requiring all lower clausal phase heads to be ^-bearing too. Similarly, the linearization properties of the heads forming the (distinct) "backbone" of non-clausal projections (e.g. the DPs and PPs which serve as "satellites" of the clausal backbone) are determined by the corresponding non-clausal phase heads.[5] Because the two spines are unconnected, we expect languages to feature German-type headedness discrepancies (cf. (12) and (15) above). Further, we also expect languages in which a "verbal" (sub)projection has been nominalized, via merger of a nominalising head (cf. Abney 1987, for example, on the analysis of gerunds), to permit what appear to be FOFC violations, a prediction which appears to be correct (cf. §5.2 below).

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[5]   We leave aside here the important question of the stage at which this "spreading" of properties is determined. Two options immediately suggest themselves. The first of these is that "spreading" occurs pre-syntactically as part of the operations associated with the process of "full inflection" (cf. Chomsky 1995) which results in the availability of a Numeration or Lexical Array (cf. Chomsky 2000) and which then forms the input to a specific syntactic derivation. The second option is that "spreading" is determined in a once-and-for-all fashion during acquisition, possibly as the result of one or more "third factor" considerations (cf. Biberauer 2008). For ease of exposition, our presentation in this paper will assume the former option, with "spreading" thus being taken to constitute one of the feature-determination steps involved in establishing which non-intrinsic features will be activated/present during the following structure-building process (on intrinsic versus optional formal features, see Chomsky 1995:231). Given the central role that linearization diacritics play in so-called *Borer-Chomsky*-based approaches to parametric variation (cf. Baker 2008), however, option 2 is in fact likely to be the more feasible of the two possibilities.

The third class of exceptions involves clause-final particles. Many VO languages, prominently including numerous East Asian languages (e.g. Mandarin Chinese, Sre, and Mon), but not limited to languages in this region (cf. Copala Trique and San Lorenzo Quiavini Zapotec), have clause-final tense/aspect/force particles. This is illustrated in (17):

(17) a. Mandarin Chinese
          Women zuotian   chi yurou **le**
          1PL   yesterday eat fish   PART
          'We ate fish yesterday.' (Paul 2007)
      b. Mandarin Chinese
          Ni   bu   qu   **a**?
          2SG NEG go   PART
          'You are not going?' [Did I hear you right?] (Paul 2007)
      c. Lugbara, Nilo-Saharan
          drùsĭ   mâ zâ   ɲaa **rá**
          tomorrow   I   meat eat AFF
          'Tomorrow I will eat meat.' (Heine & Nurse 2000:208)

There are several ways in which the problematic distribution of clause-final particles could be incorporated into the account of FOFC developed in this section. Particles can often appear in both nominal and clausal environments (cf. Biberauer 2009 on the Afrikaans negative particle *nie₂*, Nayudu (2008) on the polarity head in Marathi and Munaro & Poletto (2005) on clause-final particles in northern Italian dialects), and as such might be considered to be categorially deficient, i.e. associated with neither [+V] nor [+N] specification. If particles have no categorial specification they will necessarily always be categorially distinct from the phase head, and so will never be subject to FOFC. We shall leave the exact analysis of final particles as a matter for further research; however, what seems to be clear is that particles do not provide true counter examples to FOFC. As such, following Greenberg (1963), we shall exclude particles from the discussion which follows.

We now turn to a consideration of the predictions that FOFC, as a universally imposed constraint, makes in the context of word-order change, regardless of how this is triggered.

4. The final-over-final constraint and diachronic change

FOFC enables us to make interesting predictions in the domain of syntactic change. If, as proposed in the previous section, FOFC is a universal constraint on synchronic grammars, then it is operative both in today's languages and in all languages of the past. In other words, FOFC must apply at every stage of a language's history (cf. also Kiparsky 2008). This predicts that a FOFC-violating order should never be able to develop, even transitionally as part of a larger series of changes. Bearing this in mind, FOFC facilitates predictions about pathways of syntactic change.[6] For example, when a language changes from predominant head-finality ("OV") to predominant head-initiality ("VO"), this change must proceed top-down, as shown in (18):

(18) $[[[O \ V] \ T] \ C] \rightarrow [C \ [[O \ V] \ T]] \rightarrow [C \ [T \ [O \ V]]] \rightarrow [C \ [T \ [V \ O]]]$

As shown above, FOFC requires that CP must change first, giving C-TP order in place of TP-C order. The TP can then follow, giving T-VP in place of VP-T order. Only once these two changes are at the very least underway (see below) can the VP start to exhibit variation, possibly ultimately leading to change from OV to VO. If the change proceeded in the opposite direction, with the VP undergoing the change first, this would give rise to VO-T and VO-C, orders that are ruled out by FOFC, as discussed above.[7]

Similarly, if we consider the opposite change, i.e., from head-initial ("VO") to head-final ("OV"), FOFC predicts that this must proceed bottom-up. The VP must change first, followed by the TP, then the CP:

(19) $[C \ [T \ [V \ O]]] \rightarrow [C \ [T \ [O \ V]]] \rightarrow [C \ [[O \ V] \ T]] \rightarrow [[[O \ V] \ T] \ C]$

A change in the opposite direction, beginning with the CP or the TP would result in the FOFC-violating VO-C or VO-T orders from the outset.[8]

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[6] This is crucially contrary to the view held by David Lightfoot, who argues that syntactic change constitutes a random walk through parameter space, with any change being possible if appropriate evidence is available to the learner (see Lightfoot 1999, and also Roberts 2007 for discussion).

[7] In light of the discussion of particle elements in §3.2, this statement requires qualification: in an OV language in which T- and C-elements are particles or where one or more final particles are borrowed (see §5 below), VO-C and VO-T orders are evidently possible. Crucially, however, our proposals predict that this scenario should only be possible in languages with T and C particles, with the pathway outlined in the main text applying in non-particle contexts. This is, once again, a testable hypothesis.

[8] Comments similar to those in footnote 7 apply here: in a VO language in which T- and C-

A crucial point to bear in mind is that just because a particular change is permitted by FOFC does not mean that it will *necessarily* occur. FOFC predicts pathways of change that *may* occur; we are not suggesting that FOFC in any sense *causes* change. In this connection, we follow Longobardi (2001) and Keenan (2002) in adopting the so-called *Inertia Principle*. In terms of this principle—which may be seen as a principle of acquisition—syntactic changes will only occur where they are the "well-motivated consequence of other types of change (e.g. (morpho)phonological and semantic changes, including the appearance/disappearance of whole lexical items) or, recursively, of other syntactic changes" (Longobardi 2001:278). Thus syntax will not change unless it is preceded by some form of change in the trigger experience, the primary linguistic data (PLD) available to the child during language acquisition.[9] In claiming that FOFC-permitted changes will not take place unless the relevant triggers or cues (cf. inter alios Lightfoot 1991, 1999 and Dresher 1999) are available in the PLD, we are not making a claim that is any stronger than that previously made by adherents of the Inertia Principle or, more generally, acquisition-based theories to syntactic change (cf. Roberts 2007 for recent overview discussion of this general approach to syntactic change). Since we are claiming that FOFC is an absolute principle, there is, however, one aspect of our proposal that entails a strong claim not present in other theories of syntactic change, namely the following: *even if the trigger experience for a given change is present in the PLD, the relevant change will not occur if it gives rise to a word-order variant that violates FOFC*. Our claim, then, is that children simply will not postulate a FOFC-violating structure (where FOFC is understood as formalized in (16) above), even if the input to which they are exposed features a great deal of word-order variation and/or if there is the opportunity to borrow an element whose introduction would lead to a FOFC-violating structure.

In the following sub-sections we shall consider two case studies that appear to provide evidence supporting the FOFC pathways mentioned above, namely the change from OV to VO in Germanic (specifically English and varieties of Afrikaans) and the

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elements are particles or where one or more final particles are borrowed, VO-C and VO-T orders may well be available early on and it is, of course, conceivable that this fact might, in concert with independent changes in the VP-domain, play a role in the change from VO to OV. However, as suggested above for OV-VO change, we would only expect VO-OV change to permit structures that appear to deviate from the pathway discussed here where the language undergoing this change features the relevant particle elements.

[9] As an anonymous reviewer points out, it is likely that syntactic change may also be caused by changes in frequency of a given construction in the PLD. This is often the case in the domain of word-order change where an optional word order may increase in frequency and become grammaticalized as the basic word order.

change from VO to OV in Ethiopian Semitic. The effects of FOFC in language-contact domains then form the focus of §5.

4.1 The history of English

It is well known that English was at an earlier stage in its history a partially head-final language, with Old English showing word-order patterns similar to those found in Modern German. Modern English, on the other hand, is clearly predominantly head-initial. Therefore, within its recorded history, English has undergone a significant word-order change. This change seems to have proceeded along the pathway predicted by FOFC.

As we saw above, FOFC predicts that the first stage of the change from head-final to head-initial should affect the CP. From the earliest attested evidence of Germanic, we only find head-initial CPs:[10]

(20) a. Old Norse
         ef [TP hand hefði þat viljað   fága]
         if   he   has   it   wanted clean
         'If he had wanted to clean it' (*Guðm*; Hróarsdóttir 2000:178)
      b. Old English
         þæt [TP hie   mihton swa bealdlice Godes geleafan bodian]
         that   they could so   boldly   God's faith   preach
         '... that they could preach God's faith so boldly'
         (*The Homilies of the Anglo-Saxon Church* I 232; van Kemenade
         1987:179)
      c. Gothic
         ... qiþandans **þatei** [TP sa   manna dustodida timbrjan ...]
           saying   that   this man   began   build
         '... saying that this man began to build ...' (Luke 14:30; Ferraresi
         1997:36)

Crucially, however, initial complementizers may appear with both head-initial and head-final TPs and VPs (although not in the FOFC violating VO-Aux order). This is shown in the examples below (V underlined; O in SMALLCAPS; AUX in **bold**).[11]

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[10] It is not clear that there were ever clause-final complementizers in Germanic, or in fact Proto-Indo-European. Complementizers in the attested Indo-European languages seem to have developed independently, and as such we cannot reconstruct elements of this type for Proto-Indo-European (see Kiparsky 1995).

[11] For the purposes of this discussion, auxiliaries can be viewed as T-heads; this is evidently an

(21) Old English

a. Ða   se Wisdom þa   þis fitte <u>asungen</u> **hæfde** …   [OV-AUX]
    when the Wisdom then this poem sung   had
    'When Wisdom had sung this poem …'
    (*Boethius* 30.68.6; Fischer et al. 2000:143)

b. V-O-AUX unattested (cf. Pintzuk 1991[1999])

c. … þæt hie **mihton** swa bealdlice Godes geleafan <u>bodian</u> [AUX-OV]
    that they could   so boldly God's faith   preach
    '… that they could preach God's faith so boldly'
    (*The Homilies of the Anglo-Saxon Church* I 232; van Kemenade 1987:
    179)

d. … *þæt he* **mot** <u>*ehtan*</u>   godra manna   [AUX-VO]
    that he might persecute good men
    '… that he might persecute good men'
    (*Wulfstan's Homilies* 130.37-38; Pintzuk 2002:282)

Here we see that a final TP may only combine with a final VP (21a), whereas an initial TP has two combination possibilities, being able to combine both with a final VP (21c) and with an initial VP (21d). The availability of (21d) at a stage at which (21c)-type structures are still attested indicates that variation in VP order becomes possible as soon as initial TP becomes available. Crucially, however, initial VPs are strictly limited to initial TP structures.

Turning next to the TP, Pintzuk (1991[1999]) proposes that the transition from TP-final to TP-initial was a gradual process, progressing throughout the Old English period until early Middle English, when it reached completion. Variation within the VP, between OV and VO order, then continues until the Late Middle English period (cf. Fischer et al. 2000 for an overview discussion; formatting here as for (21)):

(22) Late Middle English

a. Þat ne **haue** noht here sinnes <u>forleten</u>   [AUX-OV]
    who NEG have not their sins forsaken
    'who have not forsaken their sins'
    (*Trinity Homilies* 67.934; Kroch & Taylor 2000:154)

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oversimplification, but, as indicated in §3.1, the precise status of auxiliaries does not change the predictions we make about the availability of VO-Aux ordering.

b. oðet he **habbe** i3etted ou al þet 3e wulleð   [AUX-VO]
   until he has   granted you all that you desire
   'until he has granted you all that you desire'
   (*Ancrene Riwle*; Kroch & Taylor 2000:145)

It seems then, that the shift from OV to VO order in the history of English proceeded top-down, exactly as FOFC predicts.

Significantly, the FOFC pathway seems to be replicated throughout Germanic, with both Icelandic (see Hróarsdóttir 2000) and Yiddish (see Diesing 1990, Santorini 1992, 1993) demonstrating the same pattern in their change from OV to VO. The Romance languages may also have followed this pathway, although it seems to be the case that evidence from the crucial period of the change is missing (Adam Ledgeway, p.c.). See Biberauer, Newton & Sheehan (to appear) for further discussion.

4.2 Word-order variation in Afrikaans

Turning now to another Germanic language, we find that FOFC pathways are not only identifiable when we investigate diachronic patterns; evidence supporting FOFC can also be found in cases of synchronic variation.

Standard Afrikaans, the variety prescribed by grammars, is strictly head-final in both the VP and the TP, like Modern Dutch or German.[12] In Modern Spoken Afrikaans (MSA), however, we find variation in the TP, with both verb-final (23a) and "verb-early" (23b) structures permitted in the embedded clause (we clarify the notion 'verb early' below):

(23) Modern Spoken Afrikaans
   a. Ek weet dat sy [VP dikwels Chopin gespeel] **het** [verb-final structure]
       I   know that she   often   Chopin played have
       'I know that she has often played Chopin.'
   b. Ek weet dat sy **het** [VP dikwels Chopin gespeel] ["verb-early" structure]
       I   know that she have   often   Chopin played
       'I know that she has often played Chopin.'

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[12] We leave aside here the so-called *verb-raising* and *verb-projection raising structures*, in which the finite auxiliary does not superficially seem to be occupying a head-final auxiliary-hosting projection (possibly, TP). See Biberauer & Roberts (2006) for recent discussion of how these structures can nevertheless be seen to be derived from the same grammar generating the superficially consistently head-final verbal structures that predominate in West Germanic.

(23a) represents the older pattern, i.e., the "correct" one prescribed by grammars which is also the norm in modern Dutch; the "verb early" construction is an innovation, which is impossible in modern Dutch. In MSA, however, both structures are common and, crucially, they are interpretively identical. By contrast, "verb-early" constructions featuring *lexical* verbs in second position are far less common and they also necessarily have a "main-clause" interpretation (e.g. Holmberg & Platzack 1995 on so-called *embedded root phenomena* in V2 languages).

(24)   Modern Spoken Afrikaans
        Hy dink dat sy [VP **speel** altyd   Chopin]
        he think that she   play   always Chopin
        'He thinks that she always plays Chopin.'

Since (24)-type structures systematically behave differently, both on the distributional and interpretive fronts, to the "verb early" ones in (23), Biberauer (2003) proposes that only the former involve V2; the alternations in (23)-type structures instead feature auxiliaries located in T. As such, they constitute evidence that MSA permits both final (23a) and initial (23b) TP structures.

Crucially, however, MSA does not permit initial VPs, as earlier English, for example, did (cf. (21c-d) above). Since FOFC predicts that head-initial order becomes possible in the VP once TP has become head-initial, this fact requires explanation. Recall that we noted above that the *possibility* of a change along a particular pathway of change by no means entails that this next step along the pathway will in fact be taken: for a change to take place, it needs to be triggered or cued. In the present case, the PLD available to children acquiring MSA evidently provides sufficiently strong evidence that the VP is head-final. The crucial evidence in this case seems to be the salience of particle verbs in MSA (cf. Ponelis 1993). As argued by Koster (1975 and following), particles[13] serve as "signposts" signalling the location of the verb with respect to the object: where a particle precedes the object, as in VO languages, the acquirer can conclude that VP is initial; where it follows, as in OV languages, VP must be final. Against this background, robust attestation of particle verbs in the MSA input would be expected to constitute a clear signal to the acquirer that the system being acquired involves a final VP. Conse-

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[13] It is worth noting that the particles under discussion here may or may not share the properties associated with the particles discussed in §3.2. See *e.g.* Dehé et al. (2002), Toivonen (2003), and Svenonius (2007) for recent considerations of the nature of the particles associated with verbs in West Germanic and of potential loci of defectiveness. Their "signpost" status, of course, also derives from a widely assumed deficiency, namely their syntactic inertness and consequent inability to move, either at all or independently of the verb with which they are associated.

quently, MSA lacks the consistently initial TP and VP structures that, in principle, became available when an initial TP became available.

That this reasoning is correct is strongly suggested by the fact that Kaaps, a variety of Afrikaans spoken in the Cape in which English borrowings/substitutions have drastically reduced the number of particle verbs, permits initial VPs in the presence of an initial TP. As in the earlier English case and as FOFC would lead use to expect, initial VP is, however, not compatible with final TP. The relevant facts are illustrated in (25):

(25) Kaaps
    a. … dat ons **moet** [_{VP} study altwee]   [Aux-VO]
        that us   must   study both
        '… that we must study both (books)'
        [Standard Afrikaans: *Ons **moet** altwee bestudeer*, i.e. Aux-OV]
    b. Ek **het** [_{VP} gekry R1400 van die Revenue]
        I   have   got   R1400 from the Revenue
        'I have received R1400 from the Receiver of Revenue.'
        [Standard Afrikaans: *Ek **het** R1400 van die Department van Inkomste gekry*]
    c. *…dat ek [_{VP} gekry R1400 van   die Revenue] **het**
        that I   got   R1400 from the Revenue   have

In Kaaps, then, it seems that the necessary change in the PLD has occurred. The robust cue for a head-final OV has been lost, thus allowing Kaaps to proceed one step further along the FOFC-predicted pathway than MSA.

4.3 Word-order variation and change in Ethiopian Semitic

Although the change from head-final to head-initial is widely attested within Indo-European and beyond, change in the opposite direction from head-initial to head-final seems to be much rarer.[14] One example of a language family that has undergone a change from head-initial to head-final is Ethiopian Semitic. Whereas most Semitic languages remain head-initial (cf. Shlonsky 1997 on Arabic and Hebrew), the Ethiopian Semitic (ES) languages have become predominantly head-final. This is generally assumed to be due to contact with the various Cushitic languages found in the region (cf. inter alios Leslau 1945). The details of the contact situation are, however, difficult to discern for a number

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[14] It should, however, be noted that this may simply reflect a bias in terms of (currently completed) historical language documentation; it need not necessarily imply that the change from head-initial to head-final is rare for any linguistic reason.

of reasons, most notably due to the long period of time over which it has been in place. It is difficult to gain a full diachronic picture of the word-order change in ES because there is no continuous historical record. We have evidence of Ge'ez, the oldest ES language, dating from as early as the fourth century CE. However, Ge'ez died out as a spoken language *c.* 1000 CE (it was retained as a liturgical language), and none of the modern Ethiopian languages are directly descended from it (cf. Hetzron 1972). Therefore, we have no means of directly tracking the word-order change throughout history. However, if we look instead at synchronic variation between different varieties of ES, we do still seem to be able to find evidence of the predicted FOFC pathway.

As mentioned above, the earliest attested ES language is Ge'ez. Ge'ez resembles the other non-ES languages typologically, being predominantly head-initial. The unmarked word order within the clause is VSO:

(26) Ge'ez
    a. Wä- räkäb-   ä   Yosef mogäs- ä   bäqädmä əgzi'-u
        and- get.PERF.SG-3M Joseph honour-ACC before   lord-his
        'And Joseph found grace in his sight' (*Genesis* 39:4; Demeke 2003:250)
    b. wä-'aws'ə'-   at mədr h'amälmal-ä
        and-bring.forth.PERF-3F earth vegetation-ACC
        'And the earth brought forth vegetation' (*Genesis* 1:12; Demeke 2003: 250)

The language, however, permits a significant amount of variation from this, with, among other things, the possibility of fronting any constituent for emphasis (cf. Dillmann 1907:502).[15] It, however, seems clear that Ge'ez is typologically a head-initial language as it has prepositions rather than postpositions[16] and, additionally, initial complementizers (cf. Greenberg 1963 and Dryer 1992):[17]

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[15] Praetorius (1886:157) describes Ge'ez as a free word order language. Dillmann (1907:503), Gragg (1997:255), and Demeke (2003:249), on the other hand, all argue that Ge'ez has unmarked VSO order.

[16] We shall not say any more about prepositions/postpositions here, although there is variation between Modern ES varieties as to whether they are predominantly prepositional or post-positional.

[17] It is not clear whether Ge'ez had grammatical auxiliaries. For the most part, tense, aspect, and mood distinctions are marked morphologically on the verb rather than periphrastically (see Gragg 1997:251-254, Dillmann 1907:166-200). However, there are some examples where imperfect or subjunctive verb forms appear with the verb of existence *halläwä*. Such constructions are by no means as common as in the Modern ES languages, but could perhaps

(27) Ge'ez

A'mär- ä   **kämä**   tä-   nätg- ä   may
knew- SG.3M that   PASSIVE-recede-SG.3M water
'He knew that the waters had receded.' (Gragg 1997:259)

Importantly, Ge'ez is the only ES language to show VO order. All the modern ES varieties have become head-final in the VP, showing unmarked SOV order:[18]

(28) a. Tigrinya
     'ətu   säb'ay [VP gərawti yəharrəs]
     while   man   field   plough.3SG
     'The man ploughs the field.' (Kogan 1997:441)
  b. Tigre
     Hamatu   [VP nabra sannet təwadde]
     mother.in.law   meal good   make.3SG
     'His mother-in-law makes a good meal.' (Raz 1983:95)

(29) a. Amharic
     Tämari-w   [VP təyyaqe täyyäq-ä]
     student-DEF   question ask.PST-3SG
     'The student asked a question.' (Hudson 1997:480)
  b. Ezha
     käbädä [VP ic'ä   säbbor-   ä-   m]
     Kebede   wood break.PERF-3SG.M-PST
     'Kebede broke wood.' (Demeke 2003:271)

Similarly, auxiliaries in the modern ES languages follow the verb, giving a head-final TP:

(30) a. Tigrinya
     kə-xätlänna **'əyyu**
     and-kill   FUT
     'He will kill us.' (Kogan 1997:438)

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be seen as an early stage in the development of the Modern ES compound tense system(s). See Raz (1989:95-96) for further discussion and references.

[18] Like Ge'ez, Modern ES languages show some word-order variation, with the possibility of moving any element of the clause for topicalization or focus. See Demeke (2003:272) for discussion.

b. Tigre

wa'əlli 'əb zaban badir kəl 'əwan waddwo **'adaw**
and.this in time old all time do be.3PL
'And they always used to do this in old times.' (Raz 1983:71)

(31) Amharic

a. məsa-w-n əyyä-bälla-ø **näw**
lunch-3SG.M.POSS-ACC PROG-eat.PERF-3SG.M AUX.PRES
'He is eating his lunch.' (Demeke 2003:114)

b. yonas məsa-w- n yə- bäl- **all**
Jonas lunch-3SG.M.POSS-ACC 3SG.M- eat.IMPF-AUX.PRES
'Jonas will eat his lunch.' (Demeke 2003:107)

If we turn to the CP, however, it seems there is some variation. In Tigre and Tigrinya, the northernmost languages, we find that some complementizers, such as *'əbmi* "because", appear in clause-initial position, as in example (32b), whereas others, such as *kämzə* "that", appear as a prefix on the final verb, as shown in (32a):[19]

(32) a. Tigrinya

'əgzi'abher nəhəzbu **kämzə**-bäshom 'əngera **kämzə**-habom säm'et
god people that -visit.PST bread that- gave hear.PST
'She heard that God visited his people and gave them bread.' (Kogan 1997:443)

b. Tigre

rayim gabay 'əb 'əgru 'əgəl ligis 'ala 'elu **'əbmi** makinatu'əb
long way by his-foot to go he had because his-car
hamgam təsabbara
suddenly broke-down
'He had to walk a long way because his car suddenly broke down.' (Raz 1983:91)

It could be argued that this variation reflects the fact that some complementizers in Tigre and Tigrinya appear in a head-initial CP whereas others appear in a head-final

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[19] It could be the case that the different syntactic behaviour of the subordinating conjunctions in Tigre and Tigrinya results from the fact that some are not "true complementizers". For example, whereas *that* is generally considered a complementizer, the same cannot be said for *because*. However, as it is by no means clear what, from a formal perspective, a "true complementizer" *is*, we shall leave this issue aside here, simply assuming that all subordinating conjunctions in ES are complementizers.

CP.[20] If we turn now to Amharic, on the other hand, we find that it only has the latter, seemingly head-final CP configuration—all complementizers appear prefixed to the final verb:

(33) Amharic
Tämari təyyaqe **s-** i- täyyəq astämari-w a- y- mälləs- əm
student question **when**-he-ask   teacher-DEF NEG- he-answer-NEG
'When a student asks a question, the teacher doesn't answer.' (Hudson 1997: 484)

If we consider one final ES variety, namely Harari, we see that it has gone one step further still and developed purely clause-final complementizers:

(34) Harari
[Qa:t tixaš **gir**] wari:qa bala!
 qa:t want if   wari:qa call
'If you want qa:t call Wari:qa' (Wagner 1997:505)

Harari is a language spoken in the city of Harar, where it is surrounded by Cushitic languages and further removed from other ES varieties; therefore, it is unsurprising that it has developed true final complementizers. In fact, the final complementizers that we find in Harari are often the result of borrowings from Cushitic. For example, *gir* "if"

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[20] The exact details of how the prefixed complementizers should be accounted for syntactically is a matter for ongoing research. However, it seems unlikely that they reflect a head-initial CP. If CP is head-initial in these cases we must explain why the subject, object and other non-verb (and non-clitic) material precedes the complementizer. Moving everything to the left independently via A- or A′-movement (cf. Kayne 2005b:53-56) is difficult to motivate convincingly. The situation is further complicated by the fact that when there is an auxiliary, the complementizer is prefixed to the auxiliary rather than the verb. Consider the following example:

(i) Amharic
yəsärq   sälä- näbbärä   assärut
he.steal.3SG because-3SG.M.be 3PL.imprisoned.3SG
'Because he was stealing, they imprisoned him.' (Leslau 2000:70)

One possible way of accounting for these data is to assume a strictly head-final structure, with roll-up movement in the VP, TP and CP, combined with an operation that repositions the complementizer post-syntactically as a result of its status as a prefix (e.g. Prosodic Inversion (Halpern 1995) or Local Dislocation (Embick & Noyer 2001)) Whether such a proposal is possible and what its implications are for FOFC are issues for further research.

shown in (34) developed from a Cushitic word meaning "time" (Abdurahman & Wagner 1998:281).

To sum up, then, it seems that variation within ES demonstrates the pathway that FOFC predicts, namely that the change from head-initial to head-final should proceed "bottom-up". Although all the languages (apart from Ge'ez) are head-final in the VP and the TP, there is considerable variation within the CP. The exact nature of this variation, and its syntactic analysis are issues to be left for future research; however, what these data appear to show is that the shift from head-initial to head-final word order in the VP and TP has preceded the change in the CP.

# 5. An apparent internal contradiction

5.1 FOFC across phases

Thus far we have seen three case studies which appear to adhere to the diachronic pathway mapped out by FOFC. There is, however, an apparent internal contradiction in the predictions made by FOFC, which we shall term the 'barrier to change paradox'. Recall the final formalization of FOFC given in (16) above:

(35)   Revised formalization of FOFC (final version)
        Within a clausal or nominal extended projection, if a phase head bears ^, then all the categorially alike heads in its complement domain (i.e. those making up the "spine" of the projection in question) must have ^.

So far we have considered the effects of FOFC within a single clause. However, one of the most salient features of natural language is recursion: the possibility of embedding (potentially) complex constituents *ad infinitum*. In the same way that a vP can be embedded under C, a CP can also be embedded under v, where an embedded clause is present. To access the predictions of FOFC with respect to embedded clauses, let us consider the implications of (16) at the point of merger of a phase head v, dominating a CP. According to both mainstream versions of the PIC, at the point of merger of v the lower phase head C will still be visible to the higher phase head (cf. Svenonius 2004 for a discussion of the two PICs proposed by Chomsky; cf. also Richards 2004). In the earliest form of the PIC (Chomsky 2000:108, 2001:13), the complement of a phase head is spelled out upon completion of the phase associated with that head. Thus, in the case of vP, VP is sent to Spellout once all the material associated with the vP (sub-)array has been merged and before any material from the following phase and its associated (sub-)array enters the derivation. At the point at which matrix v is merged, embedded C will thus still be visible to the newly merged phase head: VP and the edge of the lower phase

(here: embedded CP) will only be sent to Spellout once v's edge has been constructed. In the later version of the PIC (Chomsky 2001:14 and following) a phase head's search domain is larger than was the case in terms of the earlier PIC, with spellout being delayed until merger of the next-highest phase head. In the case of an embedded CP, then, spellout of TP only occurs after matrix v has been merged. Thus, once again, at the point of selection, which is presumably where phase-harmony applies, C is visible to v. As such, on either analysis, FOFC is also predicted to hold between v and embedded C.[21]

However, C, being a phase head, should be unable to harmonize with the higher phase head v as it bears its own inherent linearization specification. As long as v lacks ^, the derivation encounters no problem, as there is no requirement for v and C to harmonize. However, if v bears ^ and C does not, then this should lead to a crash in the derivation as FOFC fails to hold. This should be the situation where vP (and VP) are head-final but CP is head-initial, a point early on in the pathway defined by FOFC for both directions of diachronic change (cf. (18) and (19) above):

(36) *
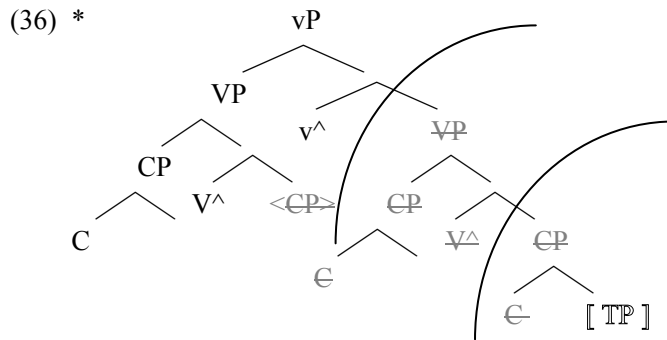
In (36), the TP complement of C does not move to the edge of C. As a result, when spellout is triggered (whether by C itself or by the higher v), the TP undergoes radical spellout and is linearized in final position. According to (35), merger of a ^-bearing v entails that both V and C must also bear ^. C, being head-initial, lacks ^; the derivation is thus predicted to crash. As it stands, the derivation in (36) incorrectly predicts a problem with the predicted pathways of word-order change discussed above: it is not immediately clear how a language can have v^ and C without incurring a FOFC-

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[21] We formulate this section as though FOFC were the result of a simple derivational mechanism in line with Chomsky's (2008) feature inheritance. As discussed in note 5, however, it remains unclear at present where exactly in the grammar FOFC resides. Sheehan (2008) proposes that FOFC is actually an effect of linearization (i.e. a PF-imposed phenomenon), and Biberauer (2008) proposes that FOFC stems from "Third Factor" considerations. Interestingly, the fact that FOFC appears to hold across phases is predicted by all approaches.

violation of the type on (36).[22] For both directions of change, the co-occurrence of v^ and C is, however, required. For a head-final to head-initial change (as has happened with English), the loss of ^ on C will be the first potential change on the predicted pathway, giving rise to v^ and C. For a head-initial to head-final change (as undergone by ES), the same is true as soon as v acquires ^, again giving rise to C and v^.

We are therefore faced with an apparent paradox, which should effectively force languages to remain unchanged in the word-order domain, contrary to what we have shown to be the case in §4. Furthermore, typological research suggests that around half of the world's currently attested OV languages have initial complementizers (39%, according to Dryer 2005b, 2005c). Strikingly, however, in all cases the radical spellout-predicted configuration, *[C] V [TP], and also the FOFC-violating *[[C TP] V] configuration appear to be banned.[23] Consider the case of Hindi-Urdu, an OV language with exclusively initial complementizers. All embedded finite clauses are extraposed to the right of the verb and no finite clause can surface in preverbal canonical object position:

(37) Hindi
    a. usee   (yah) maluum hai [**ki**   vee aa   rahee haiN]
       3SG-DAT this known is   that 3PL come PROG are
       'He/she knows [that they are coming].'
    b. *use   [(**ki**) vee aa   rahee haiN] maluum hai
       3SG-DAT that 3PL come PROG are   known is
       'He/she knows [that they are coming].' (Davison 2007:178)

Note that, in such cases, the presence of a pronominal/nominal in object position is optional (cf. Bayer 1999, 2001 for discussion of similar facts in Bangla and Biberauer & Roberts 2008 on Germanic). In fact, this is a very common pattern. Many OV languages seem to avoid a potential FOFC violation between v and C by extraposing the embedded head-initial CP (cf. Hawkins 1994, Dryer 2009, and Sheehan 2008). Other

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[22] (36) also incorrectly predicts the possibility of clause-medial subordinating complementizers, e.g. one which might be proclitic on the matrix verb. As indicated in the main text, the factor facilitating the existence of V-final languages with initial complementizers—namely, the presence of nominal superstructure, as illustrated in (40)-(41)—can also be shown to rule out this possibility.

[23] There is one language which allows the word order [C TP]V, however, which would be the word order triggered if radical spellout did not apply (cf. Dryer 2009a). Harar Oromo, an Eastern Cushitic language, which allows head-initial CPs to occur in either preverbal or post-verbal position. We return to this language below.

FOFC-avoidance strategies involve (i) nominalising CP, as in (38) or (ii) embedding a reduced clause in an ECM structure as in (39):

(38) Persian
Man [$_{DP}$ in   ke   gorbeha shir doost darand ra]   midanam]
I   this that cats   milk like   have   ACC know
'I know that cats like milk.' (Oehl & Lofti to appear)

(39) German
... dass Hans [$_{TP}$ sich zu rasieren] schien
      that Hans   self to shave   seems
'... that Hans seems to shave himself' (Biberauer & Roberts 2008)

It is our proposal that nominalization and extraposition are really two sides of the same coin. In either case, the problematic CP is selected by a nominal head to avoid a FOFC violation, as illustrated in (40) (in this and following diagrams, we shall signal the presence of nominal structure as *DP*, with $[+V]$ below a given head indicating that that head is part of a clausal spine and $[+D]$ indicating that it is part of a "satellite" nominal spine):

(40)   [$_{vP}$ v^   [$_{vP}$ V^   [$_{DP}$ D   [$_{CP}$ C   …
          $[+V]$ $[+V]$ $[+D]$

As (40) shows, the introduction of a nominal head creates a categorially distinct barrier between v and C so that FOFC need no longer hold. If the selecting nominal head is phasal and lacks ^ (i.e. it is head-initial), radical spellout leads to the apparent stranding of the CP in final position, as shown in (41) (~~strikethrough~~ indicates unspelled-out lower copies and 𝕠𝕦𝕥𝕝𝕚𝕟𝕖 𝕗𝕠𝕟𝕥 indicates that the CP has been sent to spellout):[24]

(41) a. [$_{vP}$ [$_{vP}$ [$_{DP}$ D] V^ [$_{DP}$ ~~D~~]] v^] [$_{vP}$ ~~[$_{DP}$ D]~~ ~~V^~~ [$_{DP}$ ~~D~~ [$_{CP}$ ℂ…]]]
         Head-initial CP selected by D ⇒ extraposition due to radical spellout
      b. [[$_{DP}$ [$_{CP}$ C…] D^] V^[$_{DP}$ [$_{CP}$ C…] D^]] v^ [[$_{DP}$ [$_{CP}$C…] D^] V^[$_{DP}$ [$_{CP}$ C…] D^]]
         Head-initial CP selected by D^ ⇒ fronting of nominalized CP

Note that extraposed clauses in Hindi are not islands for extraction (Mahajan 1990:142), nor are they in Persian, Turkish, German, or Dutch, all of which display very similar patterns:

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[24] Cf. Sheehan (2009) for a different account of this extraposition.

(42) Hindi

kOnsii Tiim raam- ne kahaa ki   mohan-ne socaa ki   jiltegii

which team Ram- ERG said   that Mohan-ERG thought that win-FUT

'Which team did Ram say that Mohan thought will win?' (Mahajan 1990:154)

(43) Persian

'un ketāb-ā- ro   man mi- don- am ke   Kimiyā xarid- e

that book- PL-ACC I   IMPF-know-1SG that Kimea bought-3SG

'As for these books, I know that Kimea has bought them.' (Aghaei 2006:40)

(44) Dutch

Wat   heeft Bob beweerd/gezegd dat hij zou   kopen?

what has   Bob claimed/said   that he   would buy

'What has Bob claimed/said that he would buy?' (Veld 1993:104)

Where they co-occur with a preverbal co-referent nominal, however, extraction from the extraposed clause is ruled out in all these languages (cf. Mahajan 1990:146 on Hindi, Aghaei 2006:40 on Persian, and Bennis 1986 and Veld 1993 on Dutch):

(45) Hindi

*kis-ko raam-ne **yah** socaa   ki   mohan-ne   maaraa

 who   Ram-ERG this thought that Mohan-ERG hit

≠'Who did Ram think this that Mohan hit?' (Mahajan 1990:146)

(46) Persian

*Tehran pesar-e **'in- o**   ne- mi- don- e   ke bābā=š   raft- e

 Tehran boy-DEF this-ACC NEG-IMPF-know-3SG that father-his gone-3SG

 'Tehran, the boy does not know [this] that his father has gone to.'

 (Aghaei 2006:40)

(47) Dutch

*Wat betreurde jij   **het** dat hij gezegd had?

 what regretted you it   that he   said   had

≠'What do you regret (it) that he had said?' (Veld 1993:104)

Note that this is also the case in English, a VO language.

Given these extraction facts, it is highly problematic to analyse all extraposed clauses as adjuncts (cf. Büring & Hartmann 1997 for discussion). However, even an analysis taking them to be concealed complex nominals, as is proposed here, might seem problematic, given that complex nominals also usually behave like strong islands (cf. Ross 1967). The question is why extraction is possible where the co-referent nominal/

pronominal is null, but ruled out where the nominal is overt. It is well-known that many languages do allow extraction from nominals. Even in English, extraction from indefinites is possible and many languages without determiners systematically allow left-branch extraction (cf. Bošković 2005, 2009 for recent discussion). We tentatively propose, therefore, that while null D is a standard phase head, capable of hosting optional edge features and hence extraction from its complement, overt D is a defective phase-head, which for some reason disallows the optional addition of edge features and therefore creates strong islands. As Biberauer & Roberts (2008) observe, this proposal is less stipulative than it might at first sight seem as it has previously been observed that heads allowing the projection of "escape hatches" may be spelled out differently to those which do not. Consider, for example, McCloskey's well-known work on the effects of extraction on the realization of Irish C (cf. McCloskey 2001, 2002 and also Biberauer & Roberts 2008 for further examples from other domains). In the present case, the proposal is that the edge feature-bearing D is spelled out as zero, whereas its edge feature-less (island-defining) counterpart is realized as an overtly realized nominal head.

So far, we have considered cases where CPs are embedded in initial nominals (DPs). Where the D/N head which selects the CP has ^, the whole CP is attracted into the spec of D and can therefore be attracted into the preverbal position. This appears to be what is observed in Persian nominalization. By hypothesis, the nominal head *-ra* selects the head-initial CP and attracts it to its specifier. This clause is then free to surface in the canonical object position, and to be modified by a demonstrative;[25] it is, however, an island to extraction (because D is overt and hence defective):

(48)   Persian
    a.   Man [$_{DP}$ in [$_{DP}$ [$_{CP}$ ke   gorbeha shir   doost darand] **ra**]] midanam]
          I   this   that cats   milk like   have   ACC know
          'I know that cats like milk.' (Oehl & Lofti to appear:1)
    b.   [$_{vP}$ [$_{DP}$ *in* [$_{DP}$ [$_{CP}$ *ke* …]-*ra*]] v^ [$_{VP}$ ~~DP~~ V^ ~~[$_{DP}$ D [$_{DP}$ [$_{CP}$ C *ke* …]-*ra*]~~

It therefore seems as if the 'barrier to change paradox' is overcome by the embedding of problematic CPs under a nominal head. Where this head is initial, the CP will be spelled out in final position under radical spellout (appearing extraposed). Where the D is final, the CP will occur in the canonical object position, but with clearly nominal properties. We shall now consider instantiations of both of these formal options.

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[25] We take the demonstrative to be a specifier, rather than a head following Giusti (1997).

5.2 Turkish *ki* borrowing and extraposition

With the above in mind, let us examine an example of contact-induced change from head-final to head-initial order. Turkish is an agglutinative OV language with postpositions and many final complementizer-like heads, one of which is illustrated below:

(49) Turkish
    Oya [kitap oku- r- **ken**] uyu- yakal-dı
    Oya book read- AOR- while sleep-fall- PAST
    'Oya fell asleep while reading (a) book(s).'

However, all the Turkic dialects in contact with Persian borrowed the initial complementizer *ki* (cf. Csató, Isaksson & Jahani 2005, Bowern 2008):[26]

(50) Turkish
    …[$_{CP}$ **ki** [Oya opera-ya gid-ecek]]
         that Oya opera-DAT go- FUT
    '… that Oya will go to the opera' (Kahnemuyipour & Kornfilt 2006:2)

In Turkish, the usual manner to embed a clause is via nominalization. This involves the presence of a final nominalizer (factive/indicative *-DIK* or non-factive/subjunctive *-mA*, Kornfilt 2001:187). Where an embedded clause has been nominalized, it surfaces in the canonical object position and receives accusative case (Kornfilt 1997:45):

(51) Turkish
    (Ben) [siz-in Ankara-ya git-tiğ- iniz]-i duy- du- m
     I   you-GEN Ankara-DAT go-NOM-POSS.2PL-ACC hear-PST- 1SG
    'I heard that you went to Ankara.' (Özsoy 2001:216)

Verbs of belief can also take non-nominalized TPs, which also surface in the canonical object position (Kornfilt 1997:47):

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[26] Interestingly, in addition to Turkish and several other Turkic languages, Persian *ke* has been borrowed into many other language families through contact: Indo-European (Asia Minor Greek, Hindi-Urdu), Kartvelian (Laz), Nakho-Daghestanian (Lezgian), and (Northern) Dravidian (Brahui) (Haig 2001).

(52) Turkish
Herkes   [sen/sen-i   sinema-ya   git-ti] san-iyor
everyone [you-NOM /you-ACC cinema-DAT go-PST] believe-PROG
'Everyone believes you to have gone to the movies.'

In phasal terms, the placement of these non-nominalized TPs follows straightforwardly as we are here dealing with a deficient clausal structure, lacking a phase head. As such, we expect the next-highest phase head under which this TP is embedded to dictate its placement. Since this is the matrix v, which, in Turkish, is v^, the necessarily preverbal placement of these TPs follows (cf. Biberauer & Roberts 2008 for a parallel discussion of the so-called *restructuring complements* found in West Germanic).

In contrast to the Turkish clausal structures already discussed, CPs with initial *ki* are obligatorily extraposed, as (53) shows (cf. Kornfilt 1997:46, Haig 2001:201):

(53) Turkish
Anladım   [ki onun   bir derdi   var]
understand.PST.1SG that 3SG.GEN a   problem.POSS.3SG exist.3SG
'I realized that he had a problem.' (Haig 2001:201)

By hypothesis, this extraposition is due to the fact that the CP is actually selected by a null D head which, as a phase-head, triggers radical spellout of the CP in final position, as described above (cf. (40) and (41a)). This D is obligatorily present to avoid a FOFC violation between (matrix) v and (embedded) C.

Unfortunately, it is difficult to find robust independent evidence from Turkish to suggest that the DP is initial. NP appears to be head-final as complements (except *ki*-clauses) precede N, though the fact that this complement precedes *bir* suggests a more complex structure:

(54) Turkish
Hasan [dilbilim   hakkında] bir   bildiri   ver-di
Hasan linguistics   about   one   paper   give-PST
'Hasan gave a paper about linguistics.'

Moreover, this fact tells us nothing about the order of elements in the DP as a head-final phrase can be dominated either by a head-final or a head-initial phrase. Turkish lacks definite articles and the indefinite article *bir*, though prenominal, follows adjectives and complements in the DP, making its syntactic status as a D element suspicious (cf. also Kornfilt 1997:426 and Öztürk 2005). Demonstratives are initial, but these are known to be

specifiers in a range of languages (cf. Giusti 1997) and so the evidence is not conclusive. We therefore leave this matter to future research, hoping that independent evidence can be found.

As far as the prediction that it should be possible for initial CPs to feature preverbally is concerned, we observe that Dryer (2009a) notes that one language, Harar Oromo, allows precisely this option:

(55) Harar Oromo
   a. Inníi akka deem-u good'-ám- é
       he   that   go-DEP   order-PASS-PST
       'He was ordered to go.'
   b. [akka hárrée hit-t-u   sí]-n gaafadd'e
        that   donkey tie-3-DEP you-I asked
       'I asked that you tie up the donkey.' (Owens 1985:145)

Interestingly, although Harar Oromo also lacks genuine articles, there is suggestive evidence that the Harar Oromo DP is head-final, as the noun always appears initially, followed by adj > possessor > relative/numeral > demonstrative > *only*/*all*. This is shown in (56):

(56) Harar Oromo
   inníi [makiináa xiyya sún] gurgure
   he   car   my   that sold
   'He sold that car of mine.' (Owens 1985:86)

It seems likely, therefore, that the Turkish DP, like that of German and Dutch, is actually head-initial and that this is what leads to extraposition, whereas the Harar Oromo DP is head-final, leading to an apparent FOFC-violation.

To conclude, we observe that the apparent 'barrier to change paradox' discussed in this section and its resolution via the use of nominal heads leads us to some further FOFC-based predictions:

(a) If an OV language borrows/develops/has an initial C and has initial D, embedded clauses will be extraposed;
(b) If an OV language borrows/develops/has an initial C and has a final D, embedded clauses will surface in the preverbal position and behave like nominals.

In order for option (b) to be possible, it must be the case that FOFC fails to hold between D and C. Perhaps the comparative rarity of this strategy stems from the fact that C is a hybrid nominal/verbal category in many languages, which makes it subject to FOFC from a selecting D or v. We leave this matter to future research. Ultimately, it requires extensive empirical testing.

6. Conclusions

This paper has explored the implications of the Final-over-Final Constraint (FOFC) for synchronic and diachronic variation and change. By ruling out particular word-order patterns, FOFC predicts that diachronic change must follow certain pathways. In order to avoid going through a FOFC-violating stage, word-order change from head-final to head-initial must proceed top-down (with change in the CP, then the TP, then the VP), whereas change from head-initial to head-final must proceed bottom-up (with change in the VP preceding change in the TP and the CP). Evidence from variation and change in English, Afrikaans, and Ethiopian Semitic demonstrates that these predictions are borne out.

Building on proposals made in Biberauer, Holmberg & Roberts (2007, 2008), it has been argued that FOFC effects can be understood as the result of a universal constraint on linearization, whereby phase heads determine the linearization properties of the heads in their complement domains. Crucially, though, phase heads can only determine the linearization properties of the heads in their complement domain that are categorially non-distinct from the phase head in question. Following Biberauer (2008), the notion of categorial distinctness is formulated in terms of clausal (C-T-V) vs. nominal (D) spines.

Formulating FOFC in this way enables us not only to account for many exceptions to FOFC, but also to resolve the "barrier to change" paradox. Following Sheehan (2008), it has been argued that FOFC must hold not only within but also across phases. Therefore an OV language should not allow head-initial CP complements. Yet this is the first stage in the FOFC-predicted pathway for both the change from head-final to head-initial and from head-initial to head-final order. Thus, it seems, FOFC should rule out any word-order change at all. This paradox can be overcome and change can indeed take place if languages embed the head-initial CP under a nominal (D) head. The presence of the D head blocks the effect of FOFC and gives rise to either extraposition or nominalization of the complement clause, depending on whether the D head is initial or final.

What should be apparent from the above is that FOFC makes clear predictions about allowable synchronic variation and diachronic change. It is hoped that future research will establish whether these predictions do in fact hold true.

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限制共時與歷時的變異和演變：
中心詞後置短語須居其上之約束條件

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　　本文探討共時語法的一個約束條件——「中心詞後置短語須居於中心詞後置短語之上之約束條件」（the Final-over-Final Constraint，以下簡稱爲 FOFC）(Holmberg 2000, Biberauer, Holmberg & Roberts 2007, 2008)，以及此約束條件對縱時變化的預測。作爲一個絕對原則，FOFC 排除了中心詞後置結構居於隸屬相同範疇的中心詞前置結構之上的可能性。這預示著從中心詞後置詞序發展到中心詞前置詞序必須經歷由上至下的發展過程（從標句詞開始），而由中心詞前置詞序發展到中心詞後置詞序必須經歷由下至上的發展過程（從動詞開始）。英文、南非荷蘭語以及衣索比亞閃族語的個案研究似乎支持這些預測。基於 Biberauer, Holmberg & Roberts 文中提出的理論，本文提出 FOFC 是階段和諧產生的效應。由此，如若階段中心詞中含有線形辨識符（標誌著其中心詞後置屬性），那麼所有該中心詞可見的，與之範疇相同的中心詞也必須含有該辨識符。根據階段論的標準版本，該理論預示著 FOFC 不受階段界線的制約。然而這一事實引發出的推斷與上面所提出的詞序變化理論明顯是相矛盾的，後置結構變前置或者前置結構變後置似乎都是不可能的。本文重點提供實例證據，以顯示語言是如何避開這一詞序變化的潛在障礙的，而詞序變化的發展順序確實與 FOFC 的預測相一致。

關鍵詞：語言接觸，語言演變，階段，句法類型學，普遍性，詞序