# Morphology Competes with Syntax: Explaining Typological Variation in Weak Crossover Effects[1]

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Crosslinguistic variation in weak crossover (WCO) found in Palauan, Malayalam, German, Korean, Kiswahili, Chicheŵa, and Hindi has not received a unified explanation in current syntactic theory, despite many important and insightful efforts (e.g. Reinhart 1983, Koopman and Sportiche 1983, Safir 1984, to appear, Mahajan 1990, Georgopoulos 1991b, Baker 1995a, Lasnik and Stowell 1991, Frank, Lee, and Rambow 1992). Building on Mohanan 1981, 1982, 1983, Bresnan 1984, 1994b, 1995c, and Choi 1994, 1995, I argue that this variation can be explained if linear order and hierarchical prominence are admitted as potentially conflicting domain constraints universally available to languages in different combinations or strengths (cf. Sells 1984, Barss and Lasnik 1986, Haider 1989, Williams 1994). Conflicting constraints arise because a unitary prominence condition on operator binding is interpreted on parallel structures that mismatch in certain ways, as in LFG (e.g. Bresnan and Kanerva 1989, Bresnan 1994a,b, 1995a). Although the distinct instantiations of prominence largely converge in an endocentric, analytic language such as English, they can be seen to diverge in languages with richer morphological resources for function specification (case marking in scrambling languages, pronominal incorporation in head-marking languages). In such languages word structure 'competes' with phrase structure in specifying the same grammatical relations, a result with interesting implications for the architecture of universal grammar.

[1]I am grateful to Hye-Won Choi, Cleo Condoravdi, Sam Mchombo, K. P. Mohanan, Tara Mohanan, Owen Rambow, Peter Sells, and Paul Smolensky for helpful discussion of the data and the theoretical issues presented here. I alone am responsible for errors. The main idea developed here—that linear order and syntactic rank are manifestations of a prominence relation constraining binding—was first proposed to me by K. P. Mohanan, who presented a public version of it in a Stanford Linguistics Department Colloquium in 1989; Langacker's (1969) 'primacy relations' suggest a similar conception.

# 1 Crosslinguistic variation in weak crossover

The idea that linear order as well as hierarchical prominence constrains pronominal binding by quantifiers and other variable-binding operators is present in early generative work (e.g. Postal 1972, Chomsky 1976, Higginbotham 1980) and it recurs in studies of weak crossover (wco) across languages (Mohanan 1982, 1982, Bresnan 1984, Sells 1984 (cf. Shlonsky 1992), Haider 1989, Georgopoulos 1991a,b, and Williams 1994, Bresnan 1994b, 1995c). But following the lead of Reinhart (1976, 1983a,b), much subsequent work has attempted to reduce all leftness effects to c-command and other order-free conditions on operator binding relations, such as biuniqueness (Koopman and Sportiche 1983) or parallelism (Safir 1984, to appear). In English double object constructions, the proposal that linear order affects the pronominal binding domain of operators has been revived by Barss and Lasnik 1986, only to be demolished by Larson's 1988 reanalysis of the verb phrase, which is expressly designed to build up a direct correspondence between the linear order of objects in the VP and their depth of embedding, a correspondence further extended in Pesetsky 1995.[2] The idea that scrambling can consist of movement to an A-position (Mahajan 1990, 1994) further reduces to c-command many leftness effects on pronominal binding found in scrambling languages. Such work has led to what is now the consensus view among many theorists that linear order plays no role in binding theory or conditions on operator binding. Indeed, in recent work by Kayne (1994), it is proposed that linear order relations between constituents are simply a homomorphic projection of their asymmetric c-command relations.

However, this consensus view does not explain crosslinguistic variation in wco patterns already known in the literature. There is some evidence for a linear order constraint on operator binding in English (e.g. Bresnan 1994b, 1995c, Williams 1994), although classes of potential counterexamples are known to exist (Reinhart 1983a,b, Carden 1982, Albert 1995) and there are disagreements about data (cf. Jackendoff 1990, Larson 1990, Bresnan 1995c and Williams 1994). A linear order effect in English is largely masked by the coincidence of constituent order with syntactic rank in the overall right-branching syntax of the language: the subject precedes the lower-ranking and more deeply embedded object, and the object in turn precedes the still lower ranking and more deeply embedded prepositional objects. In contrast, in Palauan, a VOS lan-

[2] Pesetsky observes that this structure does not accord with classical constituency tests, however, and proposes a second, parallel level of structure for the latter.

guage, the linear order of object and subject is opposite to their relative rank and depth of embedding, and both leftness and hierarchical prominence can be seen to affect operator binding, according to Georgopoulos 1991a. The core facts are illustrated in (1)–(3).[3] In (1) the subject operator c-commands but does not precede the possessive pronominal within the object, and binding is not possible. In (2) the object operator precedes but does not c-command the possessive pronominal in the subject, and again binding is not possible. When the operator subject is topicalized to the left of the pronominal, as in (3), a bound interpretation is possible.

**Palauan** (Georgopoulos 1991a,b):

(1) *toltoir er [a rederir] a **rebek el 'ad**
R.3p.*love* P *mother*.3p$_i$.(pro$_i$) [*every* L *person*]$_i$
'Everyone$_i$ loves their$_i$ mother.'
(Georgopoulos 1991a: ex. (57c), p. 211)

(2) *toltoir er a **rebek el 'ad** [a rederir]
R.3p.*love* P [*every* L *person*]$_i$ *mother*.3p$_i$.(pro$_i$)
'Their$_i$ mother loves everyone$_i$.'
(Georgopoulos 1991a: ex. (56c), p. 211)

(3) a **rebek el 'ad** a oltoir er [a rederir]
[*every* L *person*]$_i$ R.*love* P *mother*.3p$_i$.(pro$_i$)
'Everyone$_i$ loves their$_i$ mother.'
(Georgopoulos 1991a: ex. (58c), p. 212)

In Malayalam, linear order constrains the binding of overt pronouns, but not null pronouns (Mohanan 1981, 1982, 1983, personal communication May 1995; Bresnan 1984, 1994b, 1995c). This pattern is illustrated in (4). Note that two forms of pronouns are given—plural and reduplicated singular. The plural form has both a collective interpretation (implying that a single woman was involved with a group of children) and a distributive interpretation (implying that different women were involved with different children); on the distributive reading, the pronoun is clearly bound. The reduplicated singular form has only the distributive, or bound, reading. When either overt pronoun is omitted,

[3] All glosses follow the original sources. Georgopoulos (1991: 237) uses P for preposition, R for realis, and L for linker, while 'p' indicates plural.

a null pronominal interpretation arises, with either the group or distributive reading. (Note that the examples are starred only on the bound interpretation; the plural pronoun is grammatical if interpreted as referring elsewhere.)[4]

**Malayalam** (Bresnan 1994b, 1995c; Mohanan p.c., May 1995):

(4) in̲n̲ə **oor̄oo kuṭṭiyum** sahaayiccu
*today each child*.N *helped*
[in̲n̲ale (**awar̄e/awanawane**) s̄akaar̄icca st̲riikaḷe]
*yesterday* (*they*.A/*he*.REDUP.A) *scolded*.REL *woman*.A
'Today each child$_i$ helped the women who scolded him$_i$ yesterday.'

(5) [in̲n̲ale (***awar̄e**/***awanawane**) s̄akaar̄icca st̲riikaḷe]
*yesterday* (*they*.A/*he*.REDUP.A) *scolded*.REL *woman*.A
in̲n̲ə **oor̄oo kuṭṭiyum** sahaayiccu
*today each child*.N *helped*
'Today each child$_i$ helped the women who scolded him$_i$ yesterday.'

(6) **oor̄oo kuṭṭiyeeyum** in̲n̲ə sahaayiccu
*each child*.A *today helped*
[in̲n̲ale (**awar̄ə/awanawan**) s̄akaar̄icca st̲rii]
*yesterday* (*they*.N/*he*.REDUP.N) *scolded*.REL *woman*.N
Lit.: 'The woman who he$_i$ scolded yesterday helped each child$_i$ today.'

(7) [in̲n̲ale (***awar̄ə**/***awanawan**) s̄akaar̄icca st̲rii]
*yesterday* (*they*.N/*he*.REDUP.N) *scolded*.REL *woman*.N
in̲n̲ə **oor̄oo kuṭṭiyeeyum** sahaayiccu
*today each child*.A *helped*
Lit.: 'The woman who he$_i$ scolded yesterday helped each child$_i$ today.'

Referring to (7), observe that the binding of the null pronominal within the subject by an object operator violates the bijection principle: quantifier raising (QR) of the object operator renders both the LF trace in object position and the null pronominal within the subject locally bound, and two variables are

[4]The data given here reflect the Malayalam of K. P. Mohanan, for continuity with the worked cited (Mohanan 1981, 1982, 1983). Tara Mohanan uses the plural reduplicated pronoun where Mohanan uses the singular (see examples (4)–(7)), and her WCO judgments also differ somewhat from Mohanan's as noted by Bresnan 1994b, 1995c.

created by one A$'$ position operator. Safir's 1984 parallelism principle, which allows multiple variables to be bound from a single A$'$ position if they agree in lexicality (overtness), would allow the example, but the revised theory of Safir to appear cannot explain the effect (because it disallows combinations of d-A$'$ binding and r-A$'$ binding—that is, binding of traces by derivational movements and binding of pronominals by coindexing).[5] Mahajan's 1990 theory requires that "to be construed as a bound variable, a pronoun must be c-commanded by a binder and its variable (if there is one) at s-structure" (p. 23). The innovation of requiring the binder itself and not just its variable to c-command the bound pronoun means in the context of the scrambling theory that a binder must precede any pronoun it binds. Therefore in (7) the binding of the null pronoun in the subject by the operator following it in object position is inexplicable.

Further problems for the the order-free theories come from weak crossover effects in German and Korean. A leftness effect operating in the German examples shown in (8) is proposed by Haider 1989 and Choi 1994, 1995:

**German** (Haider 1989: p. 199):

(8) a. ??daß seine$_i$ Mutter jeden$_i$ mag
that his mother everyone.ACC likes
Lit.: 'that his$_i$ mother likes everyone$_i$'

b. daß jeden$_i$ seine$_i$ Mutter mag
that everyone.ACC his mother likes
Lit.: 'that his$_i$ mother likes everyone$_i$'

However, as they note, leftness is violated in the case of the binding shown in (9).

(9) daß seine$_i$ Mutter jeder$_i$ mag
that his mother everyone.NOM likes
'that everyone$_i$ likes his$_i$ mother'

This pattern violates both bijection and parallelism. Example (8) can be explained if we assume that the object is scrambled to an A position so that the subject pronoun is not locally bound from the A$'$ position of the QR raised

[5] Likewise, a parasitic gap analysis (cf. Hoji 1985) is ruled out, because the null pronominal can appear in the subject, from which parasitic gaps are excluded.

operator (since it is then bound by the scrambled object); but (9) should then be bad under the same assumptions: if the scrambled object is in an A position, then the possessive pronoun within it is locally A′ bound by the raised operator, which also binds the trace in subject position, violating both bijection and parallelism. If we attempt to solve this problem by saying that clause-internal scrambling is either to A or A′ positions (along the lines of Mahajan 1990), we could account for these examples, because (9) would be admitted by binding after reconstruction from the A′ position, while (8) would be admitted by binding from the A position. But this type of solution still provides no explanation for the Malayalam patterns: clause-internal scrambling to A′ positions would be needed to bind (by reconstruction) the null pronominals within scrambled objects, as in (5), but this would wrongly allow binding of the overt pronominals; and the binding in (7), which involves no scrambling at all, would remain inexplicable.

As illustrated in (10) and (11), Korean is parallel to German (Frank, Lee, and Rambow 1992, Choi 1994, 1995):

**Korean** (Choi 1994, 1995):

(10) a. *Ku$_i$-uy emeni-ka nwukwuna$_i$-lul cohaha-n-ta.
he-GEN mother-NOM everyone-ACC like-PRES-DCL
'His$_i$ mother likes everyone$_j$.' $i \neq j$

b. Nwukwuna$_i$-lul ku$_i$-uy emeni-ka cohaha-n-ta.
everyone-ACC he-GEN mother-NOM like-PRES-DCL
'His$_i$ mother likes everyone$_j$.' $i = j$

(11) a. nwukwuna$_i$-ka (ku$_i$-uy) emeni-lul cohaha-n-ta.
everyone-NOM he-GEN$_i$ mother-ACC like-PRES-DCL
'Everyone$_i$ likes his$_i$ mother.'

b. (?ku$_i$-uy) emeni-lul nwukwuna$_i$-ka cohaha-n-ta.
(he-GEN) mother-ACC everyone-NOM like-PRES-DCL
'Everyone$_i$ likes his$_i$ mother.'

None of the previous theories of WCO explains this crosslinguistic variation, regardless of whether we assume scrambling to both A and A′ positions, with or without reconstruction, with or without bijection or parallelism. Frank, Lee, and Rambow 1992 propose a special subject binding condition, but it does not account for the Malayalam and Palauan patterns. Georgopoulous' (1991b) hypothesis that pronominal variables can occur only in phrases that lie in the canonical direction of government of a language predicts no wco effects in SOV languages such as Korean and (arguably) German and Malayalam, or for VOS languages like Palauan. Hence, Georgopoulos must appeal to another factor—an independent linear order effect on pronoun-antecedent relations—to explain the constraints on operator binding observed in these languages.[6] Yet linear order alone does not explain the German and Korean patterns (e.g. (9) vs. (8a)). Nor does it explain the Malayalam pattern in (4)–(7), in which linear order is suspended for null pronouns.

Worse for a unified theory are the wco patterns in some Bantu languages. In Chicheŵa, a typically Bantu head-initial VO language, complements follow their heads; but Chicheŵa allows the subject to be ordered before or after the VP (Bresnan and Mchombo 1987, Bresnan and Kanerva 1989), with no effect whatsoever on wco. Regardless of linear order, the subject can bind into the object (12a,b), but not vice versa (13a,b).[7]

**Chicheŵa** (Bresnan 1995b):

(12) a. Mu-nthu á lí yěnse$_i$ á-ma-lemekézá ma-kóló ǎke$_j$.
1-person 1 every 1 S-PRES.HAB-respect 6-parent 6 POSS.iii.SG
'Every person$_i$ respects his$_j$ parents.' (possibly $i = j$)

b. Á-ma-lemekézá ma-kóló ǎke$_j$ mu-nthu á lí yěnse$_i$.
1 S-PRES.HAB-respect 6-parent 6 POSS.iii.SG 1-person 1 every
'Every person$_i$ respects his$_i$ parents.' (possibly $i = j$)

(13) a. Ma-kóló ǎke$_i$ á-ma-lemekézá mu-nthu á lí yěnse$_i$.
6-parent 6 POSS.iii.SG 6 S-PRES.HAB-respect 1-person 1 every
'His$_i$ parents respect everyone$_i$.' ($i \neq j$)

[6]Indeed, the noncoreference patterns with proper names are similar to those with quantifier phrases in (1)–(3). This fact, however, would follow from the theory of the present work: if linear order is implicated in pronominal binding by operators, it would also be implicated (in the unmarked case) in noncoreference between pronominals and referential nominals. See section 4.

[7]These data reflect the judgments of Sam Mchombo (personal communication, fall 1993).

| | | | | | | |
|---|---|---|---|---|---|---|
| b. | Á-ma-lemekézá | mu-nthu | á lí yěnse$_i$ | ma-kóló | ǎke$_i$. |
| | 6 S-PRES.HAB-respect | 1-person | 1 every | 6-parent | 6 POSS.iii.SG |

‘His$_i$ parents respect everyone$_i$.’ ($i \neq j$)

Thus Chichewâ shows a wco effect completely independent of linear order.[8] Double objects in Kiswahili also show that the overt order of arguments can be irrelevant to wco patterns. As we see in (14) and (15), the higher ranking object (which requires object agreement on the verb when animate) is freely ordered either before or after the secondary object (Vitale 1981). Regardless of the order of objects, binding from the primary into the secondary object is good, while binding from the secondary object into the primary object is bad.

**Kiswahili** (Marantz 1993: 117):

| | | | | | |
|---|---|---|---|---|---|
| (14) a. | Ni-li-m-som-e-a | [kila | mw-andishi]$_i$ | kitabu | chake$_i$. |
| | i.SG.S-PAST-1.O-read-APPL-FV | each | 1-writer | book | his |

‘I read for each author his book.’

| | | | | | |
|---|---|---|---|---|---|
| b. | Ni-li-m-som-e-a | kitabu | chake$_i$ | [kila | mw-andishi]$_i$. |
| | i.SG.S-PAST-1.O-read-APPL-FV | book | his | each | 1-writer |

‘I read each author his book.’

[8]If we replace the quantified phrases in (13a,b) by a proper name such as *Mavûto*, we find that only (13a) allows reference by the pronoun to the name. Unlike the corresponding English example *His$_i$ parents respect Mavuto$_i$* (which many English speakers also reject, incidentally), coreference between the object NP and the possessive pronoun is not possible here. It is likely that the object NP position in Chichewâ is interpreted as focussed or rhematic, in contrast to the topical construction using the object marker and topic NP (cf. Bresnan and Kanerva 1989, Kanerva 1990). Nevertheless, we can see that the constraints on quantifier binding in Chichewâ cannot be reduced to constraints on coreference with names, from the following contrast (Bresnan 1995b):

| | | | |
|---|---|---|---|
| (i) | ??Ndí-ma-mu-lemekêza | mu-nthu | á lí yěnse. |
| | i SG.S-PRES.HAB-1 O-respect | 1-person | 1 every |

Lit.: ‘I respect him$_i$, every person$_i$.’

| | | |
|---|---|---|
| (ii) | Ndí-ma-mu-lemekêza | Mavûto. |
| | i SG.S-PRES.HAB-1 O-respect | 1-[NAME] |

Lit.: ‘I respect him, Mavuto.’

(15) a. *Ni-li-m-som-e-a mw-andishi wake$_i$ [kila kitabu]$_i$.

| | | | | |
|---|---|---|---|---|
| *Ni-li-m-som-e-a | mw-andishi | wake$_i$ | [kila | kitabu]$_i$. |
| I.SG.S-PAST-read-1.O-read-APPL-VS | 1-writer | its | each | book |

'I read for its author each book.'

b.

| | | | | |
|---|---|---|---|---|
| *Ni-li-m-som-e-a | [kila | kitabu]$_i$ | mw-andishi | wake$_i$. |
| I.SG.S-PAST-read-1.O-read-APPL-VS | each | book | 1-writer | its |

'I read its author each book.'

This crosslinguistic variation in WCO patterns can be explained if, instead of attempting to reduce all WCO patterns to asymmetric c-command relations, we postulate potentially conflicting domain constraints universally available to languages in different combinations or strengths (Mohanan 1981, 1982; Bresnan 1994b, 1995c, 1995b; Choi 1994, 1995). A leftness constraint on operator binding of pronominals is dominant in Palauan and Malayalam (and some varieties of Hindi, as we shall see), less dominant in German and Korean, and recessive in the Bantu languages Kiswahili and Chicheŵa.

Before trying to make this idea precise, let us consider a fundamental question it raises. The question is: *Why* should there be multiple domain constraints on operator binding? We would like a more principled account than one of freely inventing constraints and simply engineering their combinatorics to get the right results across languages. If constraints themselves are instantiations of principles of universal grammar, what are the principles that explain the existence of conflicting constraints on operator binding? In other words, where do syntactic constraints come from?

The conceptual appeal of the order-free theories of operator binding is that they unify the apparent multiplicity of binding conditions under a single structural relation based on c-command: the basic intuition is that higher elements in the tree can bind lower elements. Varying binding effects are then to be derived from hypothesized parametric differences in the properties of tree configurations, which (in the most satisfying of cases) are independently motivated by other structural aspects of the languages.

Moreover, in the Minimalist Program as sketched out by Chomsky 1995, there seem to be theoretical reasons for taking an irreducible leftness condition on operator binding of pronouns to be a conceptual impossibility. In that framework the linear order of overt words and morphemes appears to be a property of the spell-out to the sensorimotor interface ('P(honetic) F(orm)'). Linear order is an unavoidable requirement of language demanded by our human sensorimotor systems, but one having no relevance for the structure that interfaces to meaning and cognition, 'L(ogical) F(orm)', from which PF is encapsulated. Within that framework, according to Chomsky, a conceptually perfect system of language would be one in which the actual forms of expressions of language are dispensible, allowing us to communicate telepathically. Within such a framework it is unexpected, mysterious, and simply implausible that there should be an irreducible linear order effect on operator binding. The reason is that the framework provides no theoretical role for the actual forms of expression of language—the overt morphological words and syntactic phrases, as opposed to the abstract information they express. If, therefore, there is in fact an irreducible linear order constraint on operator binding, we must look elsewhere for an explanation.

# 2 The Theory of Structures

LFG is one of a class of frameworks in which the syntax of language is modelled as linked parallel structures, each of a different formal character.[9] The grammar consists of a set of local, co-descriptive constraints on partial structures. There are no derivational or transformational operations involved: grammatical structures are defined by constraint satisfaction.

Each of the parallel structures of LFG models a different dimension of the structure of language. A(rgument)-structure models the grammatically expressible participants of eventualities; f(unctional)-structure models the grammatical relations among syntactic functions, and c(ategorial)-structure models the outer or 'overt' structure of forms of expression. The structures are associated by principles of functional correspondence (also called 'linking' or 'mapping' principles). The prosodic structures of phrasal phonology constitute a fourth dimension—they are linked to c-structure by similar correspondence principles (see Inkelas and Zec 1990 and the references therein).

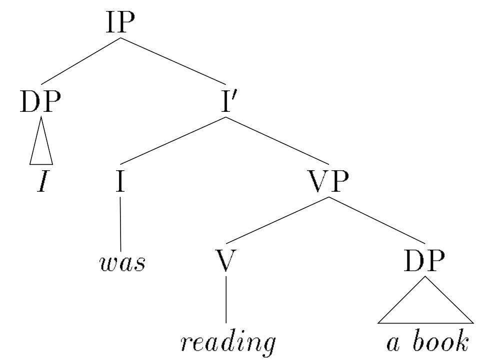
Let us take the English sentence in (16) as an example:

(16) I was reading a book.

The c-structure of this sentence is given in (17):

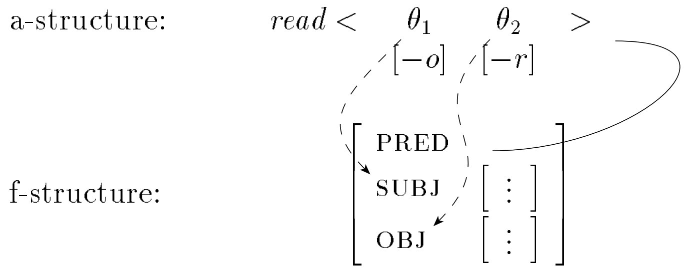
[9] See Bresnan 1995b for a recent synthesis. Recent related work includes Sadock 1991, Jackendoff 1994, and Andrews and Manning 1993, which links these ideas to HPSG (Pollard and Sag 1994).

(17) C-structure:




By principles of the lexical mapping theory (e.g. Bresnan and Zaenen 1990), the lexical a-structure of the verb stem of *reading* projects a skeletal nucleus—an incomplete f-structure representing the central relation (PRED) and syntactic functions of its participants. (The [-o] and [-r] features in (18) provide an underspecified syntactic classification of arguments; see Bresnan and Zaenen 1990 and the references cited there.)

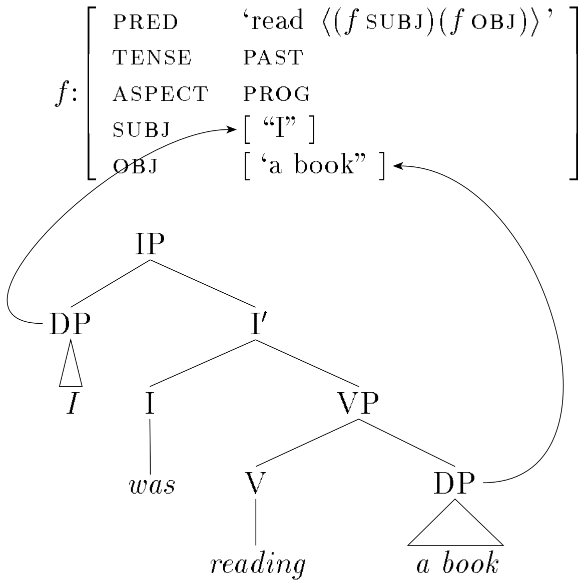
(18) Correspondences between a- and f-structures of *reading*:




General principles of uniqueness, completeness, and coherence ensure that the verb's skeletal nucleus will match up and unify with the f-structure induced by its surrounding syntactic context, as we will see directly.

Every c-structure node has a function in the f-structure. Because English is a highly configurational language, it largely relies on endocentric principles of function specification, of the type provided by X′ theory. For example, we can infer from such principles that in the c-structure above in (17), the DP in the Specifier of IP position has the subject function SUBJ and the DP in the complement of VP position has a complement function (which is lexically determined to be an object OBJ by the lexical mapping theory). Further, we assume that c-structure heads are also f-structure heads and that the c-structure sisters of functional categories such as $I^0$ or $C^0$ are f-structure co-heads (Kroeger 1993, King 1995).[10] From these principles—spelled out in Bresnan 1995b—we can infer that the extended projection of the verb (cf. Grimshaw 1991)—that is, the V, VP, $I^0$, I′ and IP—corresponds to one unified f-structure. This analysis can also capture the fact that the $I^0$ and V combine information in f-structure to provide TENSE and ASPECT features as well as the predicator relation PRED for the entire sentence. (See Niño 1994, Nordlinger 1995.) Thus we arrive at the correspondences shown in (19):

(19) Correspondences between c-structure and f-structure:




Mismatches between structures occur because the principles of uniqueness,

[10]C-structure heads are defined as in X′ theory. F-structure heads are modelled by identification (and hence unification) of f-structures: when one node is the f-structure head of another, their f-structures are unified into one.

completeness, and coherence require the full representation of grammatical relations in f-structure, but principles of lexical integrity and economy of expression suppress unnecessary syntactic constituents in c-structure. Because c-structure in this framework is *not* used to represent a-structure relations or f-structure relations (cf. Bresnan and Kanerva 1989, Bresnan 1994a,b), the X′ theory takes a different form than is assumed in transformational frameworks. One difference is that all c-structure nodes are optional and are not used unless required for expressivity or completeness. This point is referred to as 'economy of expression' in (20) (Bresnan 1995b).[11]

(20) **Economy of expression**: all c-structure nodes are optional, and are not used unless required for expressivity or completeness.

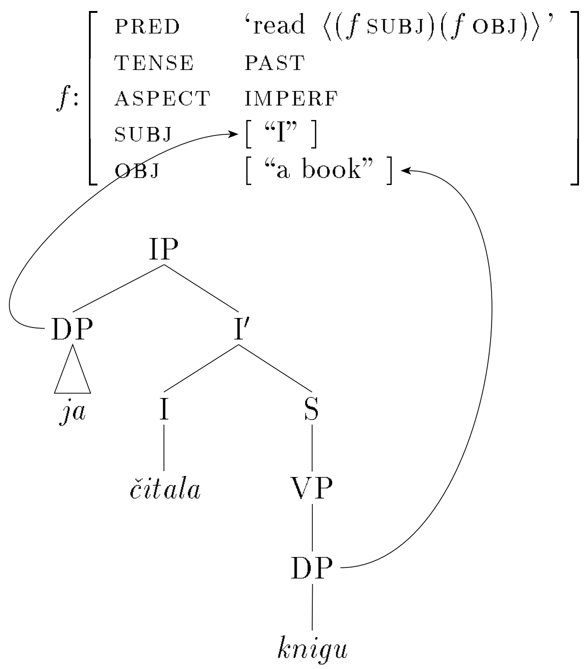
Another difference is that in LFG X′ theory conforms to the principle of lexical integrity, in the sense of *structural integrity of morphological words* (see Bresnan and Mchombo 1995 and the references therein). Thus the leaves of the c-structure tree must be fully inflected words, and all 'functional' categories in the sense of extended X′ theory (e.g. $I^0$, $C^0$, $D^0$) must correspond to specialized subclasses of words, not to 'dangling affixes' or 'disembodied features' (cf. Kroeger 1993). The complex functional information that inflected words carry is represented in f-structure, not c-structure, so each 'leaf' is corresponds to one and only one node of the c-structure tree (Niño 1994, Nordlinger 1995).

(21) **Lexical integrity**: morphologically complete words are leaves of the c-structure tree and each leaf corresponds to one and only one c-structure node.

Though words have integrity of structural formation in the architecture of LFG, they may determine the same kinds of f-structures as syntactic phrases (Andrews 1990, Bresnan and Mchombo 1987, T. Mohanan 1995, Simpson 1991, Matsumoto 1992, Sells 1995, Bresnan 1995b). One illustration of this crucial point is provided by verb movement in Russian:

[11] This principle is similar to Zaenen's 1989 WYSIWYG ('what you see is what you get') LFG concept, but allows a very restricted use of empty categories when a functional gap occurs. See below. Note also that this principle compares c-structures of a given sentence for which the lexical choices have antecedently been made. The satisfaction of this economy principle is clearly decidable, and follows from the decidability of grammaticality in LFG (Kaplan and Bresnan 1982).

(22) 'I was reading a book'




The inflectional suffix of the finite verb provides the tense information and the verb stem provides the semantic PRED feature. By lexical integrity the inflected verb belongs to a single category of c-structure. King 1995 provides evidence that this category is I, V being the category of infinitival verbs, as shown in (23):[12]

(23) $\text{verb}_{fin} \, \epsilon \, \text{I}$, $\text{verb}_{infin} \, \epsilon \, \text{V}$

The finite verb in (22) is therefore base generated in I, not V. By the same principles of structure-function correspondence that we see in the English example (19) all nodes of the extended projection of I are mapped into the same f-structure, and S, as the sister of I (and therefore its f-structure co-head), is also mapped into this f-structure. ('S' is the category, distinct from IP, that admits internal subjects, corresponding to 'small clause' (SC) in Chung and McCloskey 1989 (Kroeger 1993).) It follows that the DP in VP is interpreted as the OBJ of the verb in I, satisfying completeness and coherence in f-structure.

[12]King 1995 has Σ and VP where we have I and S, but the differences are inessential here.

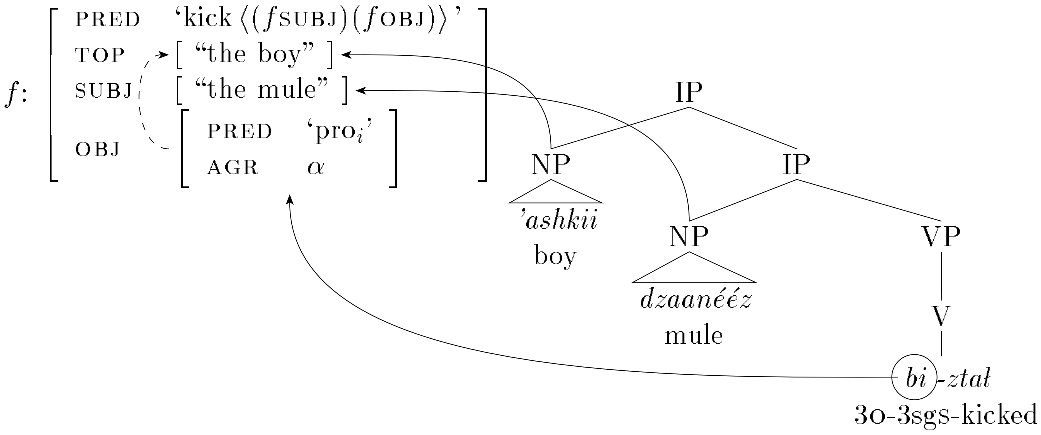
These principles also explain why no V appears in VP when a finite main verb occupies I, even though all c-structure nodes are optionally present in general. If a nonfinite verb filled the V position in the VP of (22), the uniqueness principle would be violated (because the semantic PRED features of V and I would have to unify). Hence, V can cooccur only with those finite verbs that lack the descriptive content of main verbs, having no PRED attribute—namely, certain auxiliaries, as in the English example (19) and comparable Russian examples. Finally, generation of an empty category V under VP would avoid a uniqueness violation, but it would add no information to the sentence not already available elsewhere, and it is therefore excluded by economy of expression. In this way the apparent movement of a verb stem from a nonfinite to a finite position follows from general principles including the structural integrity of morphological words. The finite verb morphologically determines the same kind of f-structure attributes as the syntactic combination of a finite auxiliary and infinitive elsewhere.

A second way that words may specify the same f-structures as phrases is illustrated by pronoun incorporation. In the grammars of some languages bound pronominal inflections have been shown to carry the same functional specifications as syntactic pronouns (Bresnan and Mchombo 1987, Demuth and Johnson 1989, Andrews 1990). If a pronominal argument is specified by a verbal inflection, the principle of functional uniqueness precludes a syntactic expression of that argument (Bresnan and Mchombo 1986, 1987).[13] Overt nominals in such languages may be optional topics or adjuncts connected to the sentence by pronominal anaphora. This is illustrated by the Navajo example shown in (24).[14]

[13]Headless modifiers of the same argument may, however, be expressed syntactically in the argument position (Simpson 1991, Andrews 1990).

[14]This example, from Bresnan 1995b, is based on the work of Uyechi 1991 and Speas 1990.

(24) 'The boy, the mule kicked him.' –Navajo (Uyechi 1991):

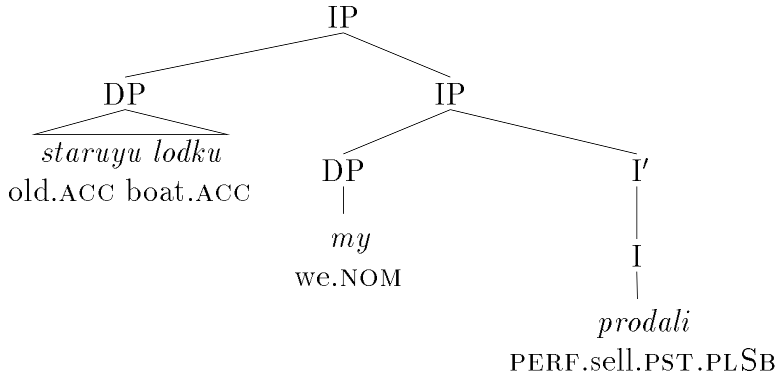



By lexical integrity, the verb stem and its pronominal inflections belong to a single c-structure category.[15] Because the pronominal inflection of the verb specifies the attributes of an OBJ pronoun in f-structure, an empty category NP (or DP) in complement position in VP would be redundant and is therefore excluded by economy of expression.

A third way in which words may determine the same f-structures as syntactic phrases is through morphological principles of function specification—case principles, in scrambling languages. This alternative is illustrated by the Russian example in (25), based on King 1994, 1995.

[15]It is shown here as V, but it could be clause-final I, as argued by Speas 1990.

(25) Russian topicalization (King 1993, 1995):




'The old boat, we sold.'

As in English, the lexical a-structure of the verb *prodali* 'sold' projects a skeletal nucleus specifying the central relation and the syntactic functions of its participants; and this incomplete f-structure must be matched up and unified with the syntactic context. From endocentric principles we might infer that the DP in the Specifier of IP position is the subject, but from the configurational position of the DP adjoined to IP we can tell nothing except that it is topicalized in Russian:

(26) left adjunct of IP = TOP

Russian solves this problem by using case principles of function specification in addition to configurational principles, as illustrated in (27):[16]

(27) NOM ⇒ SUBJ
ACC ⇒ OBJ

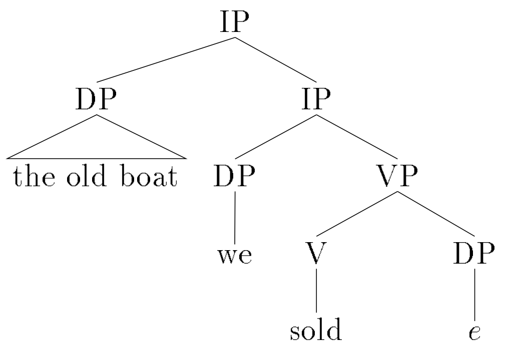
Even though the object is displaced from the canonical (endocentric) object position, it is nevertheless successfully associated with the object function by the case principles of (27). However, this nonconfigurational means of function specification is possible only within the region of c-structure which is mapped into the f-structure of the verb or other predicator. Otherwise the principles of

[16]The informal notations in (27) can be formally modelled as case conditionals (Andrews and Manning 1993, Bresnan 1995b: ch. 3), which specify a syntactic function in f-structure when the case condition is met by a case-bearing element in c-structure.

completeness and coherence could not be satisfied. Hence, this kind of topicalization is bounded; it must be local to a single extended projection.

The use of morphological principles of function specification independently of configurational principles is typologically characteristic of scrambling languages. This option is not available to English, for example, because of its meager morpholexical resources for specifying syntactic functions: pronominal inflections are absent, a zero pronominal is available only for the subjects of nonfinite verbs (the so-called 'PRO'); and except for personal pronouns, which bear the vestiges of Germanic case inflections, the language is morphologically caseless. Thus, given the typology of the language within the endocentric principles of structure-function association, it seems natural for English to utilize a structural means of function identification: the presence of a c-structure gap, to which is anchored a connecting chain of functions to the TOP in f-structure (Bresnan 1995b).

(28)




All categorial structures must have a function associated with them by the theory. The English topic and subject functions *are* configurationally associated in example (28), but assuming that English makes use of configurational principles only, the object function cannot not be associated without the DP gap in object position.

Russian has no need for the empty category in its clause-internal topicalizations, because it employs case-based principles of function specification in addition to the purely configurational principles. English, in contrast, cannot do without the configurational principles. Empty categories are pressed into service in English as a 'last resort', to secure completeness and coherence when there is no other means of function specification available.

Note that the crucial difference between English and Russian on this theory is not in the presence or absence of case *markers*, but in the typological function of case in the languages. The claim is that English case does not serve to specify syntactic functions independently of syntactic configuration, while Russian case does.[17] The failure of English pronouns to scramble is consistent with the hypothesis that their syntactic functions are determined only configurationally. The hypothesized typological difference between English and Russian is undoubtedly related to the poverty of morphological case marking in English (cf. Bresnan 1994a, Maling 1983), but of course we cannot in general expect to find a perfect correspondence between the overt case markers of a language and its functional case attributes, because of case syncretism and the paradigmatic nature of case systems (Wierzbicka 1981, T. Mohanan 1993, Blake 1994).

# 3 The Theory of Prominence

This framework of assumptions provides a conceptually simple solution to the problem of explaining WCO variation. The conceptually unifying constraint is (29):

(29) **Prominence principle**: a binder excludes from its domain any elements more prominent than it.

(30) The **domain** of a binder is the minimal clause or predication structure containing it (formally modelled as the minimal f-structure).

In the architecture of this theory, binder and bindee are both represented in parallel, nonhomogenous structures, each of which models one of their partial properties or dimensions. For example, one and the same element may be of low syntactic rank, high thematic prominence, and unexpressed, hence lacking any linear order relations.

Recall that each of the parallel structures in LFG has a formal character distinct from the others, with its own prominence relations. Linear order is native to c-structures (which model the surface ordering of expressions). Syntactic rank is native to f-structures, which model the grammatical relations among all syntactic functions, whether expressed or unexpressed. And thematic prominence is native to a-structures, which model the grammatically expressible participants of eventualities. These distinct prominence relations are defined intuitively in (31)–(33) (see Bresnan 1995b for fuller discussion):

[17] Thus, while the nominative pronouns of English are constrained to appear as subjects of some finite clause, these subject functions must be independently specified by configurational means, because English lacks nonconfigurational case schemata for function specification like (27).

(31) **Thematic prominence**: a relation of prominence among arguments associated with the same argument structure; inherited from the underlying semantic or role structure (e.g. Dowty 1991, Jackendoff 1990, Bresnan and Zaenen 1990, Alsina 1993b).

**Syntactic rank**: a relation of prominence among (expressed or unexpressed) syntactic arguments, based on the **functional hierarchy** SUBJ $>$ OBJ $>$ OBJ$_\theta$ $>$ OBL$_\theta$ $>$ COMPL $> \ldots$. $\alpha$ outranks $\beta$ if $\alpha$ and $\beta$ belong to the same f-structure and $\alpha$ is more prominent than $\beta$ on the functional hierarchy or $\alpha$ outranks some $\gamma$ that contains $\beta$; (roughly) reducible to c-command in endocentric language types (Bresnan 1994b, 1995b).

**Linear order**: a relation of prominence among the lexical expressions of arguments in their overt categorial structure. The **lexical expression** of an argument consists of any c-structure word or bound form that lexically carries the semantic features of the argument, together with all nonterminal phrase structure nodes that also correspond to the argument. The linear order of $\alpha$ and $\beta$ is determined by the right edges of their lexical expressions; reduces to simple linear order in the string whenever the correspondence between arguments and the nodes that express them is one-to-one (Bresnan 1995b).

It follows that the topicalized object is linearly ordered before the subject in our Russian example (25), but not in our English example (28). The reason is that the grammatical function of the topicalized English object is specified syntactically by its correspondence to the canonical object position in the VP to the right of the subject, while the syntactic function of the topicalized Russian object, in contrast, is specified locally by its case morphology.

Finally, because the linked parallel structures of this framework can mismatch in the ways illustrated, the prominence principle of (29) translates into distinct relations which do not necessarily converge. The result is the set of potentially conflicting constraints shown in (32):

(32) **Resulting domain constraints on pronominal binding**:

(i) The domain of $\alpha$ excludes any $\beta$ that outranks $\alpha$ (in f-structure).

(ii) The domain of $\alpha$ excludes any $\beta$ that precedes $\alpha$ (in c-structure).

(iii) The domain of $\alpha$ excludes any $\beta$ that is thematically more prominent than $\alpha$ (in a-structure).

# 4 Consequences

The theory just outlined has consequences for the typology of wco and its interactions with scrambling and null pronominals.

## 4.1 A Weak Crossover Typology

Setting constraint (32iii) aside for the moment, these constraints give us the following typology, where (i) refers to the syntactic rank constraint in (32i) and (ii) refers to the linear order constraint in (32ii).[18]

(33) **A Weak Crossover Typology**:

| *binding domain constraints* | | | |
|---|---|---|---|
| (i) & (ii) | (i) $\vee$ (ii) | (ii) | (i) |
| English<br>Palauan | German<br>Korean | Malayalam<br>Hindi | Chicheŵa<br>Kiswahili |

[18]Although Frank, Lee, and Rambow 1992 assume Hindi to be like German and Korean, Hindi examples parallel to the German cases are not provided by Mahajan 1990; examples of with a subject operator binding into a preceding object are in fact bad for several speakers I have consulted (Anjum Saleemi p.c., May 1995, Tara Mohanan p.c., May 1995). There is, however, an independent explanation for this, in the subject-free binding property of the Hindi pronoun, in complementarity to reflexives (T. Mohanan 1994). If Mahajan's Hindi judgments agree, then the Hindi evidence he gives is compatible with both the German/Korean column and the Malayalam column. I have tentatively placed it in the Malayalam column because of other leftness evidence in Hindi noted by Mahajan and the general areal properties shared by these languages (Masica 1976).

We see that Chicheŵa and Kiswahili have only the syntactic rank condition on the operator binding domain, while Malayalam and Hindi have only the linear order condition. (Recall that the null pronominals of Malayalam are exempt from the linear order condition.) Both syntactic rank and linear order constrain the domain in Palauan and English (as argued in Bresnan 1994b).[19] German and Korean are analyzed as having the union of the domains allowed by the linear order constraint and the syntactic rank constraint.[20]

The above typology predicts that in German and Korean, backward binding from one object into another object which it outranks ought to be good. But according to Frank, Lee, and Rambow 1992 this is false; backward binding is good only from the subject. Choi 1994, 1995 disputes this generalization, arguing that the backwards binding facts vary with context. (She proposes that that the greater acceptability of backwards binding from the subject follows from its topical status.) Without attempting to resolve this issue, let us observe that the judgments reported by Frank, Lee, and Rambow 1992 correlate with the cumulative prominence of the arguments on all three scales, if we assume that accusative object outranks dative object in German (Zaenen, Maling, and Thráinsson 1985), and that recipient-goal/experiencer is thematically more prominent than theme/patient, as is widely assumed on independent grounds (see Engdahl 1990):

(34) a. *

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| daß | der | Jörg | seinem$_i$ | Vater | jeden$_i$ | gezeigt | hat |
| that | art-NOM | J. | his$_i$-DAT | father | everyone$_i$-ACC | shown | has |

'that J. has shown his$_i$ father everyone$_i$'
binder to bindee: GF-rank +, precedence −, theta-rank −

b.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| daß | der | Jörg | jeden$_i$ | seinem$_i$ | Vater | gezeigt | hat |
| that | art-NOM | J. | everyone$_i$-ACC | his$_i$-DAT | father | shown | has |

'that J. has shown his$_i$ father everyone$_i$'
GF-rank +, precedence +, theta-rank −

[19] The analysis of the classes of potential counterexamples to a linear order condition in English is too complex to be treated here; see Reinhart 1983a,b, Carden 1982, Albert 1995, Bresnan 1994b, 1995c, and Williams 1994 for discussion. Irrespective of the issue of linear order, it should be noted that the present theory (incorporating the concept of operator complex of Bresnan 1994b, 1995c) also captures the 'secondary strong crossover' and 'secondary weak crossover' phenomena in English observed by Postal 1993 and Safir to appear.

[20] This analysis was first proposed to me by Hye-Won Choi in personal communication, September 1994.

c.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| daß | der | Jörg | jedem$_i$ | seinen$_i$ | Vater | gezeigt | hat |
| that | art-NOM | J. | everyone$_i$-DAT | his$_i$-ACC | father | shown | has |

'that J. has shown everyone$_i$ his$_i$ father'
GF-rank −, precedence +, theta-rank +

d.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *daß | der | Jörg | seinen$_i$ | Vater | jedem$_i$ | gezeigt | hat |
| that | art-NOM | J. | his$_i$-ACC | father | everyone$_i$-DAT | shown | has |

'that J. has shown everyone$_i$ his$_i$ father'
GF-rank −, precedence −, theta-rank +

The same pattern is reported by Frank, Lee, and Rambow for strong crossover. The strong crossover judgments they report are entailed by the present theory if we assume (as in Bresnan 1994b, 1995b) that a pronoun cannot be referentially dependent on a nominal in the *anti-binding domain* of the pronoun (that is, in the domain of the pronoun, as defined by replacing 'binder' in (30) by the pronoun).

Independent support for the assumption that the accusative object outranks the dative object comes from bound anaphora (Webelhuth 1992: p. 206; Frank, Lee, and Rambow 1992: 147–8). The dative cannot bind the accusative in (35a), but the accusative can bind the dative in (35b):[21]

(35) a.

| | | | | | |
|---|---|---|---|---|---|
| *Er | hat | den | Gästen | einander | vorgestellt. |
| he.NOM | has | the | guests.DAT | each other.ACC | introduced |

'He has introduced the guests to each other.'

b.

| | | | | | |
|---|---|---|---|---|---|
| Er | hat | die | Gäste | einander | vorgestellt. |
| he.NOM | has | the | guests.ACC | each other.DAT | introduced |

'He has introduced the guests to each other.'

The influence of thematic prominence on operator binding has been noted in English as well (e.g. by Mahajan (1990: p. 23), Engdahl 1990, and Williams 1994). In each of (36a–c) the bindings violate both syntactic rank and linear order; yet where the binder is more thematically prominent than the bound pronominal, as with the experiencer object of the verb *irritates* in (36a), binding is still possible for many speakers:

(36) a. Her$_i$ brother irritates every girl$_i$.

[21] For recent theories of bound anaphora within LFG, see Dalrymple 1993, Bresnan 1995b, and Culy 1995.

b.?? Her$_i$ brother visits every girl$_i$.

c.?? Her$_i$ brother knows every girl$_i$.

## 4.2 Scrambling Types

As a second consequence, this theory explains why local and nonlocal scrambling can give rise to different wco effects, as reported in some varieties of Hindi (Gurtu 1985, Mahajan 1990, Dayal 1994, Dwivedi 1994). A locally scrambled binder leaves no empty category; its function is determined by the configurational case principles of function specification; hence, an empty c-structure node is not required, and by the principle of economy of expression is not present. In such cases, the relative linear order of constituents reduces to simple linear order in the string, and binding can occur as long as the pronominal is not ordered to the left of the binder. This situation is illustrated by the Hindi example in (37) from Mahajan 1990:

(37) [**kis-ko**$_i$/**sab-ko**$_i$ **uskii**$_i$ bahin pyaar kartii thii?]
*who*-(DO)/ *everyone*-(DO) *his* *sister.*(SUB) *love* *do.*IMP.F *be.*PST.F
'Who$_i$/Everyone$_i$ was loved by his$_i$ sister?/.'
Lit.: *'Who$_i$/everyone$_i$ (did) his$_i$ sister love?/.' (Mahajan 1990: p. 25)

In contrast, scrambling a constituent out of its clause eliminates this means of function specification. To secure completeness and coherence, the binder must therefore have a corresponding empty category within the lower clause, which belongs to the lexical expression of the binder exactly as in English topicalization. In this case by (31) the lexical expression of the pronominal may precede the lexical expression of the binder even though the binder precedes the pronominal in the string, as illustrated in (38).

(38) * $[\mathbf{Op}_i]_{\text{OBJ}} \ldots [\ldots\ \mathbf{pron}_i \ldots]_{\text{SUBJ}} \ldots [e_i] \ldots$

A wco violation arises in Hindi in just this situation (Mahajan 1990: pp. 39, 41):

(39) *[**kis-ko**$_i$/**sab-ko**$_i$ **uskii**$_i$ bahin-ne socaa [ki
*who.*(DO)/*everyone.*(DO) *his* *sister*-(SUB) *thought* *that*
raam-ne $[e]_i$ dekhaa thaa]?]
*Ram*-(ESUB) *seen* *be.*PST
'Who$_i$ was it that his$_i$ sister thought that Ram had seen him$_i$?'
'Everyone was such that his sister thought that Ram had seen him.'

If, however, the pronominal belongs to the same clause as the gap corresponding to the extracted constituent, no wco occurs, as expected, because the possibility of scrambling varies the possible orders of the gap with respesct to the pronominal within the clause, keeping the pronominal within the binding domain.[22] This explains another generalization about Hindi wco, illustrated in (40) (Mahajan 1990: p. 42):

(40) [**kis-ko**$_i$/**sab-ko**$_i$ raam-ne socaa [ki [$e$]$_i$
*who.*(EDO)/ *everyone.*(EDO) *Ram.*(SUB) *thought that*
**uskii**$_i$ bahin-ne dekhaa thaa]?]
*his sister.*(SUB) *seen be.*PST
'Who$_i$ did Ram think was seen by his$_i$ sister?'
Everyone$_i$, Ram thought was seen by his$_i$ sister.

These data are well known and are derived by Mahajan from an order-free wco theory based on c-command alone, together with the analysis of clause-internal scrambling as movement to either A′ or A positions, and clause-external scrambling as movement to A′ positions alone. In general, as observed by Choi 1995, the linear order constraint produces the wco effects of A-movement, while the syntactic rank constraint produces the wco effects of A′ movement under reconstruction. However, the order-free theory cannot cope with the German/Korean and Malayalam patterns, as we have already seen (see also Bresnan 1994b). Further, the order-free theory cannot gracefully explain another variety of Hindi which shows the same range of word orders but differs in weak crossover effects. In the Hindi spoken by Tara Mohanan, all of (37)–(40) are ungrammatical (personal communication, May 1995). We can explain this variation by saying that in her variety of Hindi syntactic rank is dominant and linear order recessive. On Mahajan's theory, we would have to assume that all of the clause-internal Specifier positions in her grammar are mysteriously inactivated, leaving only nonargument positions. In the absence of independent evidence for this major structural difference,[23] this hypothesis is unattractive.

[22]The function of a scrambled empty category can be determined by applying the case principles of function specification to it; these principles associate a syntactic function with a constituent conditional upon the CASE attributes of the constituent in f-structure. Though an empty category of course lacks any functional attributes in itself, it corresponds to the same f-structure unit as the binder, through which its CASE attribute appears.

[23]Such evidence might consist of verb inversion phenomena (cf. Baković 1995) or adverb positioning evidence (cf. Ackema and Neeleman 1995), for example.

Note that on the present theory, all things being equal, the difference between local and nonlocal scrambling that we see in Hindi should be general. Saito 1992 argues for an equivalent difference for scrambling in Japanese, but Frank, Lee, and Rambow (1992: 146–7) argue that scrambling from an infinitival complement in German and Korean behaves exactly like local scrambling. Their German examples have a fairly straightforward explanation within our theory, given the wealth of independent evidence that these verb-infinitive combinations are complex predicates (Grewendorf and Sabel 1994).[24]

## 4.3 Two types of null pronominals

Finally, this theory explains a typological difference between null pronominals with respect to linear order effects. First consider Malayalam null pronominals. Malayalam has no verbal agreement morphology, but allows its direct argument functions (subjects and objects) to be unexpressed, giving rise to a definite pronominal interpretation. Formally, the null pronominals of Malayalam are simply analyzed as default f-structure arguments provided to the nucleus of the verb (Hale 1983, Simpson 1991).[25] Other languages have null pronominals of this type: Jiwarli (Austin and Bresnan 1995), Korean, and Japanese are clear examples. In Korean and Japanese it has also been shown that linear order constrains pronominal binding and that null pronominals mitigate weak crossover violations that hold for overt pronouns (Choi 1994, 1995; Kameyama 1985).[26] Given the functional provision of pronominal arguments, empty c-structure categories in argument positions are not required, and they are therefore excluded by economy of expression. Thus the fact that null pronominals of this type are impervious to linear order conditions is a consequence of our theory.

However, in other languages, it has been argued that null pronominals pattern with overt pronouns. In Palauan they are subject to a linear order condition on pronominal binding by quantifiers (Georgopoulos 1991a,b), as illustrated in example (1). In Navajo as well, it has been argued that null pronom-

[24]On the analysis of complex predicates in LFG, see Alsina 1993a, Butt 1993, 1995, Manning 1993, Andrews and Manning 1993, Dalrymple, Hinrichs, Lamping, and Saraswat 1993, Matsumoto 1992, and T. Mohanan 1993. Further investigation of the claim for Korean is required.

[25]This analysis is similar to a proposal entertained in Grimshaw 1995.

[26]Cole 1974 gives examples where precedence of overt pronouns prevents binding by indefinite NPs such as quantifiers and question words, while zero pronouns can be bound (e.g. Mandarin, South Min).

inals show a precedence effect for noncoreference (Platero 1974, 1978). This effect is illustrated in (41) and (42) from Platero (1978: 14–15):

(41) a. Hastiin deezghal dóó nídií'na'.
man awaken and get:up
'The man awoke and he got up.'

b. *Deezghal dóó hastiin nídií'na'.
awaken and man get:up
Lit.: 'He$_i$ awoke and the man$_j$ got up.' $i \neq j$

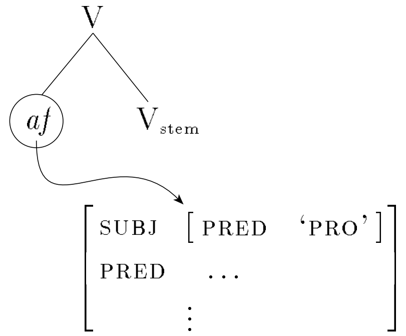
(42) a. Hastiin deezghalgo nídii'na'.
man awaken:COMP get:up
'When the man$_i$ awoke, he$_i$ got up.'

b. Deezghalgo hastiin nídii'na'.
awaken:COMP man get:up
'When he$_i$ awoke, the man$_i$ got up.'

A pronominal cannot precede a coreferential lexical NP in Navajo unless the pronominal is subordinate to the NP.

There is an obvious difference between the null pronominals of Malayalam, Korean, and Japanese on the one hand, and those of Palauan and Navajo, on the other: the latter are expressed in c-structure as pronominal inflections, while the former are not. Hence, according to our theory, the latter null pronominals are are not actually 'null' at all, but have c-structure correspondents, as illustrated in (43):

(43)




The inflectional element itself is the lexical expression of the argument and it may therefore bear linear order relations to binders in c-structure.

Assuming that linear order constrains the binding domains, this theory explains the difference between the two types of null pronominals discussed above: those which are functionally incorporated in pronominal inflections, and those which have no morphosyntactic expression at all. Empty categories are ruled out for both types by economy of expression, but the incorporated type may still bear linear order relations to other constituents. On this theory, pronominals of the inflectional type are not null pro's at all: the pronominal inflections *constitute* the pronominals.[27] This is why the linear order constraint applies to the Palauan 'null' pronominals in (1)–(3), but not to those of Malayalam in (4)–(7).[28]

Observe that incorporated pronouns in f-structure inherit their linear order relations from the pronominal inflections that express them in c-structure, and not from any empty c-structure categories. Our theory thus explains a famous violation of the conventional binding theory in Navajo, illustrated by the following example from Platero (1978: p. 167; 1982: 304; see also Hale 1989):

| | | | | | | |
|---|---|---|---|---|---|---|
| (44) | [*pro* ]$_{\text{NP}}$ | [Adą́ą́dą́ą́ | ashkii | at'ééd | yiyiłtsánée]$_{\text{NP}}$ | yidoots'ǫs. |
| | | yesterday | boy | girl | yi:see-REL | yi:will:kiss |

'The boy$_i$ will kiss the girl he$_i$ saw yesterday.'
Lit.: *'He$_i$ will kiss the girl the boy$_i$ saw yesterday.'

Here the null subject pronominal of the matrix verb 'see' is understood as coreferential with the embedded NP 'boy' within the object relative clause,

[27]This theory is thus very close in substance to that of Jelinek 1990 and Willie 1989, who take the pronominal inflections to be the arguments in pronominal argument languages, in contrast to Baker 1991, who takes the pronominal inflections to license empty categories representing null pronominals in phrase structure. The main difference is in the underlying syntactic architecture assumed. Further, unlike both Baker (cf. Baker 1995b) and Jelinek, we need not assume that there is just one parameter that accounts for the expression of all direct arguments as pronominal inflections. The present framework allows for a mixture of pronominal incorporation and agreement with a single language.

[28]Assuming the classification of Palauan in table (33), both linear order and syntactic rank define the domain. By syntactic rank, the subject is excluded from the domain of the object binder; this accounts for (2). The object in (1) and (3), in contrast, is not excluded from the domain of the subject binder, so if other constraints are satisfied, (1) and (3) should be good. When the lexical expression of the possessive pronominal (which is a nominal inflection in these examples) precedes the lexical expression of the subject, as in (1), it is excluded by its relative prominence along the dimension of linear order (see (31)-(32)); this accounts for (1). (3) reverses the linear order relations and escapes this constraint. Note that (3) involves resumptive topicalization, and so would be allowed on other grounds as well, as discussed in Bresnan 1994a, 1995b.

despite the fact that it seems to precede and c-command the coreferential NP.

Platero goes on to show that the coreferent NP 'boy' in (44) is indeed embedded within the object relative clause: scrambling of the adverb from an embedded clause before the matrix subject is not allowed in Navajo. He concludes that the proper phrase structure representation of this example must have no empty category representing the null pronominal (Platero 1978: 169). Within the configurational syntactic architecture assumed by Platero 1978, this conclusion is indeed puzzling, and it has stimulated much further work to reconcile the Navajo evidence with the supposedly universal binding theory stated in terms of c-command (see, e.g., Speas 1990). Within the alternative syntactic architecture presented here, Platero's conclusion about Navajo is extremely telling and insightful: Navajo is a highly configurational SOV language, as Speas 1990 has convincingly argued, but it is morphologically a head-marking language with pronominal inflections that can function as full pronominal arguments in the functional structure. Linear order affects the domain of noncoreference in Navajo, just as Platero argues. What Platero's evidence shows is that the linear order of the 'null' pronominals is determined, not by the c-structure position of an empty phrasal NP argument, but by the c-structure position of the inflection—on the verb. The subject pronominal of (44) outranks the embedded NP in the object, but it does not precede the object: it follows the object, as part of the inflected verb.[29]

# 5 Conclusion

I have argued that linear order and syntactic rank are potentially conflicting domain constraints on operator binding which are universally available to languages. Both order and rank are instances of a unitary prominence relation that is interpreted on parallel structures—one structure representing overt forms of expression subject to principles of lexical integrity and economy of ex-

[29]Note that if linear order is *not* implicated in the specific type of binding under at issue, then there may be no difference in the binding properties of null and overt pronominals. For example, the pronominal subject represented by the verbal agreement inflection in the following Spanish example (from Hale 1981) outranks the nominal *Juan*, and would therefore exclude coreference quite independently of considerations of linear order:

(i) Dice que Juan está cansado.
'He/she says that Juan is tired.'

pression, the other structure representing expressed and unexpressed syntactic functions subject to principles of full representation (completeness, coherence, and uniqueness). Where the parallel structures closely match, as in some highly configurational, morphologically analytic language types, the constraints will tend to converge and potential conflicts will not be visible. But where the parallel structures mismatch, as in language types with nonconfigurational resources for function specification (e.g. case marking in scrambling languages, pronominal inflections in head-marking languages), the domain constraints will diverge.

In cases where constraints diverge, an important question arises: Can we predict which constraints will be salient, more easily detected by the language learner, or incorporated into the grammar? At present I can only offer a few tentative observations in response to this question. First, the broad typology of a language seems insufficiently predictive. Korean and Malayalam are very close in their overt typological characteristics, yet they fall into different columns of the wco typology (33).[30] While there could be an as yet undiscovered universal parametric basis for the choice of constraints, it may be a mistake to look for a parametric answer to every question of constraint selection if constraint choice in fact can be underdetermined. Second, when we examine microvariation within languages, the parametric approach becomes much less plausible. The two varieties of Hindi discussed above (that of Mahajan 1990 and that of Tara Mohanan 1994, personal communication) also fall into different columns of the wco typology, yet there is no independent evidence of structural differences to which these differences could be reduced. It is possible, of course, that the relevant structural differences remain to be discovered. Yet anyone who has worked with primary data from nonstandardized languages (or from nonstandardized linguistic phenomena) knows that variation is far more extensive than is recognized in the generative literature.[31] For example, Mohanan has reported to me (in personal communication, May 1995) his initial disbelief at the fact that another Malayalam speaker's binding judgments differed from his own, until discovering to his great surprise that within his own family, his brother's judgments differed in the same way. Variation within the same family is not uncommon. This kind of microvariation is hard to explain under the traditional generative model of universal grammar, with its deep deduc-

[30] Thanks to Donna Gerdts (personal communication, April 14 1995) for making this observation.

[31] Variation in wco judgments among German speakers is discussed by Merchant 1995.

tive structure rigidly linking structural options and constraints. What may be needed is an alternative model of universal grammar with greater plasticity, along the lines of the constraint-based parallel architecture assumed here. Perhaps some degree of variation arises spontaneously from underdetermined choices among competing constraints.

The second observation I will make is that this conception of constraint selection is clearly congenial with the optimality-theoretic (OT) conception of syntax. In fact, I believe that the main results obtained here can be formally expressed within OT, although I will leave the demonstration of that claim to another occasion.[32] The advantage of this approach is the new light it throws on the classic questions of variation and learnability, and the architectural integration it offers to syntax, morphology, and phonology. Most interestingly, the existence of microvariation of the kind discussed here appears to be a natural consequence of an OT-based model of language acquisition (Pulleyblank and Turkel 1995).

Finally, I will make a concluding remark on my title. It is a commonplace of descriptive and typological studies that morphology 'competes' with syntax, in the sense that morphologically rich languages may make less use of purely structural syntactic resources. Yet this generalization is not captured within most current formal syntactic frameworks, because they give no theoretical role to the actual forms of expression of languages, as opposed to the abstract information expressed. LFG and its family of closely related theories contrast in this respect by incorporating principles of lexical integrity and economy of expression into their design. The present study shows that that the surface type of a language—its system of overt forms of expression—is far more significant even in the 'logical' domain of operator binding than has been recognized in current generative syntactic theory.

[32]What is required to obtain the table in (33) is a violable faithfulness constraint such as "Parse Operator" or "Parse Binding Link" that can be ranked above domain constraints, together with the concept of local conjunction spelled out in Smolensky and Legendre 1995 (Paul Smolensky, personal communication, May 1995). Choi 1994, 1995 gives a formal OT account of WCO effects in German and Korean incorporating both linear order and information structure concepts.

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