(Dis)harmony, the Head-Proximate Filter, and Linkers[*]
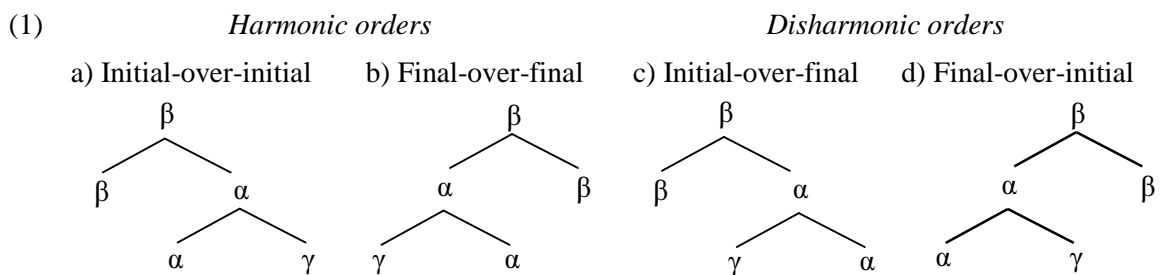
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1 Introduction

The presence of harmonic, or optimal, word order constraints (Greenberg 1963; W. Lehmann 1973; Vennemann 1973, 1974; Hawkins 1983; Dryer 1992) presents a point of interest to both generative grammarians and typologists. One feature that has almost invariably been common to such constraints is that they constitute preferences, rather than universal, absolute principles; that is, orders termed disharmonic earn this title generally not because they do not exist, but because they are dispreferred. In particular, much attention has been paid to directionality of headedness, with the consistently head-initial and consistently head-final orders – shown here in (1)a) and b) respectively – considered harmonic, while those displaying mixed headedness, as in (1)c) and d), are regarded as disharmonic:

(1)   *Harmonic orders*   *Disharmonic orders*

   a) Initial-over-initial   b) Final-over-final   c) Initial-over-final   d) Final-over-initial

Latterly attention has turned to a subset of these disharmonic orders, which, more than being simply dispreferred, appear not to surface at all (Holmberg 2000; Biberauer, Holmberg and Roberts 2007 *et seq*). Research in this area is concerned with two questions: firstly, which are the disharmonic orders that do not exist? Secondly, why are such orders absent?

This paper attempts to answer both questions by motivating the following generalisations:

(2)   a) Where α belongs to a certain class of functional heads (which we will term 'linkers', see
          Philip 2009, section 2.1 below), the disharmonic orders in (1)c) and d) are
          ungrammatical.

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b) Where α is any other head, the disharmonic orders in (1)c) and d) are simply cross-linguistically dispreferred (as long as any requirement over linkers can otherwise be satisfied).[1]

It will be shown that the difference between the two classes, and hence the difference in the two generalisations, is determined by semantics.

An alternative generalisation over absent disharmonic orders is provided by the Final-Over-Final Constraint (henceforth FOFC, Holmberg 2000; Biberauer, Holmberg and Roberts 2007 *et seq*; cf. Hawkins 1994; Julien 2002):

(3) *The Final-Over-Final Constraint (FOFC)*
     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, where:
     (i)   α and β are in the same Extended Projection [categorially non-distinct, and αP is a complement to β][2]
     (ii) αP has not been A'-moved to SpecβP.

                                                      (Biberauer, Holmberg & Roberts 2010:53, ex 1'''')

FOFC makes a very different prediction to the generalisations in (2). The prediction made by FOFC can be paraphrased as follows (leaving aside the question of A'-movement):

(4) Wherever αP is a categorially non-distinct complement of β, the final-over-initial order in (1)d) is ungrammatical.

If, as I shall propose here, the generalisations in (2) are correct, the Final-Over-Final Constraint fails empirically as a universal by being both too weak and too strong (cf. Hawkins 2010): too weak, because it fails to predict the ungrammaticality of (1)c) (the initial-over-final order) where α is a linker (see (2)a)); too strong, because it incorrectly predicts the ungrammaticality of (1)d) (the Final-over-initial order) where α is any other head (see (2)b)).

The next section provides a broad typological overview of harmonic and disharmonic word orders, and their comparative frequency of occurrence. It will be shown that while the general picture supports the generalisations in (2), much of the data presents a challenge to FOFC. We

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[1] A formal definition of the requirement over linkers will be given in section 3.2. The observation in (2)a) is a consequence, rather than a definition, of this requirement.

[2] Note that Biberauer *et al*'s definition of Extended Projection differs from Grimshaw's (1991/2005, 2000).

will then look at the relevant data in more detail, in the context of a theory of harmony (section 3), from which will be derived a theory of disharmony, and hence the generalisations in (2) (section 4). Section 5 presents the results where harmony and disharmony interact. Unlike previous approaches, the presence or absence of disharmony will be related uniquely to the semantic properties of different heads.

2 Disharmony and Typology

2.1 Linkers and Harmony

Part a) of the generalisations in (2) states that there is a class of functional heads that are always harmonic, displaying only the orders in (1)a) and (1)b); any head belonging to this class will intervene linearly between its mother and its daughter. We see direct support for this in the cross-linguistic distribution of subordinating complementisers, where a complementiser[3] C heads a clausal complement to a verb. This is shown in (5) below: the orders in (1)a) and b) are both attested, while (1)c) and d) are ungrammatical (see also Grosu and Thompson 1977; Hawkins 1988:346, 1994:§5.6.1; Bayer 1996 *et seq*; Kayne 2000:320, ex 36, p324, fn 12; Cinque 2005b:53-54):

(5) $\alpha = C$

    a) Initial-over-initial: [V [C TP]]   = 157 languages (93%)

    b) Final-over-final: [[TP C] V]   = 12 languages   (7%)

    c) *Initial-over-final: [V [TP C]]   = 0 languages   (0%)

    d) *Final-over-initial: [[C TP] V]]   = 0 languages   (0%)

(Data taken from Dryer 2009a:199-200[4])

Precisely the same distribution is found where a relative clause is marked by an independent syntactic word of some kind (REL), whether a complementiser (such as *that* in English), a general marker of subordination in the noun phrase (such as *de* in Mandarin Chinese, see (79) below), or a specialised relative clause marker (or relativiser, such as *co* in Czech): syntactically independent relative markers are initial in postnominal relative clauses, and final in prenominal relative clauses. This is shown by data in (6) below from C. Lehmann's (1984) seminal work on relative clauses, and confirmed as a universal by De Vries (2005:148, see also Andrews

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[3] Throughout this paper the term 'complementiser' refers exclusively to purely subordinating complementisers (the equivalent of *that* in English; see below for a more precise definition).

[4] I have removed from Dryer's data the languages Supyire, Khoekhoe, and Harar Oromo since these are not true instances of C-headed complements to verbs. See fn 14, fn 31 and section 4 respectively.

1975/1985:26; Downing 1978; Keenan 1985:160; C. Lehmann 1984; Hawkins 1988 *et seq*; De Vries 2002:37[5]; Cinque 2005b:53-54):

(6) α = REL

    a) Initial-over-initial: [N [REL TP]] = 21 languages (88%)

    b) Final-over-final: [[TP REL] N] = 3 languages   (14%)

    c) *Initial-over-final: [N [TP REL]] = 0 languages   (0%)

    d) *Final-over-initial: [[REL TP] N]] = 0 languages   (0%)

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(Data taken from C. Lehmann 1984[6])

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To these two better-known sets of data, I would like to add a third set showing precisely the same restriction. This concerns the distribution of linkers in the noun phrase. These are syntactically independent, semantically vacuous, morphemes serving to mark the presence of a relationship between a noun and any kind of phrasal dependent (Philip 2009; cf. Rubin 2002: chapter 2; Den Dikken and Singhapreecha 2004). Examples are given in (7) and (8) from the Central Chadic language Afade[7], where the dependent is postnominal, and Mandarin Chinese, where the dependent is prenominal:

(7) a) gilew [*an*   gu]   *Afade*

      dog(M) LNK.M my[8]

      'my dog'

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[5] De Vries (2002) shows the same absence of disharmony using a larger data set. However, he specifies that statistical tendencies in the data should not be taken as representative, as the data is biased towards Indo-European (where postnominal relative clauses are the norm) (p366):

i) *α = REL*

    a) Initial-over-initial: [N [REL TP]] = 56 languages (95%)

    b) Final-over-final: [[TP REL] N] = 3 languages   (5%)

    c) *Initial-over-final: [N [TP REL]] = 0 languages   (0%)

    d) *Final-over-initial: [[REL TP] N]] = 0 languages   (0%)

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(Data taken from De Vries 2002:376-384, table 2)

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[6] I have not included languages where the relative marker is an affix on the verb, since the affix is part of the verbal head, rather than being a functional head in its own right. See section 5.1.

[7] Afade data is taken from material written by Madam Alifa Kassala, a native speaker, during an SIL course directed by James Roberts.

[8] Abbreviations in glosses are as follows: ABS absolutive; ACC accusative; APPL applicative; ASP aspect; CAUS causative; CL classifier; COMPL completive; CONT continuous; DAT dative; DEF definite; DEP dependent; DET determiner; ERG ergative; F feminine; FUT future; GEN genitive; IMMED immediate; IMP imperative; IMPF imperfective; INF infinitive; LOC locative; LNK linker; M masculine; n- n-word; NEG negative; NOM nominative; NOMLSR nominaliser; NONPST non-past; OBJ object; PART participle; PERF perfective; PL plural; POSS possessive; PROG progressive; PST past; Q interrogative; REFL reflexive; REL relative clause; SG singular; T tense; TOP topic

b) gɨlew [an   feyo]

   dog(M) LNK.M red

   'red dog'

(8) a) [wo *de*] shu   *Mandarin Chinese*

        I   LNK book

     'my book'

   b) [hao *de*] shu

      good LNK book

     'good books'   (Den Dikken & Singhapreecha 2004:34, ex 46)

In addition, the class of linkers in the noun phrase includes the ezafe/izafe(t) in Indo-Iranian, the associative marker *-a* in Bantu, as well as purely functional adpositions such as *of* in English. It will also encompass relative clause markers of the type we looked at in (6). In terms of constituency, Philip (2009) provides evidence that linkers in the noun phrase always form a constituent with the dependent they introduce. In terms of their distribution, the data in (9) below shows that linkers in the noun phrase, like subordinating complementisers and relative clause markers, belong to the class of functional heads obeying the generalisation in (2)a. (The languages used in this sample and their classification are shown in Appendix.)

(9) α = LNK

   a) Initial-over-initial: [N [LNK XP]] = 51 languages   (61-62%)

   b) Final-over-final: [[XP LNK] N] = 31 languages   (37-38%)

   c) *Initial-over-final: [N [XP LNK]] = potentially 1 language[9] (0-1%)

   d) *Final-over-initial: [[LNK XP] N]] = 0 languages   (0%)

We have therefore now seen three sets of heads for which the generalisation in (2)a holds: complementisers, relative clause markers, and linkers in the noun phrase (with some intersection between the sets). These share the property of being subordinators of some kind, or 'linkers' in the sense of Philip (2009).

A linker is a syntactically independent, semantically vacuous word serving only to mark the presence of an independently existing relationship – modification or θ-role assignment –

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[9] See section 5.2 below.

between a head in one extended projection[10] and a distinct dependent extended projection, the dependent being sister to (a projection of) the head. As such, the linker only appears where such a relationship exists. For example, subordinating complementisers and relative clause markers do not appear in matrix clauses; the linkers in (7)b) and (8)b) do not occur with predicative adjectives: linkers do not contribute to the compositional semantics of their extended projection. Similarly, the linker does not initiate the relationship between head and dependent; it simply marks its presence. That is to say that the relationship exists independently of the linker. For example, consider a head such as the verb *know*. This assigns a θ-role to its complement, which may be either clausal or nominal in category, as shown in (10) below:

(10) a) I know [(*that*) it's Rupert].   *English*

     b) I know [(*that) your middle name].

In the former case, (10)a), the finite clausal complement is optionally marked by the overt linker *that*. Although in (10)b) the relationship between the verb and its complement – this time nominal – is identical in terms of θ-assignment, here there is no linker.[11] The fact that the relationship remains the same whether or not there is a linker indicates that the linker has no role in initiating the relationship; it is simply used to mark the presence of the relationship where the complement is both clausal and finite. More generally, the statement that linkers do not initiate the relationship they mark is confirmed by the fact that the relationships marked by linkers in (5)-(9) in many languages occur with no marking at all.

In the data in (5), the verb (a head) takes a clausal dependent; the complementiser serves as a linker marking the relationship between the two. Similarly, in (6), the noun (a different head) takes a clausal dependent; the relativiser is the linker marking the relationship. The same situation holds in (9), except that the dependent may be of any category. In none of these three cases does the linker contribute to the compositional semantics of its extended projection. This paper will ultimately propose a theory of linearisation whereby the harmonic nature of linkers falls out directly from their lack of semantics (sections 3 and 4).

2.2 Disharmony

Where we are not dealing with linkers, however, the situation is different. Part b) of the generalisations in (2) predicts that for any other head, any of the word orders in (1) will be

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[10] Throughout this paper, I use the term extended projection in the conventional sense, as first defined by Grimshaw (1991/2005, 2000), as opposed to Biberauer, Holmberg and Roberts' (2010) redefinition.

[11] Note that in many languages (e.g. Japanese) the relationship between a verb and its nominal complement is marked by a linker, in the form of a syntactically independent case-marker, the head K. See section 5.2.

possible, but the disharmonic orders in c) and d) will be cross-linguistically dispreferred. The findings of broad typological studies provide an initial indication that this is indeed the case. This can be seen in the data below, dealing with the extended projection of the verb. The data in (11) is concerned with the relative ordering of the verb and an auxiliary (independent tense, aspect or mood marker), and that in (12) with the verb and an interrogative particle:

(11) α = V

    a) Initial-over-initial: [Aux [V O]]   = 79 languages   (55%)

    b) Final-over-final: [[O V] Aux]   = 30 languages   (21%)

    c) Initial-over-final: [Aux [O V]]   = 19 languages   (13%) (39% of OV languages)

    d) Final-over-initial: [[V O] Aux]] = 16 languages   (11%) (17% of VO languages)

                                            (Data taken from Julien 2002:330-356)

(12) α = V

    a) Initial-over-initial: [Q [V O]]   = 75 languages   (20%)

    b) Final-over-final: [[O V] Q]   = 127 languages (34%)

    c) Initial-over-final: [Q [O V]]   = 34 languages   (9%)   (21% of OV languages)

    d) Final-over-initial: [[V O] Q]]   = 135 languages (36%) (64% of VO languages)

                     (Data taken from Bailey 2010:29, table 1, using data from Dryer 2008a,b)

Data from the nominal domain shows the same, predicted, distribution:

(13) α = N

    a) Initial-over-initial: [P [N PossP]] = 134 languages (40%)

    b) Final-over-final: [[PossP N] P] = 177 languages (53%)

    c) Initial-over-final: [P [PossP N]] = 14 languages   (4%)   (7% of N-final lgs)

    d) Final-over-initial: [[N PossP] P] = 11 languages   (3%)   (8% of N-initial lgs)

                             (Hawkins 2010:1, using data from Hawkins 1983)

This kind of distribution is not limited to examples within a single extended projection. Precisely the same situation holds across extended projections (except where the relationship between extended projections is marked by a linker), as can be seen where the verb takes an adpositional complement, in (14), and a nominal complement, in (15) and (16):

(14) α = P

    a) Initial-over-initial: [V [P NP]]   = 419 languages (47%)

    b) Final-over-final: [[NP P] V]   = 427 languages (48%)

    c) Initial-over-final: [V [NP P]]   = 38 languages   (4%)   (8% of postpositional lgs)

    d) Final-over-initial: [[P NP] V]   = 10 languages   (1%)   (2% of prepositional lgs)

                                         (Data taken from Dryer 2008c; Sheehan 2008:§4)

(15) α = D

    a) Initial-over-initial: [V [D NP]]   = 37 genera   (44%)

    b) Final-over-final: [[NP D] V]   = 19 genera   (23%)

    c) Initial-over-final: [V [NP D]]   = 15 genera   (18%) (29% of VO genera)

    d) Final-over-initial: [[D NP] V]]   = 13 genera   (15%) (41% of OV genera)

                                         (Data taken from Dryer 1992:104, table 34)

(16) α = N

    a) Initial-over-initial: [V [N PossP]] = 63 genera   (29%)

    b) Final-over-final: [[PossP N] V] = 112 genera (52%)

    c) Initial-over-final: [V [PossP N]] = 30 genera   (14%) (21% of N-final genera)

    d) Final-over-initial: [[N PossP] V] = 12 genera   (6%) (16% of N-initial genera)

                                         (Data taken from Dryer 1992:91, table 5)

Finally, consider what may happen where α is semantically contentful head, dominated by a linker (cf. (2)b). An example of this is given below, where a verb in an embedded clause is dominated by a subordinating complementiser (see also Hawkins 1990:226, 1994:263, §5.6.1; Dryer 1991:500, 1992:102; Bayer 1996:192):

(17) α = V

    a) Initial-over-initial: [C [V O]]   = 140 languages   (75%)

    b) Final-over-final: [[O V] C]   = 26 languages   (14%)

    c) Initial-over-final: [C [O V]]   = 21 languages[12] (11%) (45% of OV lgs)

    d) *Final-over-initial: [[V O] C]] = 0 languages   (0%)   (0% of VO lgs)

                                         (Data taken from Dryer 2009a:199, ex 24[13])

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[12] A more extended list of COV languages is given in section 3 below.

The kind of distribution we see here does not seem to conform either to the linker data in (5)-(9), or to the non-linker data we have just seen, in (11)-(15). In fact, it is the only clear left-right asymmetry among all the data. Concerning the harmonic orders, there is a major preference for the consistently head-initial order [C[VO]], the only order permitted for VO languages. The final-over-initial order *[[VO]C] is completely ungrammatical, whereas, among OV languages, the 'disharmonic' initial-over-final order [C[OV]] is scarcely less common than the 'harmonic' consistently head-final order [[OV]C].

According to the generalisations in (2), part b) will not hold where it conflicts with any requirement over linkers: a structure may be ungrammatical even where α is a non-linker, iff this non-linker is dominated by a linker (β) and the structure involving the linker is independently ruled out. In the next section, we will develop a theory of harmony which not only captures the linker data in (5)-(9) (and hence the generalisation in (2)a)), but also the otherwise anomalous data in (17).

Before turning to this theory, we will first consider, in the light of the data presented here and in 2.1, the descriptive accuracy of the alternative offered by FOFC.

2.3   Typology and FOFC

FOFC, as originally formulated by Holmberg (2000), makes a very strong prediction:

(18) *FOFC: Strong Version*
      The final-over-initial order in (1)d) is ungrammatical.

This prediction was found by Biberauer, Holmberg and Roberts (2007 *et seq*) to be too strong, so it was modified as follows:

(19) *FOFC: Weak Version*
      Wherever αP is a categorially non-distinct complement of β, the final-over-initial order in
      (1)d) is ungrammatical.

The typological data presented in subsections 2.1 and 2.2 shows that neither prediction is borne out: the strong version is not only too strong, but also too weak; the weak version is not only too weak, but also too strong.

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[13] I have removed from Dryer's data the languages Harar Oromo and Khoekhoe. See discussion in section 4.

The strong version in (18) correctly predicts the ungrammaticality of the final-over-initial order in the linker data in (5)-(9) and in (17). We will see in subsection 3.1 below that it also seems to account for the ungrammaticality of the initial-over-final order in the complementiser data in (5) (cf. Sheehan 2008:2, 14; Biberauer, Newton and Sheehan 2009b:§5.1; Biberauer and Sheehan 2010). However, it incorrectly predicts that the final-over-initial order will also be ungrammatical in the non-linker data in (11)-(15). Moreover, it has nothing to say about the ungrammaticality of the initial-over-final order as regards linkers in the noun phrase in (6) and (9).

Like the strong version, the weak version of FOFC in (19) correctly predicts which orders are ungrammatical in the complementiser data in both (5) and (17). Unlike the strong version, it also allows both grammatical disharmonic orders in the data in (14)-(15), where the heads are categorially distinct. However, it still incorrectly predicts that the final-over-initial order in the data in (11)-(13) will be ungrammatical. Moreover, in allowing for the data in (14)-(15) it loses some of the explanatory potential of the strong version: since the heads are categorially distinct, it has nothing to say about either of the ungrammatical disharmonic orders in (6) or (9) (except of course where the noun in (9) takes a nominal complement, where it captures the ungrammaticality of the final-over-initial order).

It seems then that the only data that unequivocally falls under the descriptive scope of FOFC concerns the distribution of subordinating complementisers ((5) and (17)). In the following section, we will consider this data in more detail, looking firstly at how FOFC accounts for it (subsection 3.1), and secondly at an alternative theory (subsection 3.2). In section 5 we will see that this alternative also neatly captures the other linker data in (6)-(9); moreover, there are subtleties to this data that even the strong version of FOFC cannot capture.

3 Complementiser Distribution

In the typological data in the previous section we observed two phenomena relating to the distribution of subordinating complementisers: firstly, they always intervene between the complement clause they head and its selecting verb (5); secondly, while OV languages allow both initial and final complementisers, in VO languages only initial complementisers are permitted (17). These two results combine to give the following distribution of complementisers heading clausal complements to verbs:

(20) *VO languages:*   *OV languages:*

    V[CVO]   **V[COV]**

    *[VOC]V   **[OVC]V**

    *V[VOC]   *V[OVC]

    *[CVO]V   *[COV]V

What would perhaps be otherwise unexpected about the data is the obligatory rightwards extraposition of complementiser-initial complement clauses in OV languages. Although there are OV languages with initial complementisers, the embedded clause headed by such a complementiser cannot appear in canonical object position. Examples of this are given below in examples (21)-(24), from German, Persian (or Farsi), Turkish and the Taracahitic language Yaqui, all of which are OV when the object is nominal. Other OV languages showing the same [V[COV]] pattern include the Indo-Iranian languages Kudmali (or Kurmali), Maithili, Punjabi, Sindhi, Hindi-Urdu, Kashmiri, Pashto, Wakhi, Tajik and Zazaki, the West Germanic languages Afrikaans and Dutch, Latin (Italic), Hittite (Anatolian), Sorbian (Balto-Slavic), the Cushitic languages Iraqw and Somali, Neo-Aramaic (Semitic), the North Dravidian languages Brahui (or Brahvi) and Malto, the South Caucasian languages Georgian and Svan, the Volta-Congo languages Tunen and Sare (or Sena)[14], the Eastern Malayo-Polynesian languages Gapapaiwa and Tawala, Anywa (or Anuak, Eastern Sudanic), Djapu (Pama-Nyungan), Mangarrayi (Gunwingguan), Mauka (or Mahou, Central-Southwestern Mande), Pari (Munduruku), Pima Bajo (Southern Uto-Aztecan), Teribe (Chibchan), Tsova-Tush (or Bats, Northeast Caucasian) and Wappo (Yuki-Wappo) (Dryer 1980, 2009:14, ex 27; Bayer 2001:fn 4; Cinque 2005b; Davison 2007; Sheehan 2008:14; Biberauer, Holmberg and Roberts 2010:13).

(21) a) Er hatte gewusst [*dass* er nicht lange leb-en würde]].   *German*

     he had known   LNK he not   long   live-INF   would

     'He had known that he would not live long.'

   b) * Er   hatte   [*dass* er nicht lange leb-en   würde]]   gewusst

       he   had   LNK he not   long   live-INF   would   known

                                  (Hawkins 1994:302, ex 5.43)

(22) a) An zan   mi   danat [*ke* an   mard sangi partab kard].   *Persian*

     that woman CONT   knows LNK that man rock   threw   did

     'The woman knows that the man threw a rock.'

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[14] Dryer (2009a) also includes the Volta-Congo language Supyire in his list. However, an earlier example shows that in Supyire the rightwards extraposed clause is doubled by an overt pronoun in (preverbal) object position. Since the extraposed clause itself is not the complement of the verb, this example is irrelevant. Since Dryer does not give examples from all the other languages he lists, it is possible that some of these should also be excluded on the same grounds.

b) * An zan mi [*ke* an mard sangi partab kard] danat

    that woman CONT LNK that man rock threw did knows

<div align="right">(Dryer 1980:130, exx 15-16)</div>

(23) a) aapo hunen hia [*ke* hu hamut tutuʔuli].   *Yaqui*

    he thus say LNK this woman pretty

    'He says that this woman is pretty.'   (Dryer 1980:131, ex 18, citing Lindenfeld 1973)

    b) * aapo hunen [*ke* hu hamut tutuʔuli] hia

        he thus LNK this woman pretty say

(24) a) Adam ban=*a* söyle-di-ø [*ki* Ayse kitab=*ɨ* oku-du-ø]. *Turkish*

    man me=LNK.DAT tell-PST-3SG LNK Ayse book=LNK.ACC.DEF read-PST-3SG

    'A man told me that Ayse read the book.'   (Dryer 1980:131, ex 20)

    b) * Adam ban=*a* [*ki* Ayse kitab=*ɨ* oku-du-ø] söyle-di-ø

        man me=LNK.DAT LNK Ayse book=LNK.ACC.DEF read-PST-3SG tell-PST-3SG

<div align="right">(ex 21)</div>

The Turkish example is particularly illuminating, since the extraposition only occurs where there is a complementiser. Where the complement clause is nominalised, as in (25), or simply reduced, as in (26), it appears preverbally in canonical object position. This suggests that, at least in this language, it is indeed the presence of the initial complementiser that forces the finite embedded clause into postverbal position.

<div align="right">*Turkish*</div>

(25) Adam ban=*a* [Ayse=*nin* kitab=*ɨ* oku-duǧ-u=*nu*]

    man me=LNK.DAT Ayse=LNK.GEN book=ACC.DEF read-NOMLSR-3SG.POSS=LNK.ACC

söyle-di-ø.

tell-PST-3SG

    'The man told me that Ayse read the book/of Ayse's reading the book.'

<div align="right">(Dryer 1980:131, ex 19)</div>

(26) Herkes [ben=*i* Ankara=*ya* git-ti] san-ıyor.

    everyone me=LNK.ACC.DEF Ankara=LNK.DAT go-PST consider-PROG

    'Everyone considers me to have gone to Ankara.'   (Özsoy 2001:217, ex 5a)

Furthermore, there is evidence that complement clauses with initial complementisers in these languages are base-generated in postverbal position, since at least in Dutch, German, Hindi-Urdu, Persian and Turkish they are not islands for extraction (see Bennis 1987; Karimi 2001; Aghaei 2006; Biberauer, Newton and Sheehan 2009b; Biberauer and Sheehan 2010:§4.2 and

references cited in these works). An example is given below from Persian: here the DP *un ketābāro* ('those books'), the direct object of the complement clause, is topicalised to sentence-initial position:

(27) [Un ketāb-ā=ro]$_i$ man mi-dun-am [*ke* Kimiyā t_i xar-id-e]. *Persian*
that book-PL=LNK.ACC I IMPF-know-1SG LNK Kimea buy-PERF-3SG

'As for those books, I know that Kimea has bought (them).' (Karimi 2001:84, ex 69)

In all the above languages, data of this kind contrasts with examples where the postverbal clause is coreferential with a preverbal nominal. In such cases, extraction from the postverbal clause is impossible (see Karimi 2001; Aghaei 2006; Biberauer, Newton and Sheehan 2009b and references cited in these works). This is expected, since it is the preverbal nominal that is the complement of the verb, while the clause associated with it is an adjunct, and hence an island. This is shown below in an example from Persian:

(28) * Tehran$_i$ pesar-e ' in=o ne-mi-don-e [*ke* bābā=š raft-e t_i]. *Persian*
Tehran boy-DEF this=LNK.ACC NEG-IMPF-know-3SG LNK father=his gone-3SG

(Aghaei 2006:40, ex 9)

Although these languages clearly show that it is possible for base-generated postverbal complement clauses to appear in OV languages, it seems that this option is not available where there is a final complementiser: the base-generated order *[V[OVC]] is unattested.

This is not to say that the order V[OVC] will never appear on the surface. Certain rigid OV languages, such as Japanese[15] and the Southern Dravidian language Malayalam, allow this order as a variant of the consistently head-final order [[OVC]V] (perhaps to facilitate processing; see Hawkins 1990:248-250).[16] This is exemplified below for Malayalam, (29)a) showing the complement clause in canonical object position, while (29)b) shows the same clause deaccented and in postverbal position:

(29) a) ayaaL [waliya miinu-kaL aa kuLatt-il uNTə *ennə*] paraññu. *Malayalam*
he big fish-PL that pond-LOC is LNK said

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[15] At least in Japanese, such postverbal clauses do not seem to be completely acceptable for all speakers (Reiko Vermeulen, p.c.).

[16] Other languages allowing this order as a marked variant of [[OVC]V] include Telugu (also Southern Dravidian) and the Ge-Kaingang language Canela-Krahô (see Krishnamurti and Gwynn 1985; Popjes and Popjes 1986; Cinque 2005b). While I have no information on the extraction possibilities for these languages, given the marked nature of the postverbal variant, it seems highly likely that, like Malayalam, the complement is always base-generated in preverbal position.

b) ayaaL paraññu [waliya miinu-kaL aa kuLatt-il uNTə *ennə*].

    he   said   big   fish-PL   that   pond-LOC is   LNK

    'He said that there are big fish in that pond.'

However, the examples in (30) below provide evidence that only the preverbal position is a possible base-generated position for the complementiser-final complement clause: while it is possible to extract from the preverbal clause, the postverbal clause is an island for extraction:

(30) a) [aa   kuLatt-il]$_i$ ayaaL [waliya miinu-kaL t_i uNTə *ennə*] paraññu.   *Malayalam*

       that pond-LOC he   big   fish-PL   is   LNK   said

     'In that pond, he said that there are big fish.'

                                (Bayer 1999:256, ex 35, citing p.c. from Hany Babu)

   b) * [aa   kuLatt-il]$_i$ ayaaL paraññu [waliya miinu-kaL t_i uNTə *ennə*]^{17}

       that pond-LOC he   said   big   fish-PL   is   LNK

This clearly contrasts with the Persian example in (27), where extraction from a postverbal clause with an *initial* complementiser poses no problem.

The absence of the base-generated order [V[OVC]] is particularly striking in certain OV languages that allow both head-initial and head-final complementisers. This phenomenon is found mainly in Indo-Aryan languages with close geographical or historical contact with Dravidian, such as Assamese, Bengali (or Bangla), Oriya, Marathi, Gujarati and Nepali, and also the Turkic language Uzbek and the Volta-Congo language Vata (or Dida)^{18} (Bayer 1996 *et seq*; Cinque 2005b:55; Davison 2007). In such languages all complementiser-initial clauses obligatorily follow their selecting verb, while complementiser-final clauses are uniformly preverbal.

Bengali is a head-final language allowing both scrambling/topicalisation to the left and rightwards extraposition of arguments, the latter being marked. Where the finite embedded clause is extraposed, however, no marked reading results. Bengali has two optional complementisers, *bole*, which is clause-final, and *je*, which is clause-initial. (See Bayer 1996:§7.3.1 for evidence that *je* in Bengali and related Indo-Aryan languages of the eastern zone is a genuine complementiser.) The complementiser *bole* is only possible where the embedded clause is preverbal, while *je* only appears where the embedded clause is postverbal.

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[17] This is grammatical only if the adjunct *aa kuLattil* ('in that pond') is interpreted as modifying the matrix clause (i.e. the speech act takes place in the pond), but not under the intended reading whereby the adjunct modifies the embedded clause. Note that example (30)a) has both interpretations.

[18] It is debatable whether Vata genuinely has an initial complementiser. Koopman (1984) argues that only the final subordinator *kā* is a true complementiser.

In other words, the complementiser always intervenes between the verb and the dependent it introduces:

(31) a) chele-ta   [or   baba   aS-be   (*bole*)] Sune-che.   *Bengali*
     boy-CL   his father come-FUT.3 LNK   hear-PERF.3

   b) [or   baba   aS-be   (*bole*)] chele-ta   Sune-che.
      his father come-FUT.3 LNK   boy-CF   hear-PERF.3

   c) chele-ta Sune-che [or   baba   aS-be   (*?*bole*)].
      boy-CL   hear-PERF.3 his father come-FUT.3 LNK

   'The boy has heard that his father will come.'   (Bayer 1996:255, ex 9)

(32) a) chele-ta   [(**je*)   or   baba   aS-be]   Sune-che
     boy-CL   LNK his   father come-FUT.3 hear-PERF.3

   b) [(**je*)   or   baba   aS-be]   chele-ta   Sune-che.[19]
      LNK his   father come-FUT.3 boy-CF   hear-PERF.3

   c) chele-ta   Sune-che [(*je*)   or   baba   aS-be].
      boy-CL   hear-PERF.3 LNK his   father come-FUT.3

   'The boy has heard that his father will come.'   (ex   11)

Where the embedded clause appears postverbally with an initial complementiser, we again find evidence that it is base-generated in this position. Example (33) below shows that a variable pronoun within the complement clause can be bound by a VP-internal indirect object quantifier; variable-binding is assumed to be possible only where the quantifier c-commands the variable from their surface positions. (Bayer 2000:2 provides further evidence of the low position of the complement clause, from association with focus and NPI licensing.)

                                                                                    Bengali
(33) ami prottek-Ta   chele-ke$_i$ bole-chi [*je*   Ek-jon ta-ke$_i$ durga   pujo-Y
     I   each-CL   boy-OBJ   say-PST.1 LNK one-CL he-OBJ Durga   Puja-LOC

---

[19] The ungrammaticality of this example does not receive a direct explanation under my account. Bayer (1999:259) and Bayer *et al* (2005:32, fn 10) state that overt movement of the postverbal clause is impossible throughout Indo-Aryan, as well as in Persian and Turkish. A possible explanation is that the fronting operation is only available for preverbal material, as the trace of postverbal material will not be properly governed.

notun jama kapoR   de-be].

new clothes   give-FUT.3

'I told [each boy]ᵢ that someone will give himᵢ new clothes at the festival of Durga Puja.'

(Bayer 2000:2, ex 5)

Moreover, Simpson and Bhattacharya (2000:587, 2003:130) conclude that the complement clause must be base-generated in this low, postverbal position, since it is possible to extract from the postverbal complement clause to a higher position within the matrix clause:

(34) kriSno   mEleria-teᵢ bhab-che [*je*   ram *t*ᵢ mara gE-che].   *Bengali*

Krishna   malaria-LOC think-PERF.3LNK Ram   die   go-PERF.3

'Krishna thinks that Ram died of malaria.'   (Simpson & Bhattacharya 2000:587, ex 13)

After studying the complementiser data in more detail, we are now in a position to reconsider – bearing in mind that this seems to be the only domain where FOFC holds absolutely – how much of the typology is captured by FOFC. We will then present an alternative explanation, that fully captures not only the complementiser data, but the linker data as a whole.

3.1   Complementiser Distribution and FOFC

In section 2 we saw that the most robust empirical evidence for FOFC is found in the left-right asymmetry in the distribution of subordinating complementisers: VO languages cross-linguistically do not have clause-final complementisers, while OV languages allow both clause-initial and clause-final complementisers. This is precisely the prediction made by FOFC, irrespective of the headedness of intervening heads, as has been widely documented in FOFC literature (Biberauer, Holmberg and Roberts 2007 *et seq*; Biberauer, Newton and Sheehan 2009a *et seq*; Biberauer and Sheehan 2010:12-13): either the head-final CP itself immediately dominates an initial TP, as in (35)a), or a head-final TP (or some other intermediate projection) immediately dominates the initial VP, as in (35)b). Both configurations are ruled out by FOFC: the ungrammatical orders *[V[VOC]] and *[[VOC]V] are therefore ruled out.

(35) a) [[T VP]C]

b) [[VO T]C]

The previous subsection highlighted a second curiosity in the data: although OV languages allow clause-initial complementisers, a clause headed by such a complementiser must always appear in postverbal position, never in canonical object position. This requirement can also be explained by FOFC. Since both V and C bear the feature [+V], and are therefore categorially non-distinct, the domain of FOFC as it is formulated in (3) – whether the strong or the weak

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version – is extended across both clauses. As pointed out by Sheehan (2008:2, 14), Biberauer, Newton and Sheehan (2009b:§5.1) and Biberauer and Sheehan (2010), it is therefore predicted that a complementiser-initial CP cannot be dominated by a head-final VP. This explains why complementiser-initial clauses are only possible postverbally, ruling out the ungrammatical orders *[[CVO]V] and *[[COV]V].

This leaves one more unattested order: *[V[OVC]]. FOFC does not provide a direct explanation for the ungrammaticality of this order. Biberauer and Sheehan (2010:51) however posit that the absence of this order can be explained indirectly by FOFC: if extraposition of complement clauses in OV languages is motivated purely to avoid violating FOFC, there is no reason to extrapose a clause that would not otherwise violate FOFC in preverbal position. This explanation is therefore dependent on the assumption that the process resulting in postverbal complement clauses in OV languages is a more costly operation than that used for preverbal ones. However, we have already seen earlier in the section that in both cases the complement clause is base-generated; neither operation is more costly than the other.[20] Therefore attributing the grammaticality of [[OVC]V] versus the ungrammaticality of *[V[OVC]] to economy seems dubious.

On the face of it, then, it seems that FOFC successfully allows the grammatical orders in (20), and unequivocally rules out at least the majority of the ungrammatical orders. When we look at the data in more detail, however, the situation is not quite so simple. The explanation for the absence of final complementisers in VO languages is based on the assumption that FOFC is an absolute principle, holding over all heads in the extended verbal projection. The typology in (17) shows that FOFC always holds as a descriptive observation regarding the order of the complementiser relative to the verb it dominates. However, examples such as the following from Canela-Krahô, a Ge-Kaingang language, show that FOFC does not necessarily hold between CP and TP: here the final complementiser *na* immediately dominates an initial tense-head, *te*. Canela-Krahô thereby instantiates the order in (35)a, predicted by FOFC to be ungrammatical:

(36) i=te [a=te   ihmutri, capi jũrkwa ri, a=kra   cahhyr *na*] a=pupun.   *Canela-Krahô*
     1=PST 2=PST there   Capi house at 2=child beat   LNK 2=see
     'I saw you beat your child there, at Capi's house.'   (Popjes & Popjes 1986:138, ex 73)

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[20] Indeed, under an LCA-based analysis (Kayne 1994) such as that adopted by Biberauer *et al*, all complement clauses must be base-generated in postverbal position, and it is the *preverbal* ones that require an extra step of movement.

The order in (35)b), on the other hand, does indeed seem to be ungrammatical (see (17)). Here the FOFC violation is incurred not by C, but by T. However, we have already seen evidence from the typology in (11) suggesting that, contrary to previous claims, T and other intermediate heads in the extended verbal projection by no means always comply with FOFC; the order [[VO]T] certainly seems to exist. (See section 4 for more detailed discussion and data.) The explanation for the absence of the order *[[VOT]C] therefore cannot lie with FOFC.

Given the empirical facts, then, the grammaticality of the order [[T VP]C] as manifested by Canela-Krahô, and, I would argue, the ungrammaticality of both *[[VOT]C] and *[V[OVC]] all fall outside the explanatory scope of FOFC. We must therefore look elsewhere for an explanation of the data. Below a sketch is given of an alternative theory that fully predicts the complementiser distribution given in (20), including the Canela-Krahô data, without appealing to FOFC.

3.2 *Complementiser Distribution and the Head-Proximate Filter: A Theory of Harmony*

FOFC's approach to the subordinating complementiser data, which I have argued to be inadequate, focuses on two striking left-right asymmetries in the data: firstly, only initial complementisers are found in VO languages, while OV languages allow both initial and final complementisers; secondly, only postverbal complement clauses are attested in VO languages, whereas in OV languages, both preverbal and postverbal complement clauses are permitted. If we return to the complementiser distribution in (20), however, we notice that these two observations alone are not sufficiently restrictive to derive the data. In all cases, the complementiser must be base-generated such that it intervenes linearly between its selecting verb and the complement clause.

In this subsection, I will argue that the three observations, and hence the complementiser data given in (20), can be successfully derived without the need to posit FOFC; the data is fully captured by the interaction of three independently motivated, violable, harmonic word order constraints. The three relevant constraints are formulated below:

(37) HEAD-PROXIMATE FILTER

The highest head in the extended projection of a subordinate domain must be contiguous with the head of its superordinate domain.

(38) CP-FINAL REQUIREMENT

A clausal dependent must follow the head of its superordinate domain.

(39) HEAD UNIFORMITY

    A functional head must match the lexical head of its extended projection in the direction of headedness.

We will see both here and in subsequent sections that it is the word order constraint behind the third observation – the intervention requirement – that is key in explaining not only the complementiser data in (20), but also extends to data falling outside the explanatory scope of FOFC (section 5). This observation is captured by the constraint in (37), the Head-Proximate Filter. The Head-Proximate Filter has its correlates in Generative Grammar in the Head-Final Filter (Williams 1982; cf. Emonds' 1976, 1985 Surface Recursion Restriction), in Functional Grammar in Rijkhoff's (1984 *et seq*) Principle of Head Proximity, and in the principle of Early Immediate Constituents in Hawkins' (1990, 1994) performance theory of grammar (cf. also W. Lehmann 1973). (See footnote 21 below for a discussion of the differences between these constraints and the Head-Proximate Filter.) The Head-Proximate Filter specifies a requirement for the head of a phrase and the head of its dependent to be linearly as close to each other as possible. We have already seen evidence of this as a cross-linguistic preference in the data in (5)-(9) and (14)-(16). The same concept can be used to explain a number of other observed cross-linguistic word order preferences.

For example, Rijkhoff (2002:261-263) points out that the data from Hawkins' (1983:281-290) expanded sample shows a general tendency for languages to avoid placing adjectives and possessor NPs between the noun they modify and its selecting verb; in more concrete terms, there is a tendency for a noun to precede its dependents in VO languages and to follow its dependents in OV languages (cf. (16) above; Greenberg 1963:85-90 and references cited in W. Lehmann 1973). A similar concept is found in the Head-Final Filter, where, in the Germanic and Romance languages in which it applies (see Escribano 2004:1, fn 2 for references), prenominal modification is only possible where the modifier is head-final, and therefore its head is immediately adjacent to the noun phrase it modifies. Escribano (2004:2-3) shows that the effects of the Head-Final Filter in the languages in which it operates extend beyond the nominal domain to other categories. The Head-Proximate Filter that I am proposing here simply extends the Head-Final Filter to include its mirror image. Like the Head-Final Filter, the Head-Proximate Filter operates only over base-generated structures; its effects can be undone by movement (cf. Williams 1982; Escribano 2004:4).[21]

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[21] Here the Head-Proximate Filter differs (as far as I can see) from both Rijkhoff's Principle of Head Proximity and and Hawkins' concept of Early Immediate Constituents. The latter relates purely to ease of processing; therefore it is presumably concerned only with surface word order. Similarly, there is a further fundamental difference between the Head-Proximate Filter and Rijkhoff's Principle of Head Proximity. Rijkhoff takes the head of the subordinate domain, or the dependent, to be its *lexical* head. The Head-Proximate Filter takes the head of the subordinate domain to be the *highest* head in the extended projection of the dependent, which may or may not be the lexical head. We will see in the

Returning to the complementiser data in (20) in which we are interested, we see that the complementiser, as the highest head in the dependent, or subordinate, clause, must be base-generated such that it is contiguous with its selecting head, the verb, thereby perfectly conforming to the Head-Proximate Filter.

The second constraint of relevance in deriving the complementiser data is derived from Dryer's (1980) Sentential NP Position Hierarchy. Looking at the cross-linguistic distribution of clausal arguments, Dryer established the following hierarchy:

(40) *Sentential NP Position Hierarchy*

    clause-final position > clause-initial position > clause-internal position (Dryer 1980:126)

This hierarchy states that if a language allows any argument to appear in a given position on the hierarchy, it will allow clausal arguments in that position; a position further to the left, where available, will be preferred over any position to its right. We see evidence for this in the typology in (20), where embedded clauses are allowed in final position in both VO and OV languages, but preverbal complement clauses are not found in VO languages, which by definition always allow arguments in final position. Of relevance to us here is the fact that the clause-final position is preferred over any other (cf. (5) above): from this we derive the CP-Final requirement as a violable constraint, formulated in (38) (cf. Language Independent Preferred Order of Constituents, Dik 1997:411).

The first two constraints we have looked at have been concerned with ordering between a head in one extended projection (the head of the superordinate domain) and a dependent extended projection (the subordinate domain). We move now to the final constraint, Head Uniformity, which is concerned rather with the order within the extended projection itself. This constraint is perhaps the best known among harmonic word order constraints. There is a preference for heads in a given language or domain to be consistent in directionality of headedness: either uniformly head-initial or head-final (cf. Natural Serialisation Principle, Bartsch and Vennemann 1972:136; Cross-Categorial Harmony, Hawkins 1980, 1983; Head Parameter, *inter alia* Chomsky 1981; Branching Direction Theory, Dryer 1992, 2009a; Principle of Cross-Domain Harmony, Dik 1997:403). Given this tendency, we would therefore not only expect the attested preference for initial complementisers in VO languages, but also a preference for final complementisers in OV languages.

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remainder of this paper that the restriction to base-generated structures and to the highest head of the dependent captures a wider range of data.

Of course, the three relevant constraints – the Head-Proximate Filter, the CP-Final requirement, and Head Uniformity – will not always be mutually compatible. Where the three compete it is the Head-Proximate Filter that takes precedence; the constraints are hierarchically ordered *à la* Optimality Theory in the following, universal, ranking:

(41) *Harmonic Word Order Ranking*

      HEAD-PROXIMATE FILTER >> CP-FINAL, HEAD UNIFORMITY

The application of this hierarchy can be seen in the tableaux in (42) and (43) below. In VO languages, it is possible to obey all three constraints, resulting in a single optimal order – the consistently head-initial order:

(42)

VO language	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY
a. ☞ V[CVO]			
b. [VOC]V		*!	*!
c. V[VOC]	*!		*
d. [CVO]V	*!	*	

In OV languages, on the other hand, there is no single order that obeys all three constraints. Therefore, in order to obey the dominant constraint, the Head-Proximate Filter, either the CP-Final requirement or Head Uniformity must be violated, resulting in two possible orders: the consistently head-final order and the disharmonic initial-over-final order:

(43)

OV language	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY
a. ☞ V[COV]			*
b. ☞ [OVC]V		*	
c. V[OVC]	*!		
d. [COV]V	*!	*	*

Unlike FOFC, here we are able to derive the typology in (20) without ruling out the grammatical Canela-Krahô example in (36), that is, the grammatical order [[TOVC]V]. The complementiser here obeys both the Head-Proximate Filter and Head Uniformity (the latter requires the complementiser to match only the verb it dominates in direction of headedness, not intervening heads, see (39)).[22] Since we are dealing with an OV language, a CP-Final violation is permitted as long as Head Uniformity is obeyed.

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[22] Of course, T violates Head Uniformity here, but we will see in section 4 below that this is perfectly allowable.

Furthermore, notice that if, as I argue here, harmony is defined by the ranking in (41), we have an explanation for why the supposedly 'harmonic' [[OV]C] and 'disharmonic' [C[OV]] are equally common among OV languages (see (17)); according to the ranking in (41), both are equally harmonic. The ranking also (at least partially) explains the marked preference for [V[C TP]] in (5);[23] of the three possible orders in (20), two are of the type [V[C TP]]. It is worth bearing in mind that while FOFC is able to capture much of the typology in (20), it has very little say about the relative frequency of the different orders: in particular, there seems to be no reason why the supposedly 'disharmonic' order [C[OV]] should occur very nearly as frequently as the supposedly fully harmonic order [[OV]C].

I have argued here that the ordering properties of complementisers are determined by the Harmonic Word Order Ranking in (41) and the resulting tableaux in (42)-(43). This is not to say however that a complementiser as a lexical item can never have its own ordering statement. Indeed, we have already seen evidence to the contrary for Bengali (as well as the other OV languages with a hybrid complementiser system). Examples (31)-(32) show that in Bengali the complementiser *je* can only appear in initial position, selecting a complement to its right, while *bole* must be final, selecting a complement to its left.[24] What is important is that any specialisation within the lexicon must remain within the confines of the principles of the grammar. The Harmonic Word Order Ranking defines what is a possible grammar in terms of the position of complementisers. An individual complementiser may therefore have its own ordering statement, as long as the result is congruous with the Harmonic Word Order Ranking. Therefore, by (43), it is possible for a complementiser in an OV language to have either an initial or a final ordering statement. On the other hand, (42) shows us that a subordinating complementiser with a final ordering statement will not be allowed in a VO language.

Before leaving this section, it is worth noting that the other linker data in (6)-(9) give at least an initial indication that the scope of the proposed Harmonic Word Order Ranking extends beyond the complementiser data: the typology shows that the dominant constraint, the Head-Proximate Filter, is unviolated; the linker, as head of the dependent, or subordinate domain, is always adjacent to its superordinate head. (See section 5 for a more detailed discussion of how the Harmonic Word Order Ranking interacts with other factors in such constructions.)

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[23] Subordinating complementisers are more common in VO languages (which only allow the order V[C TP]) than in OV languages. Hawkins (1994, 2004) provides an explanation for this from parsing (Dryer 2009a:18; Hawkins 2010:7).

[24] Note that *je* and *bole* are not simply different phonological realisations of the same linker. The choice of complementiser is partly determined by both syntactic and semantic environment: *je* is used to mark any finite clause, whether complement to a verb, or a relative clause; *bole* is used for both finite and non-finite clauses, but can only be used where its selecting verb is associated with some kind of speech act (Singh 1980; Bayer 2001). Note that the properties of finiteness and of the semantics of speech are not introduced by the linker itself, but by the heads T and V respectively. The semantically vacuous linker simply marks these properties.

4 A Theory of Disharmony

In the previous section, I suggested on the basis of complementiser data – both the attested distribution and its relative frequency – that harmonic word order be determined by the ranking of the Head-Proximate Filter, Head Uniformity and the CP-Final requirement, with the Head-Proximate Filter taking precedence. I furthermore indicated that evidence for this same ranking is found in other linker data, within the complex noun phrase. (This will be confirmed in section 5, where the interactions between harmonic and disharmonic orders will be discussed.)

Where a head is not a linker, on the other hand, we have already seen evidence in section 2.2 that disharmony is possible, though cross-linguistically dispreferred. That is to say that for any head that does not fall within the class of linkers, it is possible to deviate from the harmonic word order as defined by the Harmonic Word Order Ranking in (41): for example, in the (c) and (d) examples in (14)-(16) the Head-Proximate Filter is violated; in (11)-(12), where the Head-Proximate Filter does not apply,[25] the (c) and (d) examples violate Head Uniformity.

The crucial difference between these two classes of elements – linkers and non-linkers – concerns their semantics. As discussed in section 2.1, linkers, unlike other syntactic heads, make no contribution to the compositional semantics of their extended projection. Their purpose is simply to mark the presence of an independently existing relationship between a head and its dependent; they are otherwise semantically vacuous.

In this section, I will propose a theory of disharmony that explains why deviation from the Harmonic Word Order Ranking is possible; moreover, by its very nature, this deviation cannot occur where the relevant head is a linker – that is, a semantically vacuous head.

Word order rules within language need not always be concerned with harmony. For example, ordering rules that serve a particular pragmatic or Information Structural function are relatively common in the world's languages. In addition to the universal harmonic word order constraints, I propose that a language may have its own ordering constraints pertaining to the semantics of a head. These constraints can require a head with specified semantics to appear in a prominent position, either initial or final. In principle these ordering constraints can therefore refer to any head as long as it has its own semantics. Where such constraints conflict with, and override, the Harmonic Word Order Ranking in (41), disharmony arises.

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[25] The Head-Proximate Filter does not apply in these examples, since we are dealing with word order in a single extended projection; the Head-Proximate Filter is concerned with the relative order of the head of a superordinate domain and the highest head in the extended projection of its dependent (see (37)).

For example, disharmony is relatively common for negative markers. As operators, negative markers certainly have semantics. Therefore it is possible for ordering rules of the type described above to refer to the negative semantics of the negation head within a given language and require it to appear in a prominent position. The cross-linguistic situation confirms this. There is a tendency to place negative markers in one of two prominent positions: initially, with the result that negation will be expressed as soon as possible, preventing a 'semantic garden path' (Jespersen 1917, 1933:297; Dryer 1988:102); or finally, the position reserved for new or significant information, often the locus of sentence stress (Mazzon 2004:5). Now, if an OV language has a dominant ordering rule such that a head expressing negation must appear in initial position, disharmony of the kind seen in (1)c) will be found: the initial-over-final order [Neg[OV]]. In the same way, a VO language may have a dominant rule requiring the negative head to appear in final position, resulting in the disharmonic order in (1)d): the final-over-initial order [[VO]Neg].

The following tableaux illustrate this using Optimality Theory.[26] Suppose that Universal Grammar makes available, in addition to the Harmonic Word Order Ranking, the competing constraints Neg-Initial and Neg-Final. The former requires the negation head to appear initially to its projection, the latter finally. There will be equivalent initial and final constraints for every head with semantics. In the case where we are dealing with a VO language, the disharmonic order [[VO]Neg] will arise whenever Neg-Final dominates both Head-Uniformity and Neg-Initial. This is shown in the tableau below. (Note that the same optimal output obtains regardless of the relative ordering between Head Uniformity and Neg-Initial.)

(44)

VO language	HEAD-PROXIMATE	NEG-FINAL	CP-FINAL	HEAD UNIFORMITY	NEG-INITIAL
a. ☞ [VO]Neg				*	*
b. Neg[VO]		*!			

However, for any ranking whereby Neg-Final is ranked lower than, or equally with, either one of Head Uniformity or Neg-Initial, the optimal output will be the harmonic order [Neg[VO]]. This is illustrated by the tableaux in (45)-(46). In (45), Neg-Final dominates Neg-Initial, but is ranked equally with Head Uniformity. The candidate displaying the harmonic order in a) violates Neg-Final, but the disharmonic candidate in b), which obeys this constraint, violates the

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[26] While Optimality Theory provides a useful means of illustrating the proposals put forward here, it is not necessary to adopt all the assumptions of the Theory in order to accept the broader ideas put forward in this paper. Crucial to my proposals is the concept inherent to Optimality Theory of competition between violable constraints, with obedience to higher-ranked constraints outweighing any violations of lower-ranked constraints. On the other hand, I am not committed to the relevance of all constraints in all languages. For instance, we might safely conclude that in a language displaying the order [[OV]Neg] the constraint Neg-Initial, though presumably available to the child as part of UG, is absent in the adult grammar.

equally ranked Head Uniformity, with the result that any violation of the lower ranked Neg-Initial becomes fatal:

(45)

VO language	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY	NEG-FINAL	NEG-INITIAL
a.　[VO]Neg			*		*!
b. ☞ Neg[VO]				*	

In (46) we see a similar situation, except that here it is Neg-Initial that is equally ranked with Neg-Final, and the disharmonic candidate's violation of Head Uniformity that is fatal:

(46)

VO language	HEAD-PROXIMATE	NEG-INITIAL	NEG-FINAL	CP-FINAL	HEAD UNIFORMITY
a.　[VO]Neg		*			*!
b. ☞ Neg[VO]			*		

Of course, precisely the same results obtain where either Head Uniformity or Neg-Initial is ranked any higher, or Neg-Final is ranked any lower. In OV languages, we will expect the inverse results: the disharmonic order [Neg[OV]] will obtain only where Neg-Initial dominates both Head Uniformity and Neg-Final; for any other ranking, the harmonic order [[OV]Neg] will be optimal. We expect exactly the same results where Neg is replaced by any other head with semantics.

This explains not only how disharmony is possible, but also why it is comparatively infrequent, or cross-linguistically dispreferred. The conditions allowing disharmony to arise are such that there are more logically possible rankings resulting in harmony than those resulting in disharmony.[27] (For example, of the thirteen logically possible rankings of the relevant constraints Head Uniformity, Neg-Initial and Neg-Final, seven invariably result in harmony; three result in harmony for OV languages and disharmony for VO languages; three result in harmony for VO languages and disharmony for OV languages.[28])

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[27] This explains the tendency we would expect as far as the grammar alone is concerned. The empirical situation tells us there is indeed a general tendency towards harmony, but the extent of this varies considerably for different heads (see section 2.2 above). Finer variation of this kind need not necessarily be explained by the grammar, but may be the result of functional considerations of the kind proposed by Hawkins (1994, 2004).

[28] In VO languages, only the following rankings result in disharmony ([[VO]Neg]): NEG-FINAL >> HEAD UNIFORMITY >> NEG-INITIAL; NEG-FINAL >> NEG-INITIAL >> HEAD UNIFORMITY; NEG-FINAL >> HEAD UNIFORMITY, NEG-INITIAL. In OV languages, the disharmonic rankings (giving ([Neg[OV]]) are: NEG-INITIAL >> HEAD UNIFORMITY >> NEG-FINAL; NEG-INITIAL >> NEG-INITIAL >> HEAD UNIFORMITY; NEG-INITIAL >> HEAD UNIFORMITY, NEG-FINAL.

Consider now the situation with linkers. These are distinguished from other heads by their semantic vacuity. I have proposed here that disharmonic word orders arise as a result of ordering constraints within the grammar requiring a head with specified semantics to appear in a certain (prominent) position. As we saw in the previous section, it is possible for a linker to have some kind of ordering statement as part of its lexical properties; however, this lexical ordering statement is strictly constrained by what is permitted in the grammar. Since the linker is semantically vacuous, the grammar itself can never contain any ordering constraint referring to its (non-existent) semantics. Therefore, in the absence of any other ordering rules affecting linkers in the grammar, their position, and any possible lexical ordering statement, is always determined purely by harmonic word order rules, as ranked according to the Harmonic Word Order Ranking in (41).

For example, we saw in the previous section that the complementisers *je* and *bole* in Bengali must obey the dominant constraint of the Head-Proximate Filter: complement clauses headed by initial *je* must be postverbal, while those headed by final *bole* must be preverbal (cf. (31) and (32) above). Interestingly, it is possible for a clause headed by *bole* to appear postverbally – so violating the Head-Proximate Filter and hence the Harmonic Word Order Ranking – where it functions not as a subordinating complementiser, but heads a reason adverbial clause; in this case, *bole* does not mark the presence of an existing relationship (i.e. it is not a linker), but rather introduces its own relationship:

(47) ami ekhane eSe-chi [tomar SONge kOtha bol-bo bole]. *Bengali*
     I   here   come-PST.1 you   with speech say-FUT.1 because
     'I have come here in order to talk with you.'   (Bayer 1996:255, ex 10)

(48) tomar mon kharap [ami kolkata-Y ja-bo na bole].
     your mood bad   I   Calcutta-LOC go-FUT.1 NEG because
     'You are in bad mood because I won't go to Calcutta.'   (Bayer 2000:4, ex 15)

This shows that there is no ban on postverbal *bole*-clauses *per se*, but simply those where the subordinating *bole* is semantically vacuous.

Similarly, a brief look at the diachronic development of the subordinating complementiser *kī* in the now extinct East Semitic language Akkadian provides direct support that it is indeed the lack of semantics in linkers that prohibits disharmonic word order. Akkadian was an SOV language spoken in ancient Mesopotamia. The subordinating complementiser *kī* developed over time from the adverbial conjunction *kīma*. This morpheme *kīma* occurred in initial position within the adverbial clause, which itself overwhelmingly appeared in preverbal position

(usually, but not always, in sentence-initial position, preceding the subject). An example containing *kīma* from the Old Babylonian period is given below in (49):

(49)   [kīma udammiqak-kunūši]   dummikā-nim.   *Akkadian*
        as   1SG.do.favours.PST-to.you.PL do.favours.IMP.PL-to.me
     'As I have done you favours, do me favours.'   (Deutscher 2007:40, ex 27)

Deutscher (2007:§4) documents in detail a change in this morpheme's semantics of the kind comparative > causal/purpose > factive, leading to an eventual complete semantic bleaching; that is, a semantically contentful conjunction introducing an adverbial clause (*kīma*) eventually became a subordinating complementiser heading a complement clause (*kī*). Crucial to the theory put forward here, however – and its predictions – is the result of this change on word order. Throughout the diachronic change, the morpheme *kī(ma)* remains consistently initial to the clause it introduces. However, the semantic bleaching of the morpheme is accompanied by extraposition of the clause it heads: by the Middle Babylonian period complement clauses headed by the subordinating complementiser have shifted to postverbal position, while adverbial clauses remain preverbal:[29]

(50) bēl-ī   īde   [*kī*   ultu ēlâ   dilipt-u   mahratan-ni]. *Akkadian*
     lord-my   3SG.know LNK   since1SG.arrive.PST trouble-NOM 3FSG.contront.STATIVE-me
     'My lord knows that since I arrived, trouble has befallen me.' (Deutscher 2007:51, ex 57)

In terms of the theory proposed in this paper, the shift of position for clauses headed by a subordinating complementiser, but not for those introduced by a semantically contentful adverbial conjunction, is easily understood. Where a clause is headed by a semantically vacuous subordinating complementiser, its position is determined uniquely by the Harmonic Word Order Ranking in (41) (since no ordering constraint referring to semantics can apply). The tableau in (43) shows us that the only grammatical option for an OV language with an initial subordinating complementiser involves extraposition of the complement clause, giving the order attested in Akkadian, [V[COV]]. The final-over-initial order [[COV]V] that would result if the subordinating complementiser retained the position of its semantically contentful predecessor would be disharmonic, and hence ungrammatical. On the other hand, examples such as (49) are unproblematic for the theory put forward here, since *kīma* in this example is semantically contentful and therefore may have its own ordering constraints such that disharmony is possible.

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[29] There is an intervening period in which *kīma* is used sometimes as a factive complementiser, sometimes as an adverbial conjunction. In both cases the *kīma*-clause precedes the verb. The diachronic situation therefore leaves a few questions open. See Deutscher (2007:§4) for fuller details.

A similar argument can be used for the East Cushitic language Harar Oromo. Cinque (2005b:54, fn 12), Dryer (2007:100, 2009a:200, ex 27, p203, table 4) and Biberauer and Sheehan (2010:50, fn 24) point out that in examples such as (51) below, it appears to instantiate the disharmonic order *[[COV]V]:

(51) inníi [akka deem-u] good'-ám-é.   *Harar Oromo*

    he   that go-DEP   order-PASS-PST

    'He was ordered to go.'   (Owens 1985:145, ex 49)

As was the case in Akkadian, it seems that the initial element of the preverbal clause, *akka*, is not in fact semantically vacuous, and therefore does not belong to the class of linkers; it is free to have its own (disharmonic) ordering rule. The morpheme is used for a variety of purposes, and is translated by reference grammars as 'according as, just as, like, how, manner, way, (in order) to/that, (the fact) that' (Hodson and Walker 1922; Owens 1985). It is moreover worth noting however that Owens (1985:114) refers to the clause introduced by *akka* as a 'noun clause'. It seems that the clause is indeed nominal, since, where it expresses purpose, it can optionally be marked with dative case (Owens 1985:146):[30]

(52) [akka na árk-aníi=ʃ]   d'uf-an.   *Harar Oromo*

     that me see-PL=LNK.DAT came-PL

    'They came to see me.'   (Owens 1985:146, ex 54)

Elsewhere, there is no overt case-marking on the complement clause, but this is entirely expected, as the direct object always appears in the absolutive case, which is unmarked morphologically.[31]

The theory of disharmony outlined above therefore predicts part b) of the generalisations in (2): we expect that for any head that is not a linker, disharmony will be possible. Besides the evidence we have seen above from Bengali, Akkadian, and Harar Oromo, the typologies in section 2.2 suggest that for a number of different heads this prediction is borne out. The rest of this section will be devoted to studying the relevant disharmonic structures in greater detail.

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[30] Since the dative case marker is syntactically independent, it is in fact a linker (see section 5.2). As predicted, it obeys the Head-Proximate Filter.

[31] Cinque (2005b) claims that the languages D(h)ivehi (Insular Indo-Aryan), Ngiti (Central Sudanic) and Lak(h)ota (Siouan) instantiate the disharmonic order *[V[OVC]], as does Dryer (2009:14, ex 27, p17, table 4) for the Kwadi-Khoe language Khoekhoe. Like Harar Oromo, the alleged 'complementiser' here is in fact nominal in nature, and hence semantically contentful (see Cain and Gair 2000; Rood 1973; Kutsch Lojenga 1994:395 and Güldemann 2006:29 respectively). The disharmonic order therefore poses no problem.

We begin by considering markers of verbal properties such as tense, aspect and mood. Cross-linguistic studies such as Cinque (1999, 2009) and Julien (2002) argue firstly that these markers are functional heads in the extended verbal projection, and secondly show that these heads obey a strict, universal, hierarchy, or functional sequence (see also Grimshaw 1991/2005, 2000; Svenonius 2008 and references cited in these works). These findings, which appear to be without exception, are based on the properties and placement of such markers both in head-initial and head-final languages.

Given then that markers of tense, aspect and mood – both initial and final – are semantically meaningful functional heads, it is predicted that ordering constraints referring to semantics should be able to target these heads, resulting in disharmony. We have already seen typological evidence suggesting this prediction is borne out in (11). Concrete examples given below in (53)-(55) below suggest that this prediction is borne out. The example in (53) demonstrates the initial-over-final order in the North Volta-Congo language Supyire: the head-final VP is dominated by an initial aspect marker, *á*. (See also examples from Canela-Krahô in (36) and (64), where an initial tense marker dominates a head-final VP.)

(53) Yi [a   [yì-yé   kúnúŋɔ́]].   *Supyire*
    they PERF they-REFL be.close.by
    'They are (too) close to each other.'   (Carlson 1991:215, ex 30)

The inverse, final-over-initial, construction, whereby final tense or aspect markers are found in VO constructions, is also relatively common (Biberauer, Holmberg and Roberts 2007 *et seq*; Biberauer, Newton and Sheehan 2009b; Dryer 2009b). This is demonstrated in examples from the Central Sudanic language Bagirmi and the North Volta-Congo language Mumuye: the Bagirmi example in (54) shows a final aspect marker, *ga*, dominating a head-initial VP, while the final tense marker, *ni*, in the Mumuye example in (55) dominates a head-initial AspP:

(54) bɨs [sa   ja   tebɨre] ga.   *Bagirmi*
    dog eat meat yesterday COMPL
    'The dog ate the meat yesterday.'   (Stevenson 1969:85, gloss Dryer 2009b:344, ex 104)

(55) Znàsǫ [dé   baasé Ranti] ni.   *Mumuye*
    Znaso PERF mimic Ranti   IMMED.FUT
    'Znaso is about to mimic Ranti.'   (Dryer 2009b:345, ex 106b, citing Shimizu 1983:112)

The same results can be shown for the negation head, though the situation here is less straightforward. Firstly, negative particles are not always heads, but in many languages are adverbs. Secondly, where the negative marker is an adverb in a double negation language,

NegP is usually not projected (Zeijlstra 2004). Moreover, where it is present, the position of NegP within the functional sequence varies from language to language (Laka 1990/1994; Ouhalla 1991; Zanuttini 1991, 1997; Cinque 1999; Julien 2002; Svenonius 2007:§3). It therefore does not necessarily follow that any attested sequence of either [Neg[OV]] or [[VO]Neg] exemplifies the predicted disharmonic structure; further investigation is required. Since NegP is generally not projected in double negation languages, we restrict our discussion to negative concord languages, which under most theories of negative concord must project NegP (*inter alia* Zanuttini 1991; Haegeman and Zanuttini 1991, 1996; Haegeman 1995, 1997; Brown 1999; Zeijlstra 2004; Ruff 2007). Our goal will therefore be to find negative concord languages in which the negative marker is a head, and this head differs in the direction of headedness from the verb.

An example of the disharmonic initial-over-final order is found in the Northern Tungusic language Evenki, an OV language. This is demonstrated in example (56)b) below. It is clear here that the negative marker ə- is a head in the extended verbal projection, since it inflects for subject agreement and tense. Comparing the negative example in (56)b) with its affirmative counterpart in (56)a), we see that these markings would otherwise appear on the lexical verb; in the negative example this latter has a participial form. This confirms not only that the negative marker is a head, but that the construction is monoclausal (see Payne 1985:212-214).[32]

(56) a) Bi [dukuwūn-ma duku-cā-w].   *Evenki*

    I   letter-OBJ   write-PST-1SG

    'I wrote a letter.'

   b) Bi [ə-cə̄-w   [dukuwūn-ma   duku-ra]].

    I   NEG-PST-1SG letter-OBJ   write-PART

    'I didn't write a letter.'   (Payne 1985:213, ex 31)

Turning now to the inverse disharmonic order, the order [[VO]Neg] is relatively common in central Africa (see Dryer 2009b) and in the Pacific region (Biberauer, Holmberg and Roberts 2010:56, citing Reesink 2002). Here again it can be shown that, at least in some cases, this final negative marker is a head, and thus instantiates the disharmonic final-over-initial order. Firstly, like Evenki, the Central Sudanic language Ma'di marks negation by means of a negative auxiliary. This is shown in (57) below, where the final negation head is marked for tense, while the lexical verb remains unmarked:

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[32] It is also possible for the object to precede the negative marker, as in the example below. This is presumably the result of object-shift.

i) Bi dukuwūn-ma ə-cə̄-w   duku-ra.   *Evenki*
   I letter-OBJ   NEG-PST-1SG write-PART
   'I didn't write a letter.'   (Payne 1985:213, ex 31b)

(57) a) [m´-āwí   ʤótī]   kū.   *Ma'di*

          1SG-open door   NEG.NONPST

      'I won't open/am not opening the door/don't open doors.'

                                                              (Blackings & Fabb 2003:14, ex 8)

      b) [m´-āwí   ʤótī]   kūrù.

          1SG-open door   NEG.PST

      'I did not open the door.'   (ex 7)

On the other hand, in the absence of negation, the same past/non-past distinction is marked on the lexical verb:

(58) ká   gbándà   ŋ̄ā.   *Ma'di*

     3SG cassava NONPST.eat

     'He is eating/eats cassava.'   (Blackings & Fabb 2003:13, ex 1)

In languages where the negative marker is an uninflected particle, there may still be evidence that this particle heads NegP. An example of such a language is Lagwan (or Logone, Central Chadic),[33] which exhibits the order T[VO]Neg:

(59) [Sà-dì   gɨ́r kàskú dìyásɨ́n]   sá.   *Lagwan*

       FUT-3FSG go   market tomorrow   NEG

     'She won't go to the market tomorrow.'

A number of factors indicate that the negation marker here heads the projection NegP, and therefore exemplifies the disharmonic final-over-initial order. Firstly, example (60) below provides evidence that Lagwan is a negative concord language, and therefore projects a NegP: the negative marker *sá* is required to license the negative concord item (or n-word):

(60) Bɨ̀l=*á*   shímá [[á   ló]   *(sá)].   *Lagwan*

     man=LNK.M n-M   3MSG.PERF come NEG

     'Nobody came.'

Secondly, it is clear that NegP has a fixed position in the Lagwan clause, dominating head-initial TP. This evidence comes from prohibitives. In Lagwan indicative clauses, as in (59) and (60), the uninflected verb is preceded by a head expressing subject agreement and, where relevant, tense or aspect. In imperatives, this head is absent, conforming to Kayne's

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[33] Lagwan examples here and below are based on my fieldnotes, 2004-2005. More detailed discussion of negation and imperatives in Lagwan is given in Ruff (2007).

(1992/2000) conclusion that true imperatives are truncated structures lacking TP and any higher functional projections:

(61) Slà á !   *Lagwan*
  push.IMP up
  'Get up!'

However, as is the case in many languages (see Zanuttini 1991 *et seq*; Kayne 1992/2000; Rivero and Terzi 1995; Zeijlstra 2004; Van der Auwera *et al* 2008), true negative imperatives are banned in Lagwan: as shown in (62)a), it is not possible to attach the negative marker to an imperative clause. Instead, a surrogate is used, with the second person future tense head preceding the uninflected verb, as in (62)b):

(62) a) * Slà á sá !   *Lagwan*
   push.IMP up NEG

  b) [Sà-gɨ̀ slá á] sá !
    FUT-2SG push up NEG
   'Don't get up!'

Zanuttini (1994, 1996) argues that in languages banning true negative imperatives, NegP must dominate TP, thereby rendering a structure in which NegP is present but TP is absent (such as (62)a)) ungrammatical. The fact that in Lagwan the ungrammatical structure is repaired by projecting TP seems to confirm this hypothesis.

Finally, there is evidence not only that NegP is projected, and that this NegP dominates head-initial TP and VP, but also that the final negative marker heads this projection, as opposed to being an adverb in its specifier.[34] This evidence is found by applying the 'why not' test developed by Merchant (2006). The 'why not' construction is analysed as a form of phrasal adjunction, and hence only permitted where the negative marker is a maximal projection. In Lagwan, no such construction is possible:

(63) a) * Àgé ghwànì sá ?   *Lagwan*
   because what NEG

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[34] Note that, under any theory prohibiting rightward specifiers, it is immaterial whether a final negative marker in a negative concord language is a head or an adverb in [Spec, NegP]. Given that in negative concord languages, the negative marker either heads NegP or sits in its specifier (on the left), the presence of a final negative marker invariably indicates that NegP must be head-final.

b) * Sá   àgé   ghwànì ?

    NEG because what

We have seen then that heads marking tense, aspect and negation can all, as predicted, violate Head Uniformity, resulting in disharmony. The typological data in (12) above indicates that the same is true of interrogative heads. This is exemplified firstly in Canela-Krahô, an OV language with an initial interrogative marker, *xà*:

(64) xà capi   te [po   curan]?   *Canela-Krahô*

    Q Capi PST deer kill

    'Did Capi kill a deer?'   (Popjes & Popjes 1986:157, ex 186)

The inverse disharmonic order, whereby a VO language has a final interrogative marker, is exhibited, among very many other languages, in Lagwan. Lagwan has a final interrogative head (*dá*), dominating an initial TP and VP. It occurs in both matrix and subordinate clauses, as shown in (65) and (66) respectively:

(65) [G-á   m̀mà ì   ghá] dá ?   *Lagwan*

    2SG-PERF leave her.ACC home Q

    'Did you leave it at home?'

(66) Ǹdál-ú   ǹgwà sáà, kí [[d-á   ghín ná]   dá].

    1SG.PROG-1SG look.at time LNK 3SGF-PERF do   COMPL Q

    'I'm looking at the time, to see if it's up.'

As regards interrogative markers and other discourse C-particles, notice that the semantic explanation for disharmony accounts for an otherwise anomalous situation. We have seen in the previous two sections that for subordinating complementisers, the disharmonic final-over-initial is ungrammatical. However, this order is relatively common for other discourse-related heads assumed to belong to the CP-domain, including, as we have seen, question particles (see Julien 2002:§3.6.1; Biberauer, Holmberg and Roberts 2007 *et seq*; Paul to appear a, b). If the presence or absence of disharmony is related not directly to category, but rather to semantics, the apparent anomaly disappears.

4.1 Disharmony and FOFC

The disharmony we have just witnessed for tense, aspect, negative and interrogative markers – both initial-over-final and final-over-initial structures – fully endorses the predictions made by the theory proposed here, without the need for further elaboration. On the other hand, for

FOFC, the final-over-initial structures are counterexamples that require explanation. Before leaving this section, we will take a brief look the explanation offered by Biberauer, Holmberg and Roberts' (2010) rationalisation of the counterexamples, and why, at the very least in the case of the Lagwan data above, it appears to be inadequate.

In the case of final tense and aspect markers in VO languages, Biberauer, Holmberg and Roberts (2007 *et seq*) propose that a distinction should be made between uninflected particles and inflected auxiliaries. They claim that, while the order [[VO]T/Asp] is widely attested for the former, it is strikingly absent where the tense/aspect marker is an inflected auxiliary. One seemingly strong piece of evidence for making this distinction is taken from Bwe Karen, a Tibeto-Burman language with VO order. In example (67) below, an uninflected aspect particle, *lɔ*, appears in final position. Example (68) shows that, on the other hand, the tense marker, which appears to be inflected with subject agreement, precedes the verb. Biberauer, Holmberg and Roberts use this to argue that the particle (the aspect marker in (67)) and the auxiliary (the tense marker in (68)) differ in distribution; moreover, it is the auxiliary that avoids a FOFC-violation.

(67) yə=ca   dɛyo   lɔ.   *Bwe Karen*
     1SG=see picture ASP
     'I'm looking at a picture.'   (Dryer 2008e, ex 24, citing Henderson 1997:39)

(68) cə=dɔ   *mɪ*   jə=khɔ́ phɪ   má nɔ?
     3=say   LNK 3=FUT take what
     'What did he say he would take?'   (ex 29, citing Henderson 1997:187)

However, closer inspection of the language strongly suggests that the alleged 'agreement inflection' attached to the verb in (67) and to the future tense marker in (68) is in fact a proclitic pronoun, since it appears in complementary distribution with full NPs, in canonical subject position. This is shown in example (69), where *ʃɛ* ('trap') is the subject, and in (70), where the subject of the embedded clause is the full NP *yəcɛ ɓenu* ('my book'); in both cases the alleged 'agreement' is absent:

(69) ʃɛ   ní   dòkhí   tə-dɔ́   *Bwe Karen*
     trap catch barking.deer one-CL
     'The trap catches a barking deer.'   (Dryer 2008e, ex 2a, citing Henderson 1997:258)

(70) yə=bɔ̀dá   *mɪ*   yə=cɛ   ɓe-nu   lɛ́mὲ thó.

1SG=think   LNK   1SG=book   CL-that   lost   PERF

'I thought that my book was lost.'   (ex 26, citing Henderson 1997:379)

While the order [[VO]Aux] does appear to be absent for inflected auxiliaries (though see Sheehan 2008:8 and Biberauer, Holmberg and Roberts 2010:8-9, fn 4 for some potential counterexamples)[35], this result is actually not so surprising. It should be noted that for many of the VO languages exhibiting final uninflected tense or aspect particles, there is simply no verbal inflection in the language at all (Matthew Dryer, p.c.). This can be seen in (54)-(55) above, where not only are the final tense and aspect markers uninflected, but also the verb itself and the initial aspect marker. In such a case we would hardly expect inflection to turn up on the final markers. Moreover, even in languages which do display some subject agreement (see discussion of Mbay and Ngambay in fn 35), the results are not altogether surprising, as pointed out by Julien (2002:52-3, fn 32). Julien suggests that uninflected tense particles are T heads to which the verb has not moved, while inflected auxiliaries are often V+T combinations. The latter share the distribution of any other finite verb.

Moreover, in order to legitimately exclude uninflected tense and aspect particles from the predictions of FOFC, it would need to be proven that they are not heads in the extended projection of the verb. For example, many tense or aspect markers may have semantic (near) equivalents in adverbs. If, however, the final tense and aspect particles were phrasal we would expect to see, firstly, evidence for internal structure through the possibility of modification, and secondly, we would expect focus-movement of the particle to be possible. Moreover, in order for FOFC to hold, this would have to be the case for *all* the languages exhibiting the order [[VO]T/Asp].

As regards negative and interrogative markers, Biberauer, Holmberg and Roberts (2010:81-85) claim that they are syncategorematic; that is, they neither c-select nor are c-selected, and hence are in some sense outside the verb's extended projection. Such an analysis is incompatible with the examples we looked at from Lagwan in (59)-(63) and (65)-(66). Firstly, the comparison of the imperative and the prohibitive (cf. (61) and (62)) strongly suggested that *sá*, the negative head in Lagwan, must select TP, not VP, and hence is involved in c-selection. Secondly, if an interrogative marker is syncategorematic and cannot be c-selected, it is predicted that it should only be able to appear as the highest head in root questions; it should not appear in subordinate

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[35] Svenonius (2000:21, fn 5), citing Dryer's (1998) database, lists two Central Sudanic languages displaying the order [[VO]Aux], where Aux is inflected – Mbay and Ngambay, both of the Sara group. However, my own research into these two languages (based on Vandame 1963; Fortier 1971; Thayer 1978) has found no evidence for this order. (There are both inflected auxiliaries and final aspectual markers, but not the desired combination of final inflected auxiliary.)

clauses (Biberauer, Holmberg and Roberts 2010:83). However, example (66) above shows directly that the final interrogative marker in Lagwan, *dá*, can indeed appear in subordinate clauses.

Bailey (2010) and Biberauer, Holmberg and Roberts (2010:81) also offer an alternative explanation for the presence of final interrogative markers in VO languages. Jayaseelan (2008) and Bailey (2010) point out that in many languages the so-called question particle and disjunctive connective are homophonous. Bailey (2010) and Biberauer, Holmberg and Roberts (2010:81) use this to suggest that the apparently final interrogative marker may in fact be an initial disjunctive connective with an elided second conjunct, in a structure of the kind [TP [or ~~TP~~]] (cf. Jespersen 1924:323; Katz 1972: chapter 5; Bencini 2003; Aldridge to appear on Mandarin Chinese). It should be noted, however, that this is not the conclusion Jayaseelan (2001, 2008) draws. (Note, in particular, that in Malayalam, on which Jayaseelan's studies are largely based, the disjunctive connective *-oo*, although homophonous with the interrogative marker, cannot be used to coordinate tensed clauses, Jayaseelan 2001:65, fn 1.) In any case, this analysis cannot account for the presence of the final interrogative marker *dá* in Lagwan. The coordination example in (71) below shows that the disjunctive connective is an entirely different morpheme, *ǹdí*:

(71) [Gì   gír] ǹdí [gì   gír   sá].   *Lagwan*
         2SG go   or   2SG go   NEG
       'You leave or you don't leave.'   (Aboukar 2003:57, gloss and English translation mine)

That the final interrogative marker in Lagwan is not a disjunctive connective is confirmed by its optional appearance in *wh*-questions. This is exemplified in (72):

(72) [Mì   ghín dǐkímì]   (dǎ) ?   *Lagwan*
         1PL do   how   Q
       'What do we do?'

This result is incongruous with an analysis whereby there is an elided second conjunct;[36] as pointed out by Jayaseelan (2008:5; cf. also Katz 1972: chapter 2), under that analysis we would expect the interrogative/disjunctive marker to appear only with polar questions.[37]

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[36] Except perhaps with the reading 'What do we do or what don't we do?' This is clearly not the intended reading in (72).

[37] In addition to the orders discussed above, Biberauer, Holmberg and Roberts (2010:21-25) claim somewhat controversially (contra extensive work by Cinque 2005a and Abels and Neeleman 2009, to appear) that there are no true examples of the order [[Num NP]Dem]. In order to rule out apparent counterexamples they are forced to conclude that these contain demonstrative positions both above and below the numeral. In allowing a demonstrative position below the numeral, however, they lose any

We have seen than that, at the very least in the case of the Lagwan data, Biberauer, Holmberg and Roberts' rationalisation of the counterexamples to FOFC is inadequate. (See also Paul (to appear b) for arguments that sentence-final particles in Chinese are fully-fledged functional heads, and hence cannot be excluded from the predictions of FOFC.) On the other hand, these same examples pose no problem under the theory of disharmony presented earlier in this section. Because this theory of disharmony is based on semantics, we are still able to maintain the stronger predictions of the Harmonic Word Order Ranking (41) for any semantically vacuous head – that is, any linker.

5 Harmony meets Disharmony: Linkers in the Noun Phrase and Elsewhere

In the previous two sections we established firstly a theory of harmony, consisting of a universal ranking of harmonic word order constraints (41), and secondly a theory of disharmony, allowing divergence from the order determined by the Harmonic Word Order Ranking by language-individual specific ordering rules. In this section we return to those elements which, being semantically vacuous syntactic heads, are predicted to obey exceptionlessly the Harmonic Word Order Ranking: linkers. In particular, we will be interested in those cases where the lexical head of the relationship marked by the linker and its dependent are of different categories: by studying relative clause markers and other linkers in the complex noun phrase, we will consider the outcome where harmonic structures and disharmonic structures interact. The results of this study will not only add empirical support to the theory put forward in sections 3.2 and 4, but also shed some light on the well-observed near parallels between the distribution of relative clauses and complement clauses, and why such parallels fail to be realised completely.

5.1 Relative Clause Markers

We have already observed in section 2.1 one parallel between subordinating complementisers and relative clause markers (see (5) and (6)): in both cases the linker (C or REL) is required to intervene between the lexical head (V or N) and its clausal dependent; moreover, in both cases there is a marked preference for the clausal dependent to follow the lexical head.

In the case of complement clauses, we observed a direct link between this CP-Final preference and the order of object and verb: in VO languages the complement clause *must* appear in

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explanation for the ungrammaticality of the order *Num-Dem-NP (cf. Cinque 2005a; Abels and Neeleman 2009, to appear).

Secondly, they claim that FOFC holds in morphology (Biberauer, Holmberg and Roberts 2010:§1.1.4, following Myler 2009), ignoring clear counterexamples such as $[_V[_V$ be$[_N$ head]]ed]. While FOFC does hold as a descriptive observation over synthetic compounds, the ungrammatical final-over-initial structures are ruled out on independent grounds (see Ackema and Neeleman 2004:164ff). Moreover, the weak version of FOFC in (3) only accounts for a subset of these ungrammatical initial-over-final structures: those where the categories are non-distinct.

postverbal position, while in OV languages complement clauses are found with near equal frequency in both preverbal and postverbal position (see (17), (20), (42), (43)).

As regards the distribution of relative clauses, the order of object and verb in the language again plays a significant role. This is shown below using data from Dryer (2008d, see also Greenberg 1963:90, table 10; Downing 1977:164, 1978:374, 383, 391-392; Mallinson and Blake 1981:§5.2.1; Hawkins 1983 *et seq*; C. Lehmann 1984; Keenan 1985:§2.1; Foster and Höfling 1987:486, 494; Dryer 1991:456, 1992:86, 2007:§6.1, 2008e; De Vries 2001:235-236, 2005:136-137; Rijkhoff 2002:307; Andrews 2007):

(73) a) Postnominal and VO: [N [$_{RC}$ V O]] = 370 languages (64%)

b) Prenominal and OV: [[$_{RC}$ O V] N] = 111 languages (19%)

c) Postnominal and OV: [N [$_{RC}$ O V]] = 95 languages (16%) (46% of OV languages)

d) Prenominal and VO: [[$_{RC}$ V O] N] =   5 languages   (1%)   (1% of VO languages)

(Data taken from Dryer 2008d)

We see that in OV languages, relative clauses are distributed relatively evenly between prenominal and postnominal position. This mirrors the distribution of complement clauses in relation to the verb in this same set of languages. In VO languages, on the other hand, there is a strongly marked preference for relative clauses to follow the noun. While this preference again seems to run parallel to the distribution of complement clauses in VO languages, there is an important difference. In the case of complement clauses, we are dealing with a strict requirement: preverbal complement clauses in these languages are ungrammatical. With relative clauses, on the other hand, we are dealing with a simple statistical preference: prenominal relative clauses in VO languages are possible, but very rare. The overall crosslinguistic distribution of relative clauses and their markers is therefore as follows (cf. typology of complementiser distribution in (20) above):

(74) *VO languages:*   *OV languages:*

N[REL VO]   **[OV REL]N**

[VO REL]N (very rare)   **N[REL OV]**

*N[VO REL]   *N[OV REL]

*[REL VO]N   *[REL OV]N

We saw in section 3.2 that the crosslinguistic distribution of subordinating complementisers and the complement clauses they head is exactly captured by the Harmonic Word Order Ranking (41), both in terms of attested distribution and its relative frequency. This section will show that, despite a small, but significant, difference, the attested distribution of relative clause

markers and the relative clauses they head is again precisely predicted by theories put forward in this paper: not by the Harmonic Word Order Ranking alone, but in combination with the theory of disharmony proposed in section 4.

We begin by considering the more simple case of OV languages. The relative clause marker, as a linker, cannot have ordering rules of its own and therefore must obey the Harmonic Word Order Ranking. This can be seen in (75) below, where the attested orders for OV languages are precisely those predicted by the Harmonic Word Order Ranking:

(75)

OV language	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY
a. ☞ N[REL OV]			*
b. ☞ [OV REL]N		*	
c. N[OV REL]	*!		
d. [REL OV]N	*!	*	*

Moreover, the relative frequency of the two orders is predicted: since neither is more marked than the other, both appear with near equal frequency (see (73)).

Turning now to VO languages, it seems initially as if, like complement clauses (cf. (42)), the Harmonic Word Order Ranking allows only one optimal order, the consistently head-initial order:

(76)

VO language	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY
a. ☞ N[REL VO]			
b. [VO REL]N		*!	*!
c. N[VO REL]	*!		*
d. [REL VO]N	*!	*	

However, recall that while the Harmonic Word Order Ranking invariably applies to linkers, this is not necessarily the case with heads endowed with semantics. These may have their own ordering rules. In the case of relative clauses, the linker is immediately dominated by NP. As a head with semantics, it is possible for N to have its own ordering constraint.[38] We must therefore also consider the results where the constraints N-Initial and N-Final are introduced into the ranking.

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[38] While nouns undoubtedly bear semantics, it is debatable whether there are semantics peculiar to the category N itself. See however Geach (1962), Baker (2003) and references cited there for the view that nouns are distinguished semantically from other categories by having criteria of identity. Another possibility is that, while ordering constraints can apply only to categories bearing semantics, they are formalised in terms of syntactic category, rather than semantic properties.

We find very similar results to those discussed in the previous section for the constraints Neg-Initial and Neg-Final. Due to CP-Final and Head Uniformity, the optimal order determined by the Harmonic Word Order Ranking alone requires the noun to appear in initial position. The constraint N-Initial calls for the same result. However, it is possible for the noun to appear in final position if all three constraints CP-Final, Head Uniformity and N-Initial are dominated by N-Final, as below:

(77)

VO language	HEAD-PROXIMATE	N-FINAL	CP-FINAL	HEAD UNIFORMITY	N-INITIAL
a. N[REL VO]		*!			
b. ☞ [VO REL]N			*	*	*
c. N[VO REL]	*!	*!		*	
d. [REL VO]N	*!		*		*

Because of the high ranking of N-Final, the a) and c) candidates are immediately ruled out, and a violation of both CP-Final and N-Initial is inevitable. The Head-Proximate Filter ensures that the b) candidate, [[VO REL]N], is chosen, also incurring a violation of Head Uniformity. (Note that precisely the same results obtain irrespective of the relative ordering of Head-Proximate and N-Final.) On the other hand, if any one of CP-Final, Head Uniformity or N-Initial is ranked either equally with, or higher than, N-Final, the a) candidate, [N[REL VO]] will be optimal. This therefore explains firstly why there are two possible orders for relative clauses in VO languages, and secondly why [[VO REL]N] is very rare: there are fewer possible rankings leading to this as the optimal order.

As regards OV languages, the Harmonic Word Order Ranking in any case allows one N-initial order, one N-final order (see (75)). So the former will be chosen wherever N-Initial dominates N-Final, and the latter where N-Final dominates N-Initial. Where both contstraints are equally ranked, either order will be possible.

Consider now why a parallel situation does not arise with clausal complements to verbs – that is, why we do not find complement clauses in preverbal position in VO languages. The situation where a clausal dependent in a VO language precedes its superordinate head (thereby violating both Head Uniformity and the CP-Final requirement) will only arise if the superordinate head has an active final ordering constraint. In the case of clausal complements to verbs, the superordinate head in question is V. In a VO language, however, it is simply impossible to have a V-final ordering constraint; if there is an active V-final constraint, the language as a whole is necessarily OV.

Returning now to the order [[VO REL]N], the explanation offered above makes a very precise prediction. The languages exhibiting this order should be exactly those VO languages that have an active N-final constraint. That is to say that in these languages we expect N to be final not only with respect to relative clauses, but also with respect to any other kind of dependent within the immediate projection of the noun.

The five VO languages listed by Dryer as having postnominal relative clauses are the Chinese languages Mandarin, Cantonese and Hakka, the Tibeto-Burman language Bai and the Central East Formosan language Amis. To this list we can Pazih (or Pazeh), a North Formosan language (Comrie 2008). In all these languages the prenominal relative clause is marked by an overt linker.

Firstly, the Chinese languages are well known to have a consistently N-final noun phrase, thereby bearing out the prediction (cf. (8), (79) and (82)).

Bai is a more complex case. According to Dryer (2008e:§4), possessors, like relative clauses, precede the noun; however, demonstratives and numerals follow the noun, while adjectives may appear on either side. While at first sight the Bai data seems problematic, a more detailed study reveals that, like the Chinese languages, Bai perfectly bears out the prediction concerning VO languages with prenominal relative clauses. Recall from section 3 that our theories of harmony and disharmony are concerned not with the surface order, but with the base-generated order. Therefore the predicted restriction to prenominal position for dependents of the noun in languages like Chinese, Bai, Amis and Pazih need apply only at the base-generated level. In the case of Bai, there is good evidence for movement of the noun from final position. The surface order is usually A-N-Dem-Num, with N-Dem-Num-A also attested (Cinque 2005a:319, fn 10, 11; Dryer 2008e:§4), though the latter may exist only in written language as a borrowing from Chinese (Abels and Neeleman to appear: 35). Extensive work by Cinque (2005a) and Abels and Neeleman (2009, to appear) on the crosslinguistic distribution of these four elements shows that the orders attested in Bai are not possible as base-generated orders; they can be derived only by leftwards movement of (a projection of) the noun from final position. Specifically, the order A-N-Dem-Num is derived by movement of the noun with pied-piping of the adjective, as in (78)a), while the order N-Dem-Num-A would be derived by movement of the noun alone, as in (78)b):

(78) a) [A N]$_i$ [Dem Num t_i]

b) N$_i$ [Dem Num A t_i]

Turning to the Formosan languages, Amis has prenominal demonstratives, numerals and adjectives, while possessors may appear on either side of the noun, the postnominal position being preferred (Joy Wu, p.c.). The appearance of possessors following the noun however is not necessarily problematic. It is generally assumed that Universal Grammar has two available positions for possessors: one low, within NP, and one high, in [Spec, DP]. If then the postnominal possessor in Amis is associated with D, rather than N, and hence outside the immediate projection of N, its appearance in final position poses no problem.

A similar case can be made for the final language, Pazih. In this language, possessors, adjectives and numerals precede the noun, while demonstratives may appear on either side of the noun (see Li 2000; Li and Tsuchida 2001). Since demonstratives, like high possessors, are associated with D, appearing in [Spec, DP], they are outside the scope of our predictions and hence do not pose a problem. Pazih then, like the Chinese languages, Bai and Amis, supports the proposal that among VO languages, prenominal relative clauses are available only in those languages that have an active N-final constraint.

We have seen then that the theories of word order put forward in this paper not only successfully derive the attested cross-linguistic distribution of relative clauses markers, including the presence of prenominal relative clauses in VO languages, but also place a restriction on exactly which VO languages should allow this option. On the other hand, we have already observed in section 2.3 that much of this data falls outside the scope of FOFC. Most significantly, under FOFC instances of the order [[VO REL]N] are counterexamples that require explanation: examples such as the following from Mandarin Chinese and Bai are predicted to be ungrammatical, since a head-final linker dominates an initial VP:[39]

(79) [zuotian   chi yurou *de*] ren   *Mandarin Chinese*
         yesterday eat   fish   LNK person
      'the people who ate fish yesterday'   (Paul to appear b: 4, ex 8a)

(80) [[vɛ̃⁴² tsɇ²¹tsɑ⁴² *no³³*] sɤ⁵⁵]   xɑ̃⁵⁵ ɣo⁴².   *Bai*
         write tidy   LNK word   read easy
      'Words that are written tidily are easy to read.'

                                              (Dryer 2008e, ex 39, citing Xu & Zhao 1984:73)

Before leaving the relative clause data, it is worth saying something about relative clauses that are marked not by a linker, but by an affix marking subordination. It has sometimes been

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[39] Note that, at least in the case of Mandarin Chinese, the head-final linker *directly* dominates the initial VP; there are no other clause-final particles in relative clauses (Paul 2007:16, to appear a: 4, to appear b: 16). The FOFC violation therefore cannot be attributed to an intervening final particle.

claimed that, in addition to the orders given in (74), the order [N[OV REL]] is also attested (Hawkins 1990:244, 1994:§5; Cinque 2005b). However, the languages allegedly exhibiting this order – the Pama-Nyungan languages Dyirbal and Kuku Yalanji,[40] Hurrian (Hurro-Urartian), Lushei (or Mizo, Tibeto-Burman) and Sumerian – mark subordination in the relative clause not by means of an independent syntactic head (that is, a linker), but by a suffix on the verb (see C. Lehmann 1984:76-78; De Vries 2002:Appendix II).[41] This is demonstrated by the Dyirbal example below. Here the verb in the relative clause is marked by a relative suffix, *-ŋu*, which replaces the tense suffix (Dixon 1969:37; C. Lehmann 1984:73). That it is indeed a suffix, rather than a syntactically independent clitic, is evidenced by the fact that the relative marker is followed by the ergative case marker, itself a suffix:

(81) yibi [yaṛa-ŋgu   [njalŋga-ŋgu djilwal-ŋa-ŋu-ru]]buṛa-n.   *Dyirbal*

　　woman man-ERG   child-ERG   kick-ŋaj-REL-ERG see-T

　　'The man who had kicked the child saw the woman.'   (Dixon 1969:38, ex 12)

There are two views of affixes: one morphological, one syntactic. Under neither view do affixes in fact fall under the restrictions of the Harmonic Word Order Ranking. The morphological view is based on evidence suggesting that affixes do project in the syntax or are otherwise inaccessible to the syntax component (see, among others, Di Sciullo and Williams 1987; Spencer 1992; Joseph and Smirniotopoulos 1993; Ackema and Neeleman 2002, 2004, 2007; Philip 2009). If an affix does not head its own projection within the extended projection, or is otherwise invisible to the syntax component, it is subject to neither the Head-Proximate Filter nor Head Uniformity. Greater freedom for semantically vacuous affixes than for semantically vacuous heads (linkers) is therefore predicted.

The alternative view maintains that affixes are in fact syntactic objects, which have combined with the heads to which they attach through movement (see, for example, Baker 1988; Halle and Marantz 1993). Recall however that it is perfectly permissible for the effects of the Harmonic Word Order Ranking to be undone by movement. Therefore, if an affix has moved from its

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[40] Cinque (2005b:58, 80) also claims this language exhibits the order [V[OVC]]. The 'complementiser' here is the same subordinating suffix as used in the relative clause. As in Dyirbal, further suffixes can be added to this subordinating suffix. See Patz (2002).

[41] Cinque (2005b) also cites the Na-Dené language Slave(y), the Paya language Pech and Teribe as examples of languages displaying this order. In the case of Slave the alleged relative clause marker makes a semantic contribution, and hence is not a true linker (see Rice 1989:§47.2). Disharmony is therefore predicted to be possible. In Pech, the marker of subordination is transcribed as an affix and also seems to make a semantic constriction (Cinque 2005b:84). I have not been able to find any information on Teribe.

Cinque (2005b:60-61) gives the South Semitic language Tigre as an example of the order [[REL TP]N], which is also ruled out for true linkers by the Harmonic Word Order Ranking. In this case the alleged relative clause marker – which is not restricted to initial position in the clause – is in fact a marker of definiteness. See Palmer (1961) and Raz (1983).

base position, there is no expectation that it should obey the Harmonic Word Order Ranking on the surface.

5.2 Linkers Elsewhere

We have seen then that the Harmonic Word Order Ranking in (41), together with the theory of disharmony presented in section 4, successfully accounts for the distribution of two types of linker: subordinating complementisers and relative clause markers. As linkers, and therefore semantically vacuous, both heads, as predicted, obey the Harmonic Word Order Ranking; no independent ordering rule is possible. In section 2.1 a third, broader, set of linkers was mentioned: linkers used more generally in the complex noun phrase, the dependent being of any category. Being likewise semantically vacuous, this set of linkers is also predicted to obey the Harmonic Word Order Ranking. The only difference here will be that, where the dependent is not clausal, the CP-Final requirement will not come into play.

As with relative clause markers (a subset of linkers in the noun phrase), we are dealing here for the most part with a superordinate head – always a noun – and a dependent of differing category. As with relative clauses, therefore, we expect different results depending on the ranking of the constraints N-Initial and N-Final with respect to the Harmonic Word Order Ranking.

Let us consider firstly the results where either N-initial or N-Final dominates at least part of the Harmonic Word Order Ranking. If the dependent marked by the linker differs from the noun in direction of headedness, violations of Head Uniformity will be requisite. We saw in the previous subsection that in VO languages with prenominal relative clauses, such as Mandarin Chinese, the constraint N-Final must dominate at least CP-Final and Head Uniformity. Therefore, where the noun takes a head-initial dependent of any kind, the linker marking the relationship will necessarily violate Head Uniformity in order to obey the Head-Proximate Filter. An example is given in (82) below from Mandarin Chinese, where the noun is modified by a head-initial PP, and motivated in (83). Note again that the grammatical order chosen by the Harmonic Word Order Ranking constitutes a counterexample to FOFC:

(82) [zai Beijing *de*] ren   *Mandarin Chinese*
       in   Beijing LNK person
       'people in Beijing'   (Den Dikken & Singhapreecha 2004:34, ex 46c)

(83)	*Head-initial dependent*	HEAD-PROXIMATE	N-FINAL	CP-FINAL	HEAD UNIFORMITY	N-INITIAL
a.	☞ [P NP LNK]N				*	*
b.	N[LNK P NP]		*!			
c.	[LNK P NP]N	*!				*
d.	N[P NP LNK]	*!	*!		*	

On the other hand, in a language where the constraints N-Initial and N-Final are ranked below the Harmonic Word Order Ranking, we expect all three constraints in this ranking to be obeyed wherever applicable. An example of such a language is the Malayo-Polynesian language Batad Ifugao. The linker in this language has two allomorphs: an enclitic *-n*, used where the preceding word ends in a vowel, and the independent word *an*, used immediately following a consonant. Numerals and unmodified adjectives precede the noun, with an intervening linker:

(84) nan tulu=*n*   balāhang   *Batad Ifugao*

   DET three=LNK   young.girl

   'the three young ladies'   (Dryer 2007, ex 174b)

(85) nan nappuhi=*n*   tibung

   DET bad=LNK   wine.jar

   'the bad wine jar'   (ex   175a)

Where however the adjective is modified – a head-initial construction – the AP must follow the noun it modifies, the linker again appearing in intervening position:

(86) nan tibung [*an*   nappūhih pan-nig-a']   *Batad Ifugao*

   DET wine.jar LNK bad   MANNER-see-1SG

   'the wine jar which is bad with reference to the way I see it'   (Dryer 2007, ex 175b)

The data here can be easily accounted for if we assume the following ranking for Batad Ifugao:

(87) HEAD-PROXIMATE FILTER >> CP-FINAL, HEAD UNIFORMITY >> N-FINAL >> N-INITIAL

The linker must always obey the dominant constraint, the Head-Proximate Filter: therefore it will be final if the dependent is prenominal, and initial if the dependent is postnominal. We firstly consider the case where the noun is modified by a complex head-initial AP, as in (86). If the head-initial AP precedes the noun, the linker will be final, so violating Head Uniformity. In order to obey both the Head-Proximate Filter and Head Uniformity, the complex AP follows the

noun, dominated by an initial linker. The consequent violation of N-Final is irrelevant, since this constraint is ranked below Head Uniformity:

(88)

Head-initial dependent	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY	N-FINAL	N-INITIAL
a. ☞N[LNK A XP]				*	
b. [A XP LNK]N			*!		*
c. [LNK A XP]N	*!				*
d. N[A XP LNK]	*!		*	*	

We now turn to the case where the dependent of the noun – adjective or numeral – is itself unmodified, as in (84)-(85). In this case Head Uniformity is no longer relevant, since the adjective or numeral is non-branching and hence does not have a direction of headedness. Here then, N-Final does come into play: of the two candidates that obey the Head-Proximate Filter, it is the candidate that obeys N-Final, [[A LNK]N], that is optimal:

(89)

Non-branching dependent	HEAD-PROXIMATE	CP-FINAL	HEAD UNIFORMITY	N-FINAL	N-INITIAL
a. ☞[A LNK]N					*
b. N[LNK A]				*!	
c. [LNK A]N	*!				*
d. N[A LNK]	*!			*	

The above findings therefore confirm those of the previous subsection: where a linker marks the relationship between a superordinate head and dependent of differing category, we may find otherwise unexpected violations of the CP-Final requirement and Head Uniformity. Irrespective of the ordering properties of the superordinate head, however, it is predicted that the dominant constraint in the Harmonic Word Order Ranking, the Head-Proximate Filter, will always be obeyed (hence the generalisation in (2)a)). With one potential exception, to be discussed below, the results in (9) confirm that this is indeed the case.

As with subordinating complementisers, there may be surface violations of the Head-Proximate Filter. The surface violation poses no problem as long as the linker obeys the Head-Proximate Filter in its base-generated position. I know of two languages displaying such a surface violation.[42] In the first language, Kanuri (Western Saharan), the possessor phrase follows its

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[42] Den Dikken and Singhapreecha's (2004) list of languages containing linkers in the noun phrase includes another language that appears to violate the Head-Proximate Filter: Takia (Malayo-Polynesian), displaying the order [N A-*n*]. This case need not concern us, since there is evidence that -*n* is not a syntactically independent head, but a suffix (see Ross 1998). As discussed in section 5.1 above, suffixes, by their very nature, are not subject to the Head-Proximate Filter.

head noun, and is marked by a genitive case enclitic, -*ve* (or -*be*). This results in the surface order [N[PossP=*ve*]]:

(90) [fátò   [kâm kúrà=*ve*]]=*ga*   rúskəna.   *Kanuri*
       compound   man big=LNK.GEN=LNK.OBJ   I.saw

      'I saw the big man's compound.'   (Dryer 2007, ex 51)

The above example demonstrates that -*ve* is indeed a clitic (and hence a syntactically independent head), as opposed to a suffix: where the possessor is modified, -*ve* attaches phonologically not to the possessor noun (*kâm*), but to the final word of the possessor phrase as a whole (*kúrà*). Being a syntactically independent head serving to mark the presence of a relationship, the case clitic is a member of the class of linkers, and therefore subject to the Head-Proximate Filter at the base-generated level. In order to maintain the generalisation in (2)a, it is therefore predicted that the order shown in (90) can only obtain as the result of movement.

Cyffer (1998:51) reports that the general ordering of components within the Kanuri noun phrase is as follows:

(91) N-Possessor phrase[43]-Adjectival-Relative Clause-Dem/Det-Additive adjunct

While this order itself is not directly indicative of movement, it is not incompatible with it. It is possible that the genitive-marked possessor in fact underlyingly precedes the noun (conforming to the Head-Proximate Filter), and the noun then moves leftwards around the possessor to initial position.

The second language, Pashto, displaying the inverse surface order, provides direct evidence for movement. This language uses the linker *de* to mark a possessor phrase, exhibiting the surface order [*de* PossP]N, as shown below:

(92) [*de*   Asad] [moțar]   *Pashto*
        LNK Asad   car

      'Asad's car'   (Larson in press: 15, ex 56)

Larson (in press) provides evidence suggesting that this word order is result of movement of the possessor phrase headed by *de*. His argument is based on the fact that where the relevant

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[43] Cyffer in fact reports that a pronominal possessor precedes the gentive-marked noun phrase. However, there does not seem to be any motivation for this distinction between the two in his examples.

extended nominal projection is the complement of a preposition, the linker and possessor precede this preposition, as exemplified in (93) below. In order to maintain compositional semantics, the possessor must have moved out of the nominal complement of the preposition.

(93) a) [*de*   Asad]ᵢ   [pə   chāqú *t*ᵢ]   *Pashto*

      LNK Asad   with knife

   'with Asad's knife'   (Larson in press: 15, ex 58a)

   b) * pə [*de*   Asad] chāqú

      with LNK Asad   knife   (ex 57a)

Therefore, if, as the data suggests, the base-generated order is [N[*de* PossP]], Pashto perfectly conforms to the Head-Proximate Filter, and consequently the predicted pattern for linkers.

The prediction that linkers should obey the Head-Proximate Filter at the base-generated level is of course not restricted to linkers in the noun phrase. It is predicted to apply to any semantically vacuous syntactic head that serves to mark a relationship between a superordinate head and its dependent. We have already seen that this is the case for subordinating complementisers, relative clause markers and other linkers in the noun phrase. Linkers however are not limited to these domains.

Firstly, they may also occur in the form of syntactically independent case markers – that is, realisations of the head K (see Lamontagne and Travis 1987; Bittner and Hale 1996) – at least where the case is purely structural and hence makes no semantic contribution. Syntactically independent case-markers of this kind are found in languages such as Hindi-Urdu, Marathi, Persian, Japanese, Korean, Turkish, Harar Oromo, Kanuri, Khoekhoe (or Nama, Kwadi-Khoe), Miskitu (Misumalpan), Shokleng (or Xokleng, Ge-Kaingang) and Yele (Yele-West New Britain), all of which are OV, and in the VO languages Khasi (Northern Mon-Khmer) and Samoan (Polynesian). In all these languages the case-marker intervenes between the superordinate head and its nominal dependent; it is postnominal in OV languages and prenominal in VO languages. We have seen examples of this for the OV languages Turkish in (24)-(26), Persian in (27) and (96), Harar Oromo in (52) and Kanuri in (90). An example from Khasi, a VO language, is given below:

(94) Ka   la   yo"ii [*ya*   'u   khlaa].   *Khasi*

   she PST see   LNK.ACC the tiger

   'She saw the tiger.'   (Bittner & Hale 1996:4, ex 4a, citing Rabel 1961)

Secondly, a linker may be used to mark the relationship between an adjective and its complement. Where the complement is nominal, in many cases the same linker is used here as that used between a head noun and its nominal dependent: for example, many languages use a purely functional adposition, such as *of* in English, to mark the relationship, while the Indo-Iranian languages use the ezafe/izafe(t). An example is given below from Persian:

(95) âšeq[=*e*   Hasan]   *Persian*

    in.love=LNK Hasan

    'in love with Hasan'   (Larson in press: 3, ex 6a)

Where the complement of the adjective is clausal, the linker used is frequently identical to the subordinating complementiser – that is, the linker used more generally to introduce clausal dependents. (Note that in this case, precisely the same predictions as those regarding the relative clause marker arise: we expect OV languages to allow freely both pre- and postadjectival complement clauses, as long as the linker intervenes, while VO languages should allow preadjectival complement clauses – with a final linker – only if the adjective has a final ordering rule.) An example is given below from Persian:

(96) xošhâl   [*ke*   šâh   kešvar=*râ*   tark kard]   *Persian*

    happy   LNK Shah country=LNK.ACC left did

    'happy that the Shah has left the country'   (Larson in press: 8, ex 27b)

While a thorough study is beyond the scope of this paper, as far as I am aware, linkers used to mark the relationship between an adjective and its complement, whether clausal or nominal, again, as predicted, always intervene between the two.

A third way in which linkers are used in some languages is to introduce adverbials. This is shown below for Tagalog (Malayo-Polynesian), Bai, Mandarin Chinese and Romanian. The adverbial introduced by the linker may act as a modifier within either the (extended) verb phrase or the adjectival phrase (as in, for example, (103)). The adverbial itself may be either adjectival (as in (97)-(100), (103)) or nominal (as in (101)-(102)) in category:

(97) a) Umalis [*na*   bigla] ang bisita.   *Tagalog*

       left   LNK sudden TOP visitor

   b) [Bigla=*ng*]   umalis ang bisita.

       sudden=LNK left   TOP visitor

   'The visitor left suddenly.'   (Rubin 2002:6, ex 10)

(98) si⁵⁵ɣɯ³³   lɯ³¹ tsɯ³¹   xɛ̃⁵⁵   [no³³ tuĩ⁵⁵].   *Bai*

   willow   this CL   grow   LNK straight

   'This willow has grown straightly.'   (Dryer 2008e, ex 40a, citing Xu and Zhao 1984:53)

(99) xɯ³³tsi³³   lɯ³¹ suã⁵⁵ tshɛ̩⁴⁴   [no³³ xɑ̃⁵⁵tɕɛ̩⁴²].

   plum   this CL   red   LNK good-looking

   'The plums are red in a beautiful way.'   (ex 40b, citing Xu and Zhao 1984:54)

(100) Ni   keyi   [manman *de*] zou.   *Mandarin Chinese*

   you can   slow   LNK walk

   'You can walk slowly.'   (Rubin 2002:25, ex 28a)

(101) Women [kexue *de*] yanjiu   nei-ge wenti.

   we   science LNK research that-CL problem

   'We will research that problem scientifically.'   (p26, ex 28d)

(102) Se   cînta [*de*   obicei] acolo.   *Romanian*

   REFL sings   LNK custom there

   'One usually sings there.'   (p17, ex 18)

(103) Problem=a   este [[curios *de*] grea].

   Problem=the.F is   curious LNK tough.F

   'The problem is curiously tough.'   (p15, ex 16ai)

In all the above examples, the linker, as predicted, intervenes between the adverbial it introduces and the predicate it modifies. This is particularly interesting in the Tagalog, Bai and Romanian examples. Firstly, Tagalog is interesting since it allows modifiers to appear on either side of the head they modify. The linker however remains in intervening position, preceding the adjective in (97)a and following it in (97)b. Note that the phonological difference in the linker in the two examples is purely due to phonological environment: if the preceding word ends either in a vowel, or in /n/, /h/ or /ʔ/, the linker has the enclitic form *-ng*, becoming the syllable coda of the preceding word; elsewhere, it occurs as an independent word *na* (Schachter and Otanes 1972).

A similar situation occurs in Romanian: the nominal adverbial follows the verb in (102), while in (103) the adverbial precedes the adjective it modifies. The linker, *de*, correspondingly precedes its complement in (102) and follows it in (103).

Finally, in the Bai examples in (98)-(99), the adverbial follows the predicate it modifies, hence the linker, no^{33}, precedes its complement. However, we previously saw in (80) that this same linker, when marking the relationship between a noun and a relative clause, must follow its complement. The different ordering possibilities for the linker in fact acts as confirmation to our analysis of the order [[VO REL]N], at least in Bai. It was argued in the previous subsection that this order comes about due to the high ranking of an N-final ordering constraint. The fact that the linker no^{33} clearly does not have an ordering rule, while we have seen that the noun in Bai does, confirms that the order [[VO no^{33}]N] must be the result of an ordering rule associated with the semantically contentful noun, as opposed to the semantically vacuous linker.

The Tagalog, Romanian and Bai data therefore directly support the proposal put forward in this paper: the position of the linker, being semantically vacuous, is determined not by its own ordering constraint, but its choice of position is subject to the optimal position in terms of the Harmonic Word Order Ranking.

6 Concluding Remarks

I have proposed here that the notion of harmonic word order be defined by the ranking of the Head-Proximate Filter, Head Uniformity and the CP-Final requirement, with the Head-Proximate Filter universally taking precedence. Evidence supporting this ranking has been given by various types of linker, in particular subordinating complementisers, relative clause markers, and linkers in the complex noun phrase. I have shown that deviation from the optimal order is possible only where a head has ordering rules of its own relating to its semantics. The possible presence or absence of disharmony is therefore directly related to the presence or absence of semantics on a head. The combination of these theories of harmony and disharmony results in the generalisations in (2). These generalisations have been shown to be empirically superior to FOFC, in terms of both what is permitted and what is disallowed.

Furthermore, our study has shown that harmony is concerned not with the surface linear order, but with the base-generated, or first-merged, order. This is suggestive that ordering at least to some extent is a product of the narrow syntax, rather than belonging exclusively to PF.

Appendix: Languages with Linkers in the Noun Phrase

Classification	No. of lgs. in sample	Language	Position of linker
Afro-Asiatic	10		
- Chadic	(9)		
Biu-Mandara	(8)		
A		Gude	Postnominal

B	(7)		
Kotoko-Yedina			
Kotoko		Afade	Postnominal
		Goulfey	Postnominal
		Lagwan	Postnominal
		Mpade	Postnominal
		Mser	Postnominal
Zina		Mazera	Postnominal
		Zina	Postnominal
West Chadic		Nyam	Postnominal
- East Cushitic		Dasenech	Prenominal
Austronesian	13		
- Formosan	(4)		
Atayalic		Mayrinax Atayal	Prenominal/Both
Bunnan		Isbukun Bunan	Prenominal
Central East Formosan		Amis	Prenominal
Northern Formosan		Pazih	Prenominal/Both
- Malayo-Polynesian	(9)		
Nuclear Malayo-Polynesian		Palauan	Both
Oceanic	(5)		
Central-Eastern Oceanic	(2)		
Central Pacific		Rotuman	Postnominal
Micronesian		Kiribati	Postnominal
Meso-Melanesian		Bali-Vitu	Postnominal
Polynesian		Samoan	Postnominal
Southern Oceanic		Malo	Postnominal
Philippine	(3)		
Central Philippine		Tagalog	Both
Northern Luzon	(2)		
Central Cordilleran		Batad Ifugao	Both
Ilocano		Ilocano	Both
Creole languages	2		
- Dutch Creole		Berbice Dutch Creole	Postnominal
- English Creole		Tok Pisin	Postnominal
Indo-European	18		
- Albanian		Albanian	Postnominal
- Indo-Iranian	(11)		
Indo-Aryan		Hindi	Prenominal

		Urdu	Both
Western Iranian	(9)		
Northwestern Iranian	(7)		
Caspian		Gilaki	Both
		Mazandarani	Both
Kurdish		Balochi	Postnominal
		Hawrami	Postnominal
		Kurmanji	Postnominal
		Sorani	Postnominal
		Zazaki	Postnominal
Southwestern Iranian		Persian	Postnominal
		Tajik	Postnominal
- Italic	(3)		
Romance			
East Romance		Romanian	Postnominal
Italo-Western	(2)		
Italo-Dalmation		Italian	Postnominal
Western		French	Postnominal
- West Germanic	(3)		
Anglo-Frisian		English	Postnominal
High German		German	Postnominal
Low Franconian		Dutch	Postnominal
Japonic	1	Japanese	Prenominal
Korean	1	Korean	Prenominal
Kwadi-Khoe	1		
- Khoe		Khoekhoe	Postnominal
Mayan	1		
- Cholan-Tzeltalan		Tzeltal	Prenominal
Niger-Congo	9		
- Atlantic-Congo	(8)		
Benue-Congo	(7)		
Bantoid			
Central Bantu			
Zone D		Kilega	Postnominal
Zone E	(2)		
Kikuyu-Kamba		Gikuyu	Postnominal
		Kiitharaka	Postnominal
Zone G		Swahili	Postnominal

Zone J	(2)		
Haya-Jita		Haya	Postnominal
Konzo		Kinande	Postnominal
Zone N		Chichewa	Postnominal
Senegal-Guinea		Wolof	Postnominal
- Central-Southwestern Mande		Bambara	Prenominal
Nilo-Saharan	4		
- Central Sudanic		Lendu	Prenominal
- East Sudanic	(2)		
Western Nilotic			
Southern Luo			
Luo-Acholi		Dholuo	Postnominal
		Lango	Postnominal
- Songhay		Koyra Chiini	Prenominal
Penutian	1	Tsimshian	Postnominal
Sino-Tibetan	8		
- Sinitic	(3)		
Chinese		Cantonese	Prenominal
		Mandarin	Prenominal
		Taiwanese	Prenominal
- Tibeto-Burman	(5)		
Himalayish	(2)		
Mahakiranti		Newari	Prenominal
Tibeto-Kanauri		Byansi	Prenominal
Lolo-Burmese	(2)		
Burmish		Burmese	Prenominal
Loloish		Lahu	Prenominal
Northeast Tibeto-Burman		Bai	Prenominal
Tai-Kadai	1		
- Tai		Thai	Postnominal
Trans-New Guinea	1		
- Madang		Amele	Prenominal

Data from Ross (1998); Zeitoun *et al* (1999); Li (2000); Matambirofa (2000); Li & Tsuchida (2001); Kinyalolo (2002); Rijkhoff (2002); Den Dikken & Singhapreecha (2004); Holmberg & Odden (2004); Kutsch Lojenga (2005); Shklovsky (2005); Svenonius (2006); Witzlack-Makarevich (2006); Dryer (2007, 2008e); Bögel *et al* (2008); Jahani (2008); Spencer (2008); Andreas *et al* (2009); Philip (2009); Tourneux & Mahamat (2009); Larson (in press)

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