Split Scrambling : Barriers as Violable Constraints*

Maria Gouskova

Abstract: The paper argues that DP splitting results from the interaction of violable constraints with opposing demands. A set of constraints requires Topic, Contrastive Focus and Presentational Focus to appear in certain positions in the clause. Another set of constraints defines DPs, PPs and VPs as barriers to movement. These barrier constraints form a fixed hierarchy, which is universal across languages. The factorial typology of the constraints predicts the variable status of the same barriers in the same language with respect to different kinds of movement. A small typological survey supports this prediction.

1. Introduction

The DP is a barrier for Topicalization in English, as the contrast between (1a) and (1b) shows. However, the grammatical Russian (1c) suggests that DPs are not barriers in every language. Chomsky (1986) proposed that maximal projections were barriers, subject to additional structural restrictions. In current syntactic theory, it is unclear how barriers are defined—the problem of what counts as a barrier in a given language or cross-linguistically is still open.[1] This paper claims that Barriers differ from language to language because maximal projections are violable barriers. The violability of DP barrier allows split scrambling[2] in Russian as in (1c).

(1)   a.*<u>Gorilla</u> we saw <u>a big</u> yesterday.
        b. <u>A big gorilla</u> we saw yesterday.
        c. <u>Gorillu</u>ᵢ my videli včera   <u>bol'shuju</u>ᵢ.
           gorilla we saw   yesterday big
         'As for gorillas, yesterday we saw a big one.'

Barriers are defined as *violable constraints* in an Optimality Theoretic grammar (Prince and Smolensky 1993). In Russian, the DP BARRIER constraint is outranked by the constraints that require Focus and Topic to appear in certain positions, and as a result DP-internal Foci and Topics are required to move out of DP. In English, the DP BARRIER constraint dominates the constraints that require Topic and Focus movement, which means that no Topic or Focus can move out of a DP. The proposal treats DP splitting as a specific instance of a more general interaction of barriers and movement: in Russian, the movement of Focus and Topic can cross all barriers, including DP, VP, and PP. Other languages do not allow such freedom because BARRIERS dominate some or all of the movement constraints. Cross-linguistic variation results from different rankings of violable constraints.

---

[1] It is widely assumed that only whole DPs move. Their scrambling is well-studied. See Saito (1989), Boskovic and Takahashi (1998), Miyagawa (1997), Choi (1999), Bailyn (1995), Webelhuth (1995) and references within those works.
[2] I follow Sekerina's (1997) terminology. See Siewierska (1988) for a description of split scrambling in Dyirbal, Latin, Polish, and Kalkatungu.

Barriers for some kinds of movement are not necessarily the same as barriers for other kinds of movement in a given language. The same XP can be a barrier for one kind of movement (as DP is for Topic movement in English), but allow other movement (Wh-movement). These kinds of patterns in Mandarin Chinese, Polish, Japanese, and English are straightforwardly captured by the violable barrier analysis proposed here.

An additional issue this paper investigates is the nature of Alignment constraints in OT syntax. They are shown to differ from phonological Alignment in that they require more than just edge correspondence between constituents. Alignment must be sensitive to the nature of aligned constituents: only the licensed constituents can satisfy alignment. Also, more arguments are put forward in favor of non-gradient alignment (Grimshaw and Samek-Lodovici 1998).

1.1. Constraints

The constraints I use in my analysis are listed below. There are three types: alignment constraints, which require elements with certain features to adjoin at clause edges, fixed position constraints, which require operators such as Contrastive Focus to appear in a special fixed position, and barrier constraints, which define DPs, PPs, and VPs as barriers. (These constraints will be discussed in more detail in part 3.)

Alignment:

ALIGN-R (PFOCUS, CLAUSE)*:* Align the right edge of an element with the right edge of some clause *iff* it is a Presentational Focus. (adopted and redefined from Grimshaw and Samek-Lodovici (1998))

ALIGN-L (TOPIC, CLAUSE)*:* Align the left edge of an element with the left edge of some clause *iff* it is a Topic.

Contrastive Focus Position:

CFOCUS SPEC: Contrastive Focus appears in the contrastive focus specifier position (adapted from Grimshaw 1997, Bakovic 1998's OPSPEC).

Barriers:
 DP BARRIER: DP is a barrier.
 PP BARRIER: PP is a barrier.
 VP BARRIER: VP is a barrier.

As we will see, reranking these constraints yields the different patterns for English and Russian.

The paper is organized as follows: Part 2 introduces the syntax and pragmatics of Russian DP splitting and shows that Topic, Presentational Focus and Contrastive Focus all have different positions in the clause. Part 3 is the core of the OT analysis of Russian DP splitting. The Typology yielded by re-ranking the constraints is discussed in part 4. This section discusses the cross-linguistic implications of positing several Barrier constraints, in particular, the prediction that within the same language, different kinds of movement can be sensitive to different kinds of barriers. Part 5 discusses the counterexamples of DP splitting in English, and part 6 addresses some derivational alternatives. Finally, part 7 is the conclusion.

2. The Syntax and Pragmatics of DP Splitting.

It is commonly recognized that Russian syntax is governed by discourse, or pragmatic considerations such as given/new information structure (Krylova and Khavronina 1984, Yokoyama 1986, Bailyn 1995, King 1995, Kondrashova 1996, Sekerina 1997, Hajičová, Partee and Sgall 1998). The same principles and considerations govern DP splitting. This section discusses Russian discourse-configurational structure and the DP splitting facts. It will be shown that DPs must split when some part of them is a *Topic*, a *Contrastive/CFocus*, or a *Presentational/PFocus*.[3] Thus, adjectives move away from their nouns, and nouns from determiners in precisely those situations when the discourse considerations require them to do so.

Sentence (2) below is an example of *the neutral SVO order*, which is used whenever the sentence does not refer to any antecedents in the context and all the information in the sentence is new (the 'out-of-the-blue' context). Any other order is infelicitous in that context. For example, gratuitous splitting is not allowed in (3), where no information is given or topical:

(2)   Xuden'kij mal'čik kupil entsiklopediju včera.
        skinny boy bought encyclopedia yesterday
        'A skinny boy bought an encyclopedia yesterday.'

(3)   Q: What happened?
        #Entsiklopediju₁ xuden'kij   mal'čik kupil   za dva rubl'a bol'šuju₁.
        encyclopedia   skinny   boy   bought for two rubles big
        'A skinny boy bought a big encyclopedia for 2 r.'

However, splitting is possible under the right discourse conditions, for example if either the adjective or the noun bears PFocus, and if the other subconstituent of the DP is a Topic:

(4)   Q: Of the *big* things, what did you see at the zoo?
        Bol'šuju₁ my videli v zooparke gorillu₁.
        big   we saw at the zoo   gorilla
        Topic   Tail   Pres Focus
        As for big (things), we saw a gorilla at the zoo.

2.1.   Topic.

Whenever some part of the DP is marked as a Topic, that is, central to the discussion and *given* (Schwarzschild 1999), it must move to the very beginning of the sentence.[4] The Topic (or Topics) precedes CFocus and wh-words (5). In (5), the Topic is adjoined to the CP headed by the Wh-word:

(5)   Belogo kto videl medved'a?
        White who saw bear
        Topic Wh-word   Tail
        As for white (ones), who saw a bear?

---

[3] Contrastive Topic has been left out of this discussion, because it is syntactically similar to non-contrastive Topic.
[4] Only matrix clauses will be discussed. Split scrambling out of embedded clauses is possible, as well (See Sekerina 1997, Nowak 2000).

```
              CP
          ╱        ╲
     white₂        CP
              ╱        ╲
          Spec          IP
          who₁      ╱      ╲
                  t₁        VP
                        ╱      ╲
                     saw        DP
                              ╱  ╲
                           t₂     bear
```

A note on syntax: I assume that projections are built up only when necessary (Grimshaw 1997). Thus, Topic may adjoin to IP or CP, whichever is the highest clause. A CP is not projected for the sole purpose of Topic adjunction.

2.2.   PFocus.

PFocus is F-marked in the sense of Schwarzschild (1999). It appears in the clause-final position at the extreme right edge of the clause. Even adjuncts may not appear there unless they are PFoci. Thus, (6) is infelicitous: this sentence can be uttered with the intonation shown only if both 'gorilla' and 'at the zoo' were new information.[5] Sentence (6) is odd because the PFocus does not appear at the edge:

(6)   Q: What did you see at the zoo?
```
                     H*              L*L-L%
        # My videli  gorillu      v zooparke.
        we saw       gorilla      in zoo
        Tail         PFocus       Tail
```
        We saw a gorilla at the zoo.

As sentence (4) showed, the part of a DP which is F-marked must appear at the right edge, adjoined to IP.

2.3.   CFocus.

DPs can be partially marked for CFocus, as well. CFocus can be either given or not, it can be associated with the exhaustive listing and existential presupposition of Kiss (1998), but it is invariably characterized by an intonational and discourse prominence. CFocus is preceded by the Topics and followed by the Tail. In (7), 'big' is contrasted with 'small,' yet 'encyclopedia' is merely given. Thus, only the CFocus-bearing adjective moves left, and the noun stays in situ.

(7)   Context: U1: I thought the boy bought a **small** encyclopedia yesterday.
        U2:   Bol'šuju₁ mal'čik kupil entsiklopediju₁ včera.
        big   boy   bought encyclopedia   yesterday
        CFocus   Tail
        The boy bought a **big** encyclopedia yesterday.

---

[5] This sentence is fine if the final PP is pronounced with the 'afterthought' intonation, i.e. without a pitch accent. In that case, the PP is not, strictly speaking, part of the sentence.

I assume that CFocus appears in a fixed position, namely, Spec, CP (King 1995). For arguments, see Appendix.
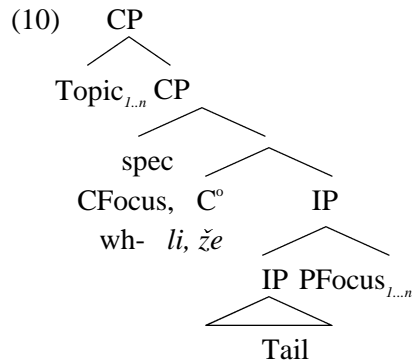
2.4.   Tail.

Discourse-neutral, or non-topical given material is the Tail. All Tail material appears in situ. In (8), 'big' is not designated as a Topic, and thus it does not move.

(8)   U1: So, you saw a big walrus at the zoo?
         <u>Gorillu</u>$_1$ my videli <u>bol'šuju</u>$_1$ v zooparke.
         gorilla   we saw   big   at zoo
         CFocus   Tail
         'We saw a big **gorilla** at the zoo.'

To summarize, the order of discourse constituents in Russian (9) and (10) must be obeyed even if it gives rise to a rather marked split DP.

(9)   *Linear order*: Topic(s)—CFocus—Tail—PFocus/i

(10)   CP
         Topic$_{1..n}$ CP
             spec
         CFocus,   C^o IP
          wh-   *li, že*
                  IP PFocus$_{1...n}$
                     Tail

The examples above were of adjective/noun DPs, but they are not the only DP constituents which can split scramble: so can Determiners, Quantifiers, and non-agreeing PPs. (all of the examples below are of CFocus, but the point applies to all discourse constituents).

(11)   <u>Každogo</u>$_1$ my posčitali <u>šimpanze</u>$_1$.   Quantifier
         every   we counted chimpanzee
         'We counted **every** chimpanzee.'
(12)   <u>Etogo</u>$_1$ obnjala Maša <u>orangutana</u>$_1$.   Determiner
         this hugged   Masha orangutan
         'Masha hugged **this** orangutan.'
(13)   <u>S dlinnymi ryžimi volosami</u>$_1$ ja ljublju <u>obez'jan</u>$_1$. PP
         with long   red hair   I like   monkeys
         'I like monkeys **with long red hair**.'

There is no subject-object asymmetry: split scrambling out of a subject is grammatical. This suggests that extraction is not subject to the Condition on Extraction Domains (no extraction out of a domain which is not properly governed). This point will be taken up in section 5 in the discussion of government in English.

(14) <u>Sinix</u>   my videli <u>makak</u>.   Object
blue   we saw macaques
'We saw **blue** macaques.'

(15) <u>Malen'kij</u> ee obn'al <u>orangutan</u>.   Subject
small   her hugged orangutan
'A small **orangutan** hugged her.'

Thus, Topic, PFocus and CFocus in Russian can host any of the subconstituents of a DP, and are not subject to government restrictions. I now turn to the analysis of these facts.

3. An OT Analysis of Russian DP Splitting

Russian and English differ in how freely they can move DP-internal Topics and Foci. An OT analysis would attribute such a difference to different rankings of the same constraints in English and Russian. On the one hand, some constraint demands that Topics and Foci appear in certain positions. On the other hand, there are constraints that ban movement. English ranks the latter higher, whereas in Russian, Topic and Focus positioning overrides anti-movement constraints. This idea underlies the analysis that follows. Part 3.1 shows that STAY, a general prohibition on movement, cannot distinguish between grammatical and ungrammatical extraction in English, and that an additional set of constraints is proposed: *violable* BARRIER constraints (cf. Chomsky's 1986 inviolable barrier framework). The interaction of BARRIER constraints with CFOCUS SPEC, Topic and PFocus Alignment is discussed in parts 3.2, 3.3, and 3.4. In part 3.5, some repairs are considered which are problematic for the alignment constraints, and alignment is re-defined. Gradience is discussed in part 3.6.

3.1.   STAY: Counting Traces

STAY is a constraint that has been used in OT syntax to prohibit movement (Grimshaw 1997, Grimshaw and Samek-Lodovici 1998, Bakovic 1998). As a general prohibition on movement, STAY bans traces. However, the difference between Russian and English is not due to the number of traces in the same structures, but rather to the kinds of barriers crossed.

Thus, the only grammatical example in table (16) is the one in which the Wh-phrase is not coindexed with a position inside a DP. The number of traces in all of the examples is the same. It seems that, unlike Russian, English does not permit movement out of a DP (though see part 5 for important counterexamples).

(16)   Number of traces vs. kind

	Barriers crossed	*STAY violations*
[$_{DP}$Books] I [$_{VP}$ like t$_1$].	VP	*
[$_{DP}$That]$_1$ I have [$_{VP}$ looked [$_{PP}$ at t$_1$]].	VP, PP	*
*[Those]$_1$ we [$_{VP}$ ate [$_{DP}$ t$_1$ potatoes]].	VP, DP	*
*[Potatoes]$_1$ we [$_{VP}$ eat [$_{DP}$ fried t$_1$]].	VP, DP	*
*[Martha's]$_1$ we [$_{VP}$ ate [$_{DP}$ t$_1$ potatoes]].	VP, DP	*
*[Potatoes]$_1$ we [$_{VP}$ ate [$_{DP}$ Martha's t$_1$]].	VP, DP	*

The anti-movement constraints must be sensitive to the kind of constituents that are extracted out of: extraction out of VP or PP, but not out of DP is acceptable. In addition to STAY I propose a set of domain-sensitive constraints, which define VP, PP and DP as barriers. The constraint most relevant to

the Russian analysis is:

(17)   DP BARRIER: DP is a barrier.

This constraint is a version of Pesetsky's (1998) Island Constraint, but it is sensitive to all DP-internal traces.

(18)   ISLAND CONSTRAINTS: *α ...[$_{island}$...β...], where β is the trace of α and unpronounced.

3.2.   Ranking CFocusSpec and DP Barrier.

CFocus is a semantic operator (Rooth 1995) and bears the feature [Foc-marked] (Selkirk 1995). The OPERATOR SPECIFIER constraint (Grimshaw 1997, and Bakovic 1998) that determines the position of CFocus is formulated in (19):

(19)   CFOCUS SPEC: CFOCUS appears in specifier position.

This constraint is violated when CFocus appears in a position other than the Spec, CP. Thus, any constituent which is [Foc-marked] must move to the specifier position, or else a violation mark is incurred. An example of how CFOCUSSPEC is violated is shown in tableau (21).

First, a note on *inputs* is necessary. I will use inputs of the sort proposed by Grimshaw and Samek-Lodovici (1998): 'an input consists of a lexical head and a mapping of its argument structure into other lexical heads' (G-SL 1998, p. 194). An input also contains information about which phrases are topics and foci, which in my analysis is encoded in the feature specifications of lexical heads such as [F-marked]/[F], [Topic], and [Foc-marked]/[Foc]. Thus, the input of 'we saw a big gorilla', where gorilla is contrastively focused, is shown in (20). In this input, only 'gorilla' is Foc-marked, which means that the rest of the sentence is interpreted as 'given'. 'Big gorilla' does not form a constituent in the input, since the input is unstructured. Neither 'big' nor 'gorilla' are arguments of each other, so their relationship is shown with an intersection symbol. All the candidates and inputs are given in English as word-for-word glosses of their Russian equivalents.

(20)   <see (x,y), x=we, y=big ∩ gorilla$_{Foc\text{-}marked}$ >

(21)   How CFOCUS SPEC is violated

<see (x,y), x=we, y=big ∩ gorilla$_{Foc}$ >	CFOCUS SPEC
a. [$_{IP}$we [$_{VP}$ saw [$_{DP}$big$_{Foc}$ gorilla]]].	*
b. ☞[$_{IP}$ gorilla$_{1Foc}$ [$_{IP}$ we [$_{VP}$ saw [$_{DP}$ big t$_1$]]]].	

Tree for winner (21b):

```
              CP
         ╱         ╲
  gorilla₁        C'
               ╱      ╲
             C⁰        IP
                    ╱      ╲
                  we       VP
                        ╱      ╲
                      saw       DP
                             ╱      ╲
                           big      t₁
```
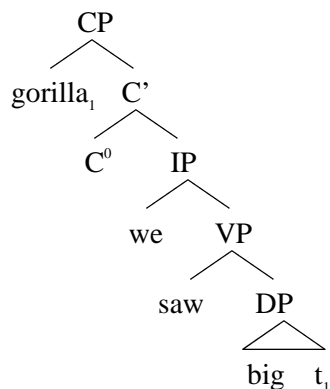
Since DP BARRIER is routinely violated in Colloquial Russian when part of a DP is contrastively focused, the ranking in (22) must hold. Candidate (a) wins despite violating DP Barrier, because it places CFocus in its proper position and satisfies the higher-ranked CFOCUSSPEC. Candidate (b) does not, though it satisfies the DP BARRIER.

(22)   CFOCUS SPEC>>DP BARRIER

$<$see (x,y), x=we, y=big $\cap$ gorilla$_{Foc}$ $>$	CFOCUS SPEC	DP BARRIER
a.☞[$_{CP}$ gorilla$_{1\,CFocus}$ [we saw [$_{DP}$ big t₁]]]		*
b. [$_{IP}$we saw a [$_{DP}$ big gorilla$_{CFocus}$]]	*!	

3.3.   Ranking Align-R PFocus and DP Barrier.

PFocus is different from CFocus both semantically and syntactically. It is not a semantic operator that requires special interpretation (Schwarzschild 1999), or its own special syntactic projection. In a sense, its clause-final position signals the F-marking. Since neither Topic nor PFocus have the semantic operator status of CFocus, their syntax will be described in terms of adjunction rather than special projection positions. Topic always comes first, before Wh-words or CFocus, and PFocus comes last, after adverbs and tail material, because in both cases they adjoin to the highest clause.

A mechanism that has been used in OT syntax to state such relations is Alignment (G-SL). Alignment constraints govern the syntax of both PFocus and Topic. The remainder of part 3 is concerned with Alignment constraints. I will start with PFocus.

(23)   *(First Version)*
        ALIGN-R (PFOCUS, CLAUSE)*: Align the right edge of the PFocus with the right edge of the clause.

This alignment constraint is violated whenever a PFocus word is not aligned with the right edge of the clause, that is, if there are words intervening between it and the right edge. Like Alignment constraints in phonology (Prince and Smolensky 1993, McCarthy and Prince 1993), ALIGN-R (PFOCUS, CLAUSE) requires edge correspondence between categories. The categories are edges of syntactic words and edges of syntactic phrases, particularly IP/CP, i.e. syntactic categories as opposed to phonological/prosodic or morphological categories.

Align-R (PFocus,Clause) is violated whenever the PFocus does not appear at the edge. One

violation is incurred for *every* PFocus which is not aligned. Thus, the constraint is violated non-gradiently. Gradience is discussed in section 3.6.
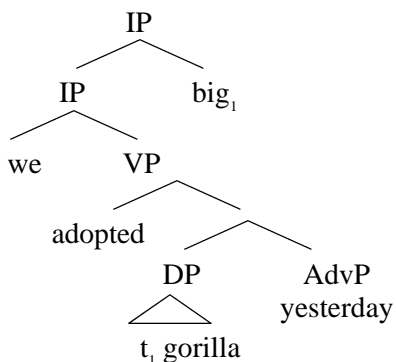
The constraint as stated in (23) conforms to the Alignment schema of McCarthy and Prince (1993): the edge of every category X must be aligned with the edge of some category Y. Category edges that intervene between X and the edge of a clause do not violate the constraint: the hierarchical nesting of other phrases does not interfere, since all the constituents whose edges are aligned share those edges (McCarthy and Prince 1993:89). This has negative consequences, which I will discuss in 3.5, where the constraint will be redefined to require that moved constituents at edges bear special features.

PFoci are extracted out of DPs, which means that aligning PFoci takes precedence over the DP BARRIER: ALIGN-R(PFOCUS) >>DP BARRIER. Tableau (24) shows how the ranking works. Not moving the PFocus fatally violates the high-ranked ALIGN-R(PFOCUS), even if it does not violate the DP BARRIER (a). Candidate b pied-pipes the entire DP that contains the PFocus. It thus satisfies the DP Barrier constraint, but violates ALIGN-R (PFOCUS) once. (Candidate b does violate VP BARRIER, which has been left out of this ranking.) Finally, the winner is c, which leaves the DP in situ and right-aligns the AP 'big.'

(24)   ALIGN-R (PFOCUS) >> DP BARRIER

$\langle$adopt (x,y,z), x=we, y=big$_F$ $\cap$gorilla, z=yesterday$\rangle$	ALIGN-R PFOCUS	DP BARRIER
a. [$_{IP}$we adopted [$_{DP}$big$_{PFocus}$ gorilla] yesterday]	*!	
b. [$_{IP}$[$_{IP}$ we adopted t$_1$ yesterday][$_{DP}$[$_{AP}$big]$_{presF}$ gorilla] t$_{1\ IP}$]	*!	
c.☞[$_{IP}$[$_{IP}$ we adopted [$_{DP}$t$_1$ gorilla] yesterday] [$_{AP}$big$_1$]$_{presF\ IP}$]		*

Tree for winner (24c)

```
                    IP
                  /    \
                IP      big₁
              /    \
            we      VP
                  /    \
            adopted     \
                      /    \
                    DP      AdvP
                   /  \     yesterday
                  t₁ gorilla
```

3.4.   Ranking Align-L (Topic) and DP Barrier

Similarly to PFocus, the Topic position is peripheral. The constraint that determines the position of Topics is ALIGN-L (TOPIC, CLAUSE):

(25)   ALIGN-L (TOPIC, CLAUSE)*:* Align the left edge of the Topic with the left edge of the clause.

This constraint is violated in the same way as ALIGN-R (FOCUS, CLAUSE), the only difference being that it requires the positioning of Topic at the *left* edge rather than right. If there are several Topics, then each one will be evaluated on alignment.

Tableau (26) shows the ranking of the Topic alignment constraint over the DP Barrier constraint. Candidate (a) is the non-movement candidate—it does not split up the DP or place the Topic in its clause-initial position, and thus fails. Candidate (b) does not split up the DP, but pied-pipes it to the Topic position, violating Align-Topic once. Candidate (c) is the winner—it aligns the left edge of the Topic with the left edge of IP by left-adjoining it to IP. The failure of candidate (d) shows how *gratuitous movement* is ruled out in the system proposed. This candidate violates DP barrier twice, once for each trace, but only one of these violations is motivated. Gratuitous splitting is thus prevented, which is a desirable result.

(26)   ALIGN-L (TOPIC) >> DP BARRIER:

$\langle$adopt (x,y,z), x=we, y=big$\cap$gorilla$_{Topic}$, z=yesterday$\rangle$	ALIGN-L TOPIC	DP BARRIER
a. [$_{IP}$we adopted [$_{DP}$big [gorilla]$_{Top}$] yesterday]	*!	
b. [$_{IP}$[$_{DP}$big [gorilla]$_{Top}$]$_1$ [$_{IP}$we adopted t$_1$ yesterday]	*!	
c.☞[$_{IP}$[gorilla]$_{1\,Top}$ [$_{IP}$ we adopted[$_{DP}$ big t$_1$] yesterday]		*
d. [$_{IP}$[gorilla]$_{1\,Top}$ [$_{IP}$ we adopted[$_{DP}$ t$_2$t$_1$] yesterday]big $_{2\,IP}$]		**!

If there is both a Topic and a PFocus, then they will both appear at edges, as ALIGN-L TOPIC and ALIGN-R PRES FOCUS demand. Candidate 27b, which aligns both Topic and PFocus, wins.

(27) ALIGN-LTOPIC, ALIGN R(PFOCUS) >> DPBARRIER

$\langle$adopt (x,y,z), x=we, y=big$_F$ $\cap$gorilla$_{topic}$, z=yesterday$\rangle$	ALIGN-L TOPIC	ALIGN-R PFOCUS	DP BARRIER
a. [$_{IP}$we adopted[$_{DP}$big$_{presF}$ gorilla$_{Topic}$] yesterday]	*!	*	
b. ☞[$_{CP}$[gorilla$_{Topic}$]$_2$ we adopted [$_{DP}$ t$_1$ t$_2$] yesterday] [big$_{presF}$]$_{1\,CP}$]			**
c. [$_{IP}$gorilla$_{1\,Topic}$ [$_{IP}$we adopted[$_{DP}$t$_1$ big$_{presF}$] yesterday]]		*!	*

There is no evidence at present that Alignment constraints and CFOCUSSPEC conflict in Russian, even by transitivity. However, in Polish, Alignment constraints seem to dominate CFOCUSSPEC by transitivity (see discussion in section 4.2).

3.5.   The Pied-Piping Problem

The rankings successfully deals with the inputs considered so far. However, there is a problem: the constraints do not select the correct output for inputs in which an F-marked element is already rightmost in its DP[adj N$_{F\,DP}$], or a Topic is already leftmost [Adj$_{Topic}$ N $_{DP}$]. Under the current system, it is better to right-align the entire DP in e.g. a focus case than to split it up: [adj N$_{F\,DP}$]$_{IP}$] > [adj t$_{1\,DP}$].....N$_{F\,IP}$]. Plainly put, the *pied-piping problem* is that (28a) wins and the actually attested candidate (28b) does not win under the current ranking. This is because (b) is *harmonically bounded* by the pied-piping candidate (a). Both equally satisfy alignment, but (b) violates DP BARRIER and (a) does not. This means that no matter what the ranking is, (b) will never be optimal in any language because it has the superset of the violations of (a) (Prince and Smolensky 1993).[6]

---

[6] The reason (28b) does not violate DP Barrier is that the whole DP moves, this is different from moving every word out of DP separately. Candidate (b) should not be mistaken for this candidate: [[$_{DP}$t$_1$ t$_2$] ....big$_1$ gorilla$_{2presF\,IP}$]. This is a terrible candidate: it satisfies Alignment no better than (a) or (b), and it contains a gratuitous violation of DP Barrier. It is therefore harmonically bounded by both (a) and (b).

(28)   Wrong prediction for Russian

<see (x,y), x=we, y=big $\cap$ gorilla$_F$ >	ALIGN-R PFOCUS	DP BARRIER
a. ☞[$_{IP}$[$_{IP}$ we saw t$_1$ in zoo] [$_{DP}$big gorilla$_{presF}$]$_{IP}$]		
b. ☜[$_{IP}$[$_{IP}$ we saw [$_{DP}$ big t$_1$] in zoo] [gorilla]$_{presF\ IP}$]		*!

There are several possible reasons for (b)'s losing. One is that some *other* constraint prefers the split candidate—the constraint that demands that only things with features move, or that the displaced thing be as small as necessary. Another possibility is that the constraints already proposed have stricter requirements: perhaps the pied-piping candidates actually violate the alignment constraints. The first alternative has problems of overpredicting. I will outline the first before adopting the second.

*3.5.1.   *Pied-Piping.*

It is natural to assume that *another constraint* disprefers the pied-piping candidate. There is evidence that something like this constraint is at work not only in Russian but also in Colloquial English, where pied-piping of Prepositional Phases is marked:

(29)   a. [$_{DP}$Which bar]$_1$ did you go [$_{PP}$to t$_1$]?
        b. *[$_{PP}$ To which bar]$_1$ did you go t$_1$?   (Colloquial)

The constraint that prohibits pied-piping, which is tentatively defined in (30), must be ranked higher than the barrier constraint. This constraint requires that only licensed constituents move, without extra 'luggage.'

(30)   *PIED PIPING: Do not pied-pipe.

In English, *Pied Piping outranks PP Barrier and VP BARRIER, since neither of the phrases is moved as a whole to avoid a barrier violation. In Russian, *PIED PIPING will outrank DP BARRIER, PP BARRIER and VP BARRIER.

(31)   Russian: *PIED PIPING >> DP BARRIER

<buy (x,y,z), x=skinny$\cap$boy, y=big$_F$ $\cap$encyclopedia$_F$, z=for two rubles>	*PIED PIPING	DP BARRIER
a. [$_{IP}$skinny boy bought t$_1$ for two rubles [$_{DP}$big [encyclopedia]$_{presF}$]$_{IP}$]	*!	
b. ☞[$_{IP}$ skinny boy bought [$_{DP}$ big t$_1$] for two rubles[encyclopedia]$_{1\ presF\ IP}$]		*

Before adopting the *PIED-PIPING analysis, let's consider the typological predictions of interranking it with just two other constraints: DP BARRIER and ALIGN-L TOPIC. Three attested types of languages are predicted: languages without Topic movement out of DP (English, usually), with split scrambling (Russian), and with pied-piping (Japanese).

(32)   Hypothetical Factorial Typology of Pied-Piping.

	P-P	DP Barr	Al-L Topic	Description
1. *P-P, DP>>Al-L Top			*	No movement
2. *P-P, Al-L Top>>DP		*		Split scrambling
3. DP>>Al-L Top>>*P-P	*			Whole DP moves (Japanese)
4. Al-L Top>>DP>>*P-P	*			Alignment w/P-P or w/o P-P (?)

The fourth type is problematic: under this ranking, pied-piping occurs only when the constituent is already at its phrase's edge. For the two inputs, $[_{DP} X_{Topic} ...]$ and $[_{DP} ...X_{Topic}]$, two different candidates would surface. The first input would correspond to a pied-piped winner (33a), while the second input would correspond to a split-scrambled winner (33b). This type brings back the pied-piping problem as described for tableau (28): for two seemingly equivalent inputs, the grammar produces pied-piping in one case but not in the other. This grammar is rather implausible: pied-piping is mandatory for inputs with Topics on the left of their DPs, but impossible for inputs with Topics on the right of their DPs. I know of no language in which pied-piping behaves this way.

(33)   Odd pied-piping

a. Topic on the left edge of DP: pied-piping.

<verb (y), y=X_{Topic}∩Y>	ALIGN-LTOP	DP BARRIER	*PIED PIPING
a. $[_{IP}X_{Topic1} [verb [_{DP} t_1 Y]_{IP}]]$		*!	
b.☞$[_{IP} [[_{DP}\mathbf{X_{Topic}} \mathbf{Y}]_1 \mathbf{verb} \mathbf{t_1}_{IP}]]$			*
c. $[_{IP} verb [_{DP}X_{Topic} Y]_{IP}]$	*!		

b. Topic on the right edge of DP: split scrambling.

<verb (y), y=X∩Y_{Topic}>	ALIGN-LTOP	DP BARRIER	*PIED PIPING
a. ☞$[_{IP}\mathbf{Y_{Topic1}} [verb [_{DP} \mathbf{X} \mathbf{t_1}]_{IP}]]$		*	
b. $[_{IP} [[_{DP}X Y_{Topic}]_1 verb t_1 _{IP}]]$	*!		*
c. $[_{IP} verb [_{DP}X Y_{Topic}]_{IP}]$	*!		

Thus we have a problem. The pied-piping constraint gets the correct results when it is ranked near the Alignment constraint with respect to DP BARRIER, but predicts an unattested language type when it is low-ranked. Therefore the pied-piping restriction, though reasonable and intuitive, is not a constraint.

3.5.2.   Pied-piping banned by alignment.

The prohibition on pied-piping must follow from the *definitions of the alignment constraints* themselves.[7] After all, it makes intuitive sense that these constraints should not be satisfied by moving more than they require: whatever moves to the topic position must be a topic, but pied-piping moves a non-topic constituent into topic position. The requirements of alignment must be twofold. If a constituent is left-adjoined, it must be a Topic, and if a constituent is a Topic, it is left-adjoined. The final definition of the constraints is:

Final Version:

(34)   ALIGN-L (TOPIC, CLAUSE)*: Align the left edge of an element with the left edge of some clause iff it is a Topic.*
(35)   ALIGN-R (PFOCUS, CLAUSE)*: Align the right edge of an element with the right edge of some clause iff it is a PFocus.*

But not every clause is required to have a Topic and a PFocus. In order for the constraints to ignore the in-situ material at edges in the absence of a Topic or a PFocus, it is necessary that the constraints only evaluate moved material, hence the following definition of what it means to be 'aligned':

---

[7] Thanks to Adam Werle for the discussion of this alternative.

(36)   An element is *aligned* iff it is coindexed with a trace in the clause and is adjoined to the clause.

Now pied-piping is a bad repair for a barrier violation in this system. A pied-piped XP is worse off on Alignment than a split scrambled constituent, because the right-aligned constituent is not licensed. A pied-piped DP will incur a violation unless it is F-marked as a whole.

There are consequences to the new definitions of the alignment constraints. All and any F-marked material must now be right-adjoined to IP, since in-situ material cannot satisfy ALIGN-R (PFOCUS). This point will be taken up again in the discussion of Gradience (3.6).

The newly defined constraints aid in ruling out gratuitous splitting discussed in 3.4 (26). Any unlicensed dislocation will violate either ALIGN-L TOPIC or ALIGN-R PFOCUS in addition to violating some constraint against movement. Gratuitous splitting now violates ALIGN-R PFOCUS or ALIGN-L TOPIC, or both.

The stricter constraint formulation avoids introducing additional constraints such as *PIED-PIPING into the system, preventing unattested grammars from being generated by ranking permutations. This is a theoretically desirable result. Two types of languages are predicted for each Alignment-Barrier constraint pair: languages that cross barriers to satisfy alignment (Russian for DP), and languages which pied-pipe the barrier XPs without crossing them to minimally violate alignment (Japanese for DP). The third type, languages that neither split nor pied-pipe (English, usually), is not predicted by these constraints. In such languages, the general constraint STAY rules out movement.

3.5.3. *Stay and Barriers.*

The well-known STAY constraint (Grimshaw 1997) must rule out Topic/Focus movement in English. STAY is ranked above BARRIERS so that nothing moves to satisfy Alignment, whether this movement violates or satisfies BARRIERS. Colloquial English, which extracts Topics and Contrastive Foci by Topicalization out of PPs and VPs but pied-pipes DPs, has the following ranking:

(37)   Colloquial English:

DP BARRIER >> ALIGN-L TOPIC, CFOCUSSPEC >> PP BARRIER >> VP BARRIER, STAY>> ALIGN-R PFOCUS

STAY dominates ALIGN-R PFOCUS, which is the only constraint that does not trigger pied-piping or splitting. In pied-piping and splitting languages, STAY is low-ranked.

3.5.4. *Summary.*

This section demonstrated that simple edge alignment does not make the right predictions for pied-piping repairs of BARRIER violations. Alignment in syntax has to be understood to require correspondence of *only* PFocus and Topic edges with the edges of the clause. Thus, languages either pied-pipe the barrier XP to the appropriate edge (even if it results in imperfect alignment), cross the barrier to satisfy alignment perfectly, or avoid movement of any kind in compliance with STAY.

The Russian rankings proposed in 3 are summarized in (38): all of the movement constraints outrank all of the barrier constraints. This means that anything that is a CFocus or a PFocus or a Topic can be moved from any phrase.

(38)   Russian:

ALIGN-L TOPIC, ALIGN-R PFOCUS, CFOCUSSPEC >> DP BARRIER, PP BARRIER[8], VP BARRIER

3.6.   Gradience

I have been assuming that alignment is *non-gradient*: just one violation mark is incurred by any non-aligned constituent, regardless of how many constituents separate it from the edge. A natural alternative is a *gradient alignment* system, where one mark is incurred for every word or constituent that separates X from the edge, thus forcing X to get as close to the edge as possible. Gradient alignment has been used both in phonology (McCarthy and Prince 1993) and in syntax (Grimshaw, in press). This section discusses the issues involved in deciding between these alternatives. Gradient alignment is preferred on empirical grounds, while non-gradient alignment is a more elegant solution. The system adopted here is a compromise between the two: alignment is non-gradient, but it is satisfied only by adjunction.

The crucial case for deciding between gradient and non-gradient alignment is that of multiply F-marked sentences, in which several words which do not form an XP are F-marked. It is impossible to align them all perfectly, assuming that PARSE rules out a deletion repair (G-SL). If alignment is gradient, the prediction is that all the F-marked constituents will get as close to the right edge as possible: the fewer words separate them from the edge, the fewer violations they incur.

(39)   Multiple F-marking and gradient alignment

verb (x,y,z) x= X_F y=Y_F, z=Z	ALIGNR(PFOCUS)	STAY
a.☞ ..Z Y$_{PFocus\ IP}$] X$_{PFocus\ IP}$]	* (Y)	**
b.☞ ..Z X$_{PFocus\ XP}$]$_{IP}$] Y$_{PFocus\ IP}$]	* (X)	**
c. ..Y$_{PFocus}$ Z]$_{IP}$ X$_{PFocus}$]	**(Y)	*
d. ..X$_{PFocus}$Y$_{PFocus}$ Z$_{IP}$]	*** (X,Y)	

If alignment is non-gradient, then it should not matter whether the F-marked constituents are aligned. Only one of them can satisfy alignment, since the others incur a mark for not being aligned regardless of how close they are to the edge. Constraints against movement, e.g. BARRIERS and STAY, would select the candidate with the least movement.

(40)   Multiple F-marking and non-gradient alignment

verb (x,y,z) x= X_F y=Y_F, z=Z	ALIGN-R(PFOCUS)	STAY
a. Z Y$_{PFocus\ IP}$] X$_{PFocus\ IP}$]	* (Y)	**!
b. Z X$_{PFocus\ XP}$]$_{IP}$] Y$_{PFocus\ IP}$]	* (X)	**!
c.☞ Y$_{PFocus}$Z]$_{IP}$ X$_{PFocus}$]	* (Y)	*
d. X$_{PFocus}$ Y$_{PFocus}$ Z$_{IP}$]	**! (X,Y)	

The Russian facts support gradient alignment. Multiple Presentational Foci in Russian are as close to the right edge as they can get. For example, in a context where 'friends' and 'books' are presupposed, everything else will move to the right edge:

---

[8] I did not argue for the ranking of the movement constraints over a PP barrier because there are additional complications to PP splitting that are largely peripheral to the issues in this paper. Russian and Polish PPs may split, provided the preposition comes before the object and can cliticize onto its complement adjective or noun.

(41)　　U1: What about friends and books?

　　　　U2: Druz'jam　knigi　　**my dajem často**.
　　　　　　　Friends-dat　　　　books we give　often
　　　　　　　Tail　　　　　　　PFoci
　　　　　'We often give friends books.'

In sum, if alignment constraints demand edge coincidence between constituents and clauses, then *alignment must be gradient*.

3.6.1.　Counting Gradient Alignment violations

　　　The problem with gradient alignment is that it is difficult to implement or formalize. In order to avoid the pied-piping problem, the alignment constraints had to be re-defined: 1) they require X to be aligned with Y by moving X so that it share edges with Y, and 2) any constituent moved to the edge of Y must be an X. How, then, do we count the violations of such alignment constraints gradiently? Compare candidates (a) and (b) for the input which is entirely F-marked. Candidate (a) is the non-moving candidate. Candidate (b) moves every F-marked word, adjoining it to IP and preserving the word order of (a).

(42)　　My igrajem v bridž po subbotam.
　　　　we play　　in bridge on Saturdays
　　　　$[[We]_F [play]_F [bridge]_F [on]_F [Saturdays]_F]_{IP}$
　　　　$play_F (x,y,z)$, $x=we_F$, $y=play_F$, $z=on_F$ $Saturdays_F$
(a)　　　$[We_F [[play_F bridge_{F VP}] [on_F Saturdays_{F PP}]_{VP}]_{IP}]$
(b)　　　$[[[[t_1 [t_2 t_3 [t_4 t_{5 PP}]_{VP}]_{IP}]we_{F1}] play_{F IP}]bridge_{F3 IP}]on_{F4 IP}] Saturdays_{F 5 IP}]$

　　　Candidate (b) actually attempts to satisfy alignment as it is defined, because the F-marked words are moved, and so it incurs only ten gradient alignment violations. But how do we decide on the alignment violations for (a)? Does (a) violate alignment five times, once for every non-aligned (i.e. non-moved) word? Or does it incur a mark for every word that separates non-aligned words from the right edge, as well? If both not aligning and not being near the edge violate alignment, then the violations must be added up. There is a conceptually simpler alternative to this: non-gradient alignment which is satisfied only by adjunction.

3.6.2.　Non-gradience with adjunction

　　　If alignment is satisfied by adjunction and does not merely require edge correspondence, non-gradient alignment will pick out the right candidates. Consider the case of multiple focus again (43). In (a), both Y and X are adjoined, satisfying the demands of non-gradient alignment. Candidate b, though in the same linear order as (a), violates alignment because Y is not adjoined to IP. Candidate c likewise incurs one mark for not adjoining Y to IP. Candidate d, the non-movement candidate, also violates alignment.

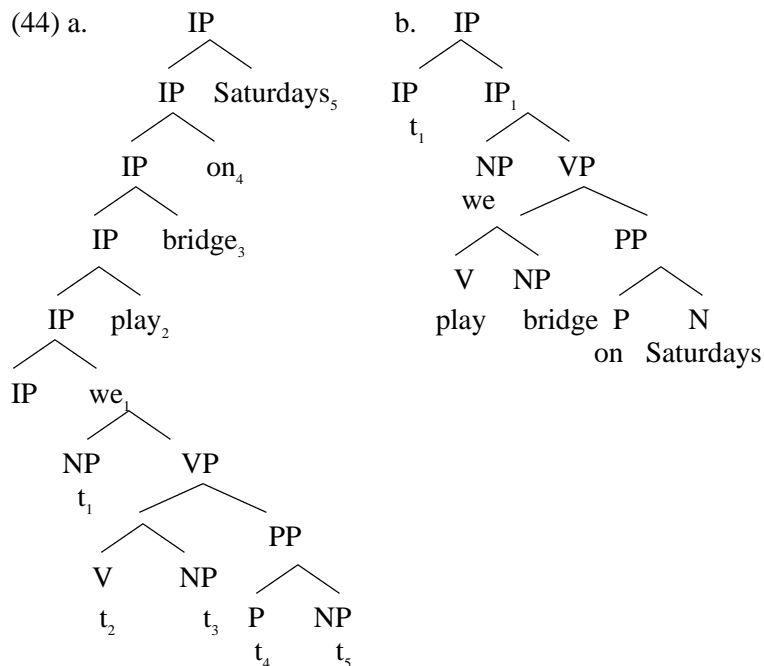(43)   Non-gradient alignment with adjunction

verb (x,y,z) x= X_F y=Y_F, z=Z	ALIGN-R(PFOCUS)
a. ☞ Z $_{IP}$] Y$_{PFocus}$ $_{IP}$] X$_{PFocus}$ $_{IP}$]	✓
b. Z Y$_{PFocus\ XP}$] $_{IP}$] X$_{PFocus\ IP}$]	*(X)
c. Y$_{PFocus}$ Z]$_{IP}$ X$_{PFocus}$]	*(Y)
d. X$_{PFocus}$ Y$_{PFocus}$ Z$_{IP}$]	**(X,Y)

Thus, non-gradient alignment selects a subset of *representations* that satisfy gradient alignment—only adjunction and not linear order satisfies it.

3.6.3. *Canonical word order*

Since all F-marked constituents must ajoin, something has to ensure that the order of adjoined words in all-new sentences is SVO, just as in the tail. Do special constraints require a correspondence between the in-situ structure and the adjoined word order, or is the correspondence due to something else? In the system of non-gradient adjunction, no additional correspondence constraints are necessary. The order in all-new sentences is SVO because the entire IP, the largest F-marked constituent, is moved and adjoined to IP.

Selkirk's (1995) F-marking applies not only to individual words but also to larger constituents. Thus, not only are the individual words F-marked, the entire IP is F-marked. It too is subject to alignment restrictions. Structure (44a), which moves individual F-marked words, is just as well aligned as (44b), but the latter incurs a minimum of movement violations. Tableau (45) shows the violation marks for each structure.

(44) a.

```
                IP
              /    \
            IP    Saturdays_5
           /  \
         IP    on_4
        /  \
      IP   bridge_3
     /  \
   IP   play_2
  /  \
IP   we_1
/  \
NP  VP
t_1  /  \
   /      \
  /        PP
 V   NP   /  \
 t_2  t_3 P   NP
         t_4  t_5
```

b.

```
        IP
       /  \
      IP   IP_1
      t_1  /  \
         NP   VP
         we  /  \
           /      \
          /        PP
         V   NP   /  \
       play bridge P  N
                 on Saturdays
```

(45) All-new sentences in a gradient alignment system

play$_F$ (x,y,z), x=we$_F$, y=play$_F$, z=on$_F$ Saturdays$_F$	ALIGN-R (PFOCUS)	STAY/ BARRIERS
a.[We$_F$ [[play$_F$ bridge$_{F\,VP}$] [on$_F$ Saturdays$_{F\,PP}$]$_{VP}$]$_{IP}$]	*****	
b.[[[[t_1 [t, t_3 [on$_F$ Saturdays$_{F\,PP}$]$_{VP}$]$_{IP}$]we$_{F1}$] play$_{F\,2\,IP}$]bridge$_{F\,3\,IP}$]	***	***
c. [[[[t_1 [t_3 [t_4 $t_{5\,PP}$]$_{VP}$]$_{IP}$]we$_{F1}$] play$_{F\,2\,IP}$]bridge$_{F\,3\,IP}$]on$_{F\,4\,IP}$] Saturdays$_{F\,5\,IP}$]		*****
d. [$t1$[We$_F$ [[play$_F$ bridge$_{F\,VP}$][on$_F$ Saturdays$_{F\,PP}$]$_{VP}$]$_{IP}$]$_{1\,IP}$]		*

To summarize, the empirical evidence suggests that alignment is gradient: all PFoci, as well as all Topics, appear *near* edges, even if they cannot all appear right *at* the edges. However, because gradient alignment is difficult to implement, the same result is achieved in a simpler, non-gradient alignment theory.

4. Factorial Typology: the Locus of Cross-Linguistic Variation

Since Optimality Theory constraints are universal, their re-ranking yields the cross-linguistic typology of grammars. Whenever a new constraint is proposed, its possible rankings should be checked to make sure that the predictions match the actual typology. Provided the constraints proposed here are actual constraints of the Universal Grammar, the ranking permutations should yield no unattested grammars. In this section, I discuss the factorial typology of the new Barrier Constraints VP BARRIER, PP BARRIER, DP BARRIER.

Proposing several specific constraints instead of one general prohibition on movement predicts that languages may split some constituents but not others. If only one barrier constraint existed, languages would either tolerate all barrier violations or none. Indeed, we find that languages do vary in what kinds of constituents they allow to split.

English allows VPs and PPs to split, but not DPs[9]. French and many other European languages allow movement out of a VP but not out of a PP. Malagasy (Keenan 1976) does not even allow the object to leave its VP: only subjects may raise, cleft, and undergo wh-movement. Thus, Malagasy objects may not leave the VP unless they become subjects of passives first. In Topicalization, objects but not subjects obligatorily leave resumptive pronouns in the VP. The Malagasy VP appears to be a barrier.
The cross-linguistic splitting patterns are summarized in the table:

(46) Cross-linguistic splitting patterns

	VP split	PP split	DP split
Malagasy	*	*	*
Japanese	✓	*	*
English	✓	✓	*
Russian	✓	✓	✓

(The source on Malagasy does not discuss the status of PP and DP as a barrier. I assume that they are barriers, since Malagasy syntax is quite restrictive in other ways.)

---

[9] See section 5 for the discussion of movement out of DP in English.

4.1. The Predictions of a Barrier Hierarchy

The typology suggests that barriers form a fixed hierarchy. Free re-ranking of Barrier constraints would predict unattested types: no language bans movement out of a VP but tolerates PP and DP splitting.[10] I will assume a fixed ranking for the barrier constraints:

(47)   DP BARRIER>>PP BARRIER>>VP BARRIER

This ranking makes the right predictions: VPs are crossed most readily, and no language splits PPs that doesn't also split VPs. This is the expected pattern of a markedness hierarchy.[11]

(48)   Factorial typology with ALIGN-L TOPIC

Rankings	DP split	PP split	VP split	Attested
a. ALIGN-L TOPIC >> DBRR >>PBRR >> VBRR				Russian
b. DBRR>> ALIGN-L TOPIC >>PBRR>>VBRR	*			English
c. DBRR>> PBRR >> ALIGN-L TOPIC >> VBRR	*	*		Japanese
d. DBRR>>PBRR >> VBRR>> ALIGN-L TOPIC	*	*	*	Malagasy

The Barrier hierarchy predicts an *implicational relation*: *if a language splits DPs for a kind of movement, it will split PPs and VPs for that kind of movement.* If Topic splits PPs, it will split VPs. If it does not split VPs, it won't split DPs or PPs. In other words, if the highest constraint in the hierarchy is violated, all the constraints below it are also violated.

An additional, more interesting prediction comes out of interranking different movement constraints with the barrier hierarchy. I posited three constraints that motivate movement of PFocus, Topic and CFocus. All three constraints in Russian are ranked above all of the Barrier constraints. However, since they are freely re-rankable, there will be languages that will only move CFocus out of a VP but not a PFocus, or that will move Topics out of PPs and VPs but leave DP-internal Topics in situ. In other words, the prediction is that *the barriers for some kinds of movement are not necessarily the same as barriers for other kinds of movement in the same language.* This prediction appears to be borne out, as I will show in the next section.

4.2. The variable status of barriers in the same language

Because different movement constraints may outrank some barriers but be dominated by others, barriers for different kinds of movement may be different in the same language. This is an important result that cannot be obtained in a system that assumes only inviolable barriers: if they were inviolable, then all movement in a given language should obey the same barriers.

In Mandarin, adjectives and objects of prepositions or verbs may be topicalized, but there is no Wh-movement. (Yip &Rimmington 1997). This situation is captured by the ranking in (49). Anything

---

[10] However, as Alexandra Zepter (p.c.) pointed out, German allows 'Was für' split to extract adjectives out of DPs but not out of PPs, which suggests that the ranking might be PP Barrier>>'Was-Für'>>DP Barrier, VP Barrier. However, this ranking of barriers makes the wrong prediction for scrambling: German DPs and VPs should split more readily than PPs for scrambling, but they do not.

[11] Unlike phonological markedness hierarchies such as the Sonority Hierarchy (Prince and Smolensky 1993), which are organized according to a clearly identifiable phonetic principle, it is not immediately clear what the basis for this hierarchy is. the barriers are organized from smallest to largest, which suggests that there is an organizing principle. This hierarchy might reflect a processing principle of some kind. I will leave this question for future research.

may be topicalized, because ALIGN-L TOPIC dominates the barriers, and WH-SPEC dominates none:

(49)　　**ALIGN-L TOPIC** >>DPBRR>>PPBRR>>VPBRR, STAY>>**WH-SPEC**

　　　　Japanese moves only whole XP Topics and Foci but no Wh-words, so in Japanese DP BARRIER would be undominated. In the violable barriers approach, this follows without any additional assumptions.

4.2.1.　Variable barriers in English

　　　　In some varieties of English, Topicalization[12] (or Yiddish Movement) is marginal, yet Wh-movement is mandatory in all varieties:

(50)　　*/? [Noodles]$_{F_I}$ I like t_I in chicken soup.[13]
(51)　　I like [noodles]$_F$ in chicken soup.
(52)　　What$_I$ do you like t_I in chicken soup?
(53)　　*You like what in chicken soup?　　　(Non-echo)

　　　　In varieties without Topicalization, STAY and BARRIERS dominate both ALIGN-L TOPIC and CFOCUS SPEC, but WH-SPEC dominates some barriers. The ranking for varieties that do not allow Topicalization is:

(54)　　DPBRR>>**WH-SPEC**>>PPBRR>>VPBRR, STAY>>**ALIGN-L TOPIC, CFOCUSSPEC**

Topicalizing varieties rank ALIGN-L TOPIC and CFOCUSSPEC above PP and VP BARRIER (perhaps optionally), but not above DP BARRIER:

(55)　　DP BRR>>**ALIGN-L TOPIC, CFOCUSSPEC,WH-SPEC**>>PP BRR>>VP BRR, STAY>> ALIGN-R PFOCUS

　　　　Thus, the Barrier analysis straightforwardly explains how PP and VP can act as barriers to some kinds of movement (Topic, CFocus) but not to others (Wh-Movement).

4.2.2.　Movement for PFocus and Topic, but not for CFocus: Polish

　　　　Unlike Russian, Polish PFocus and Topic move out of DP, but nothing moves leftward to a Contrastive Focus position (Nowak 2000, Sekerina 1997)[14]. This suggests that CFOCUSSPEC is dominated. The following ranking yields the Polish grammar:

(56)　　 ALIGN-R PFOCUS, ALIGN-L TOPIC >> DPBARR>>PP BARR>>VP BARR >>CFOCUSSPEC

　　　　Demonstrating that every single ranking permutation yields an attested grammar would go

---

[12] See Gundel 1974 for discussion of Topic Topicalization and Focus Topicalization.
[13] Grammaticality judgements were given by undergraduate students in an introductory linguistics course at UMass Amherst.
[14] Nowak and Sekerina also cite Siewierska's observation that Topic and Focus always move at the same time. That is, no 'remnants' of splitting stay in situ—parts of a split DP must appear at *edges*. Sekerina contests the claim for Russian, showing that the edge effect does not always hold. A simple explanation for the effect is that usually each clause contains both a Topic and a Focus.

beyond the scope of this discussion. The brief survey undertaken here lends some support to the variable barrier approach. I leave further investigation for future research.

4.2.3. Summary

I posited a fixed hierarchy of barriers from smallest and most marked, DP, to largest and least marked, VP. Two predictions are borne out:

1) If a kind of movement splits the smallest constituent, DP, it will be able to split the larger constituents, PP and VP.

2) Different movement might be sensitive to different kinds of barriers in the same language.

In Russian, Topic, CFocus and PFocus movement violates all the same barriers—DP, VP and PP. In other languages, different barriers block different kinds of movement, as predicted.

5. Unsolved Problem: DP Barrier in English.

Although English clearly does not allow adjectives, determiners or quantifiers to leave the DP, the DP is not an absolute barrier. Thus, Wh-movement can extract out of DP-internal PPs so long as they are theta-governed by the Noun. Compare (57) and (58). In (57), the PP is an ungoverned adjunct to the head noun, and extraction is ungrammatical. In (61), the PP is a governed argument of the noun, and extraction is grammatical.

(57)   a. *<u>What</u>$_1$ do you like [$_{DP}$monkeys [$_{PP}$ <u>with</u> t$_1$]]?
         b. *<u>What</u>$_1$ do you like [$_{DP}$men [$_{PP}$<u>with</u> t$_1$]], beards or moustaches?
         d. *<u>What</u>$_1$ did Sherlock investigate [$_{DP}$the murder [$_{PP}$by t$_1$]], poison gas or an axe?
         e. *<u>What importance</u> did you read [$_{DP}$a book [$_{PP}$of t$_1$]]?
(58)   a. <u>What</u>$_1$did you see [$_{DP}$a picture [$_{PP}$ <u>of</u> t$_1$]]?
         b. <u>What</u>$_1$ did you read [$_{DP}$a book [$_{PP}$ <u>about</u> t$_1$]]?
         c. <u>What word</u>$_1$ did you hear [$_{DP}$a pun [$_{PP}$ <u>on</u> t$_1$]]?
         d. <u>What</u>$_1$ did the explorers discover [$_{DP}$the passages [$_{PP}$<u>through</u> t$_1$]]?

Interestingly, Topicalization is marginal or ungrammatical regardless of whether the PP is governed. This suggests that the DP barrier is absolute for Topic movement, and conditional for Wh-movement.

(59) */? <u>North America</u>$_1$, the explorers discovered [$_{DP}$ the passages [$_{PP}$<u>through</u> t$_1$]].
(60) */? <u>This word</u>$_1$ I've never heard [a pun [on t$_1$]].
(61) */? <u>Long orange hair</u>$_1$ I like [$_{DP}$monkeys [$_{PP}$<u>with</u> t$_1$]].

As it stands, the analysis does not capture the adjunct-argument asymmetry. English extraction out of DP-internal PPs should be doubly bad, since it violates two barrier constraints: PP BARRIER and DP BARRIER. Conversely, the Government theory cannot account for the contrast between Wh-extraction and Topicalization of PP objects—Topicalization out of DP-internal PPs should be grammatical, yet it is not. The OT analysis easily captures the variable status of the DP Barrier in English. It could also explain the adjunct-argument asymmetry once it is properly modified. The next section sketches out a possible solution, though I leave exploring the details for further research.

5.1. Traces must be governed'—a violable constraint

Traditionally, the argument-adjunct asymmetry has been attributed to government. Argument traces are theta-governed, whereas adjunct ones are not. But the government approach runs into problems with cross-linguistic facts. Government is obviously not respected in Russian DP splitting, as demonstrated in 2. In Malagasy, verbs would have to be defined as non-governors, since even they cannot govern object traces. In French, verbs would be governors, but prepositions wouldn't be. If government indeed regulates movement out of DP in English, it has to be a violable constraint.

A constraint that requires traces to be governed has been proposed by Grimshaw (1997):

(62) T-LEXGOV: A trace is lexically governed.

The second constraint is high-ranked in English, but not in Russian:

(63) English Ranking:
      T-LEX-GOV>>WH-SPEC>>DPBARRIER>>ALIGN-L-TOPIC>>PPBARR>>VPBARR>>ALIGN-RPFOCUS, CFOCUSSPEC

Under the ranking (63), Wh-words will move out of DPs, PPs and VPs as long as the trace is governed. Topics move out of PPs and VPs, but not DPs—even if the trace is governed, this movement is ungrammatical. Finally, all focus will stay in situ.

(64) Russian Ranking:
      ALIGN-L-TOPIC**,**ALIGN-RPFOCUS,   CFOCUSSPEC, WH-SPEC >>DP BARRIER>>
       PPBARR>>VPBARR>>**T-LEX-GOV**

In the ranking (64), all movement dominates all barriers, and no traces have to be governed. Another predicted grammar is one in which some or all barriers cannot be broken regardless of whether the resulting trace is governed. Japanese and Malagasy are examples of these:

(65) Japanese Ranking:
      DP BARRIER >> ALIGN-L-TOPIC, CFOCUSSPEC >> PPBARR >> VPBARR >> **T-LEX-GOV**, ALIGN-RPFOCUS, WH-SPEC

(66) Malagasy Ranking:
      DPBARRIER >> PPBARRIER >> VPBARRIER >>ALIGN-L TOPIC, CFOCUSSPEC, ALIGN-RPFOCUS, WH-SPEC, **(T-LEXGOV)**
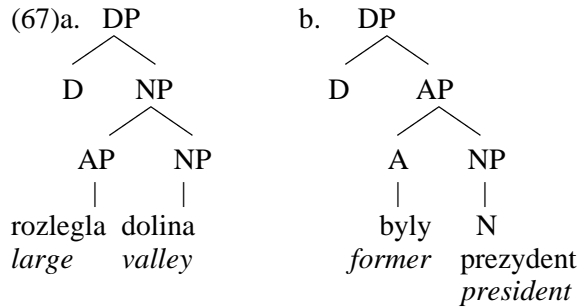
No movement of the kind discussed will be able to cross the barriers, regardless of whether the resulting trace is governed.

Introducing T-LEX-GOV into the ranking makes problematic predictions. One predicted language is one that bans ungoverned traces only inside VPs for Wh-movement, but not PPs or DPs. This seems counterintuititve—restrictions should be most stringent on the hardest barrier to cross, namely, DP. In the typology so far, T-LEX-GOV either dominates DP BARRIER or no barriers, which is odd. I will leave this problem unsolved here.

6. Alternatives to Violable Barrier Constraints

6.1. Double Movement and DP-Internal Structure: Nowak (2000), Sekerina (1997)

An alternative that has been pursued in derivational analyses of Slavic split scrambling is to posit a different structure for the DPs in Russian and Polish. Nowak (2000) argues for a double movement analysis for Polish split scrambling, following Sekerina (1997). To sustain the uniformity of derivations and prevent movement of non-maximal projections, the following two structures are proposed for DPs:

(67)a.
```
        DP                        b.       DP
       /  \                               /  \
      D    NP                            D    AP
          /  \                               /  \
        AP    NP                            A    NP
         |     |                            |     |
     rozlegla dolina                      byly    N
      large   valley                     former prezydent
                                                president
```

This is the difference that allows Polish to split DPs like the one in (67a)/(68a), but not like the one in (67b)/(68b).

(68)   a. <u>Do rozleglej</u> weszlismy <u>doliny</u>.
           to large   (we)entered valley
           'We entered a large **valley**.'
        b. *<u>Z bylym</u>   rozmawiala   <u>prezydentem</u>.
           with former (she) talked   president
           'She talked with the former **president**.'

If an adjective is a head, it may not split from its NP complement. If it is just a modifier, it can be separated by movement. However, consider the English sentences below:

(69)   This valley is large.
(70)   *This president is former.

'Large' can be used predicatively in English, but 'former' cannot. The adjectives either may or may not be separated from the subject of their predication, which suggests that the difference between the two semantic classes of adjectives is encoded in their adjacency requirements.

If the answer to the semantic difference between the two classes of adjectives is to encode it in the syntax of the DP in Russian and Polish, then it must be similarly encoded in the syntax of English DPs. If Russian and Polish allow some adjectives to appear non-adjacent because they have different structure, then English should be able to split those same kinds of adjectives from their nouns as well, and it does not.

Why can't English split its DPs if the adjectives have the same semantics? It seems that appealing to semantics should allow English to split its DPs, too, and that is the wrong prediction. My analysis does not rely on the difference in DP structure to deal with cases which are due to semantic factors. Though there might be a difference between English and Russian/Polish DPs, it is not crucial for my analysis. The difference between splitting and non-splitting languages lies in the status of DP as a barrier, not in DP structure.

6.2.   DP vs. NP.

One of the differences between Russian, Polish and Latin on the one hand and English and German on the other is that the latter require determiners, whereas the former do not. Perhaps this difference determines whether a language allows split scrambling: if DP is a universal island, and NP isn't, then, assuming Russian has NPs rather than DPs, the difference is straightforward. However, this assumption makes the wrong prediction for Japanese and Korean, which do not have overt determiners or split scrambling. (One could, of course, posit abstract Ds for those languages).

A true test of the DP/NP hypothesis is finding a language that has determiners and allows splitting. Spanish is one such language.[15] The following sentences are grammatical in the given contexts, according to some informants. In these sentences, the adjectives act as Presentational and Contrastive Foci.

(71)   Q: Que tipo de gorila viste en el zoo?
        Which gorilla did you see at the zoo?
        A: Vi <u>una gorila</u> en el zoo <u>pequeña y   peluda</u>
        (we) saw a gorilla at the zoo small   and hairy
        Tail   Pres Focus
        'We a saw a small and hairy gorilla at the zoo.'
(72)   U1: Yo pensaba que te gustan los libros pequeños.
        I thought you liked short books
        U2: <u>Policiacos</u> me   gustan <u>los libros</u>
        detective   I   like   the books
        Contr Focus   Tail
        'I like mystery novels.'

In Peruvian Spanish, even Topics may split, as (73) demonstrates:

(73)   U2: <u>Policiacos</u> me   gustan <u>los libros</u>
        detective   I   like   the books
        Topic   Tail
        'As for mystery (stuff), I like mystery novels.'

The island status of DP is thus challenged: Spanish, a language with overt determiners, allows splitting. Constraint rankings cause splitting independently of the DP structure.

7. Conclusion and Questions for Further Research

The difference between English and Russian with respect to DP splitting is due to the different ranking of DP BARRIER, which is proposed to be a violable constraint in a hierarchy of barriers. In English, it is highly ranked and dominates the Focus/Topic Alignment constraints, whereas in Russian, the Focus/Topic Alignment constraints force the violations of DP BARRIER. The analysis does not need to postulate a difference in the internal structure of DPs, counter Nowak (2000) and Sekerina (1997).

The proposed Barrier Hierarchy makes diverse predictions about cross-linguistic patterns of movement and Barrier violability, from subject-object asymmetries in Malagasy, to very free Topicalization and the absence of Wh-movement in Mandarin.

---

[15] Thanks to Vieri Samek-Lodovici and José Camacho for bringing this to my attention, and to Ana Arregui and Monica Parker for providing the data.

It was shown that Alignment constraints in OT syntax need to be modified to deal with problematic repairs. McCarthy and Prince's (1993) phonology-style edge alignment constraints produce the wrong results when they interact with constraints such as DP BARRIER. The versions of alignment proposed here evaluate both the element that is being aligned and the edge that it is aligned with, which rules out bad repairs and explains cross-linguistic pied-piping patterns.

Barriers of the kind discussed here are only one restriction on movement. There are many other constraints on movement and coreference that still need to be addressed by the framework used here. One issue is the status of split scrambling across CP. The integration of the CP into the Barrier Hierarchy based on size alone would mean that it is the least marked barrier, since it is the largest of DP, PP or VP, yet it is uncertain whether movement of any kind out of CP is actually unmarked cross-linguistically. Additional problems for future research are the difference between A and A' movement, which might be subject to different barriers, and extraction out of governed XPs vs. out of ungoverned ones.

8.   Appendix: The position of CFocus.

The claim that the CFocus position is fixed in Russian is controversial. It has been claimed that CFocus intonation can appear anywhere in the sentence (Bailyn 1995, Sekerina 1997). King (1995) presents some arguments that Russian CFocus is of the same variety as its well-known Hungarian counterpart, which has a fixed position[16]. I offer two more arguments in favor of the fixed CFocus analysis.

The first argument concerns the restricted interpretation of any pre-focal material. Unlike in-situ nouns, which are usually ambiguous between definite/specific and indefinite readings, pre-focal nouns can only be definite/specific. As we can see from the contrast between (74) and (75), the pre-focal subject is interpreted as definite and specific, indicating that it itself is a Topic rather than a mere subject.

(74)   Mal'čik   [etu   knigu]$_i$ [kupil t$_i$ včera].
        boy   this   book   bought yesterday
        Topic   CFocus   Tail
        The boy/* a boy bought this book yesterday.
(75)   [Etu   knigu]$_i$ mal'čik   [kupil t$_i$ včera].
        this   book   boy   bought yesterday
        CFocus   Tail
        The boy/a boy bought this book yesterday.

Kondrashova (1996) analyzes cases such as (74) as scrambling to a preverbal position below the subject, where the subject is not moved. Adopting Diesing's (1992) insight that specificity is related to position and movement, I take the unambiguously specific interpretation of pre-focal material as evidence that it has been moved to that position. Though this by itself does not prove that CFocus moves, it does put the in-situ CFocus hypothesis into question. The pre-Focus material should be analyzed as topical and moved to explain its definiteness/ specificity.

Second, CFocus and Wh-words appear in complementary distribution. It is impossible to contrastively focus a word other than a Wh-word when one is present[17]:

---

[16] In King's (1995) analysis, the CFocus position is SpecIP in declaratives, and SpecCP in li-interrogatives. This distinction is irrelevant for this analysis.
[17] The results of a pilot study of Russian intonation (Gouskova 1999) suggest that Wh-words and CFocus bear the same kind of pitch accents, which further suggests that they should be treated similarly.

```
    L+H*          L+H*
```
(76)   #Kto   vam   podaril gorillu?
   who   you-dat gave gorilla
   CF1   CF2
   Who **gave** you the gorilla?

If CFocus appears in the same unique position as Wh-words (namely, Spec, CP), their complementary distribution follows.

References.

Bailyn, J. (1995) *Configuring the 'Free Word Order' in Russian.* Ph.D. dissertation, Cornell University

Bakovic, E. (1998) 'Optimality and inversion in Spanish.' In P. Barbosa et al., eds. *Is the Best Good Enough?* Cambridge: MIT Press

Boškovič, Z. and D. Takahashi (1998). Scrambling and Last Resort. *LI* 29-3. 347-36

Bresnan, J. (1998) 'Morphology Competes with Syntax. Explaining Typological Variation in Weak Crossover Effects'. In P. Barbosa et al., eds. *Is the Best Good Enough?* Cambridge: MIT Press

Choi, Hye-Won (1999) *Optimizing Structure in Context. Scrambling and Information Structure.* Stanford: CLSI Publications.

Chomsky, N. (1986) *Barriers*. Cambridge: MIT Press

Diesing, M. (1992) *Indefinites*. Cambridge: MIT Press

Gouskova, M. (1999) 'The Phonetics and Phonology of Russian Focus and Topic.' Ms., University of Massachusetts

Grimshaw, J. (1997) 'Projection, Heads and Optimality.' *LI 28. 3*, 373-422.

Grimshaw, J. (in press) 'Optimal Clitic Positions and the Lexicon in Romance Clitic Systems' in G.

Legendre, J.Grimshaw and S. Vikner eds. *OT Syntax,* MIT Press.

Grimshaw, J., and V. Samek-Lodovici (1998) 'Optimal Subjects and Subject Universals.' In P.

Gundel, J. (1974/1988) *The Role of Topic and Comment in Linguistic Theory*, Ph.D. dissertation, University of Texas at Austin. (Republished, Garland: 1988.)

Hale, K. (1983) Warlpiri and the Grammar of Non-Configurational Languages. *Natural Language and Linguistic Theory.* 1. 5-47

Hajičová, E., B. H. Partee and P. Sgall (1998) *Topic-Focus Articulation, Tripartite Structures, and Semantic Content*. Dordrecht: Kluwer.

Keenan, E. (1976) 'Remarkable Subjects in Malagasy.' in C. Li, ed. *Subject and Topic*, New York: Academic Press 247-301.

Kim, Ji-yung. (in preparation) 'Specificity and Structure.' Ms., University of Massachusetts at Amherst.

King, T. H. (1995) *Configuring Topic and Focus in Russian.* Stanford: CSLI Publications

Kiss, Katalin (1998) 'Identificational Focus versus Information Focus.' *Language 74-2*, pp. 245-273.

Kondrashova, N. (1996) *The Syntax of Existential Quantification.* Ph.D.Dissertation, University of Wisconsin-Madison. Ann Arbor: UMI Dissertation Services

Krylova, O. and S. Khavronina (1984) *Por'adok Slov v Russkom Jazyke.* Moskva: Russkij Jazyk.

McCarthy, J. and A. Prince (1993a) 'Generalized Alignment.' In Gert Booij & Jaap van Marle, eds. *Yearbook of Morphology 1993.* Dordrecht: Kluwer. PP. 79-153.

McCarthy, J. and A. Prince (1993b) *Prosodic Morphology.* Ms., University of Massachusetts at Amherst and Rutgers Unversity.

Mithun, M. (1992) 'Is Basic Word Order Universal?' In Payne, D. (ed.) *Pragmatics of Word Order Flexibility.* Amsterdam: John Benjamins.

Miyagawa, S. (1997) Against Optional Scrambling. *LI* 28-1. 1-25

Nowak, Anita (2000) 'On Split PPs in Polish.' Ms., University of Massachusetts at Amherst.

Pesetsky, D. (1998) 'Some Optimality Principles of Sentence Pronunciation.' In P. Barbosa et al., eds. *Is*

the Best Good Enough? Cambridge: MIT Press.

Prince, A. and P. Smolensky (1993) *Optimality Theory: Constraint Interaction in Generative Grammar.* Ms., Rutgers University, New Brunswick, and University of Colorado, Boulder

Rooth, M. (1995) 'Focus.' In S. Lappin, ed. *The Handbook of Contemporary Semantic Theory.* Cambridge: Blackwell.

Saito, M. (1989) 'Scrambling as semantically Vacuous A'-movement,' in M. Baltin and A. Kroch, eds. *Alternative conceptions of phrase structure.* Chicago: University of Chicago Press, 182-200.

Schwarzschild, R. (1999) 'Givenness, AvoidF and Other Constraints on the Placement of Accent.' *Natural Language Semantics 7*: 141-177.

Sekerina, I. (1997) *The Syntax and Processing of Scrambling Constructions in Russian.* Ph.D. dissertation, CUNY. Ann Arbor: UMI Dissertation Services

Selkirk, L. (1995) 'Sentence Prosody: Intonation, Stress, and Phrasing.' In J. Goldsmith, ed. *The Handbook of Phonology.* Cambridge: Blackwell

Selkirk, L. (1984) *Phonology and Syntax: The Relation Between Sound and Structure.* Cambridge: MIT Press

Siewierska, A. (1988) *Word Order Rules.* New York: Croom Helm.

Wade, T. (1992) *A Comprehensive Russian Grammar.* Cambridge: Blackwell

Webelhuth, G. (1995) *Government and Binding Theory and the Minimalist Program.* Cambridge: Blackwell.

Woolford (in press) 'Case Patterns.' **in G. Legendre, J.Grimshaw and S. Vikner eds.** *OT Syntax,* **MIT Press.**

Yip, Po-Ching, and Don Rimmington (1997) *Chinese: an Essential Grammar.* London: Routledge

Yokoyama, Olga (1986) *Discourse and Word Order.* John Benjamins, Amsterdam.

University of Massachusetts at Amherst
Linguistics Department
226 South College
Amherst, Massachusetts 01003
mgouskova@linguist.umass.edu