Split Scrambling: Barriers as Violable Constraints

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1. Introduction

In contrast to English (1c), Russian allows movement out of a DP (1a,b). This kind of movement is called *split scrambling*. Both Topics (1b) and Foci (1a) can split scramble, Topics moving to sentence-initial position, and Foci to sentence-final position:

(1)   a.   [Bol'šaja t_I DP]   ukusila men'a   gorilla$_I$.
           big   bit   me   gorilla
           A big gorilla$_{Focus}$ bit me.

     b.   Bol'šuju$_1$ my   videli [t_I gorillu$_{DP}$]   včera
     c.   *Big   we   saw   gorilla   yesterday
           We saw a big$_{Topic}$ gorilla.

I argue that (1a) and (1b) are grammatical because the DP is a barrier in English but not in Russian. The central question of this paper is what determines the status of phrases as barriers cross-linguistically. I claim that barriers are violable, universal constraints in an Optimality Theoretic grammar (Prince and Smolensky 1993). Barrier constraints form a fixed hierarchy, such that movement out of a DP or a PP is cross-linguistically more marked than movement out of a VP. The analysis predicts that *no language allows movement out of DP or PP but bans the same type of movement out of VP*. If a constraint that requires movement dominates DP BARRIER, it also dominates PP and VP BARRIER. Russian allows movement to cross all three barriers, while English tolerates crossing VPs and PPs but not DPs, and Malagasy bans movement even out of VPs.

Split scrambling arises from the conflict of two opposing forces: constraints that demand movement on the one hand, and constraints that oppose it on the other. In Russian, DP BARRIER is dominated by the requirements to place Topics and Foci in their positions (ALIGN-R FOCUS, Grimshaw and Samek-Lodovici 1998), ALIGN-L TOPIC, and CONTRASTIVE FOCUS SPEC). Thus, movement out of DPs is not only possible but necessary for Topics and Foci. In English, DP BARRIER dominates the Focus/Topic constraints, so Topics and Foci cannot move out of a DP.

The constraints that oppose movement and those that require it can be interspersed, e.g. **MOVE WH** >> DP BARRIER >> **ALIGN-L TOPIC** >> PP BARRIER >>VP BARRIER. It is thus predicted that *barriers for some kinds of movement are not necessarily the same as barriers for other kinds of movement in the same language.* Thus, Mandarin Chinese allows free Topicalization out of DP, but no Wh-movement. This and other cases of variable barrier status within the same language are straightforwardly explained in the framework I propose.

This work addresses the motivation of pied-piping, which I claim to be a repair of BARRIER constraint violations. What gets pied-piped will vary from language to language, depending on which BARRIER constraints are highly ranked. This view of pied-piping sheds new light on pied-piping with inversion in Tzotzil (Aissen 1996, Trechsel 2000).

2. Split scrambling and constraint interaction

I claim that the availability of split scrambling in a language depends on the relative status of two opposing requirements: the requirement to move wh-elements, topics, foci, or verbs on the one hand, and the requirement to obey barriers on the other. Two types of constraints encode those requirements in the analysis: movement constraints and barrier constraints.

The chief difference between Russian and English lies in the different rankings of these two types of constraints. In Russian, the movement constraints take precedence over barriers, yielding relative freedom of movement. In English, barriers take precedence over movement constraints, yielding a system where the movement is rather constrained.

Before introducing the barrier constraints, I will briefly show why the difference between English and Russian cannot be captured with the constraints that have already been proposed in the OT syntax literature: STAY and MINLINK (Legendre et al. 1998).

2.1. STAY and self-conjoined BARRIERS are not enough

STAY is the constraint frequently used in OT syntax to prohibit movement (Bakovic 1998, Grimshaw 1997, Grimshaw and Samek-Lodovici 1998). However, (2) demonstrates that the difference between Russian and English is not due to the number of traces, but rather to the kinds of XPs crossed. The only grammatical

examples in (2) are the ones in which the topicalized element 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 generally does not permit movement out of a non-L-marked DP (Chomsky 1986).

(2)   Number of traces vs. kind

		Barriers crossed	Number of XPs crossed	STAY violations
a.	$[_{DP}$Books$]_1$ I $[_{VP}$ like $t_1]$	VP	1	*
b.	$[_{DP}$That$]_1$ I have $[_{VP}$ looked $[_{PP}$ at $t_1]]$	VP, PP	2	*
c.	$[_{DP}$ Troy$]_1$ he has $[_{VP}$ read $[_{PP}$ about $t_1]]$	VP, PP	2	*
d.	*[Those$]_1$ we $[_{VP}$ ate $[_{DP}$ t_1 potatoes]	VP, DP	2	*
e.	*[Potatoes$]_1$ we $[_{VP}$ eat $[_{DP}$ Idaho $t_1]]$	VP, DP	2	*
f.	*[Martha's$]_1$ we $[_{VP}$ ate $[_{DP}$ t_1 potatoes]]	VP, DP	2	*
g.	*[Potatoes$]_1$ we $[_{VP}$ ate $[_{DP}$ Martha's $t_1]]$	VP, DP	2	*

Barrier constraints have a precedent in OT syntax: the MINLINK hierarchy …>>BAR^3>>BAR^2>>BAR (Legendre et al. 1998), which states that crossing two barriers is universally worse than crossing one, crossing three is worse than crossing two, etc. Constraints that count the number of crossed barriers likewise cannot distinguish between grammatical and ungrammatical extraction in English: both the grammatical (b) and (c) and the ungrammatical (d-g) have only two barriers crossed.

To distinguish between English and Russian, we need constraints against movement that are domain-sensitive: they should state that extraction is acceptable out of some XPs but not out of others. In addition to STAY I propose a set of violable constraints that define VP, PP and DP as barriers[1].

3. Barrier constraints

The constraints that determine whether a type of movement can extract from a type of phrase are discussed in this section. Only three types of barriers are discussed.[2]

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1.   This framework can be compared to Chomsky's (1986) Barriers, where all XPs are barriers *a priori*, but the VP can be adjoined to, which nullifies its barrierhood, and IP is stipulated not to be a barrier. The system I propose gives all XPs barrier status without additional stipulations—if they don't appear to be barriers in a language, it is due to the language-specific ranking of the relevant constraints.
2.   Božena Cetnarowska (p.c) points out that Adjective and Adverb Phrases are violable barriers in Polish and Russian but not English. Consider:
     Bardzo bylam wczoraj zmeczona. *(Polish)*
     very   was   yesterday tired   'I was very tired yesterday.'
The Russian equivalent of this sentence is also grammatical, while the English gloss isn't. The cross-linguistic status of APs as barriers and their position in the barrier hierarchy is an issue I leave for future research.

(3)   Constraints against movement:

      DP BARRIER: A non-L-marked DP is a barrier.
      PP BARRIER: PP is a barrier.
      VP BARRIER: VP is a barrier.

The BARRIER constraints should be understood as prohibitions on coreference between an element outside a phrase and a trace inside the phrase, for example, the PP BARRIER can be spelled out as: $XP_1 \ldots [_{PP} \ldots t_1 \ldots]$. Compare Pesetsky's (1998) ISLAND CONSTRAINTS: $*\alpha \ldots [_{island} \ldots \beta \ldots]$, where β is the trace of α and unpronounced.

The constraints requiring movement that are relevant to the analysis of English and Russian are listed in (4).

(4)   Constraints that require movement:

      ALIGN-R (PRESENTATIONAL FOCUS, CLAUSE) Align the right edge of the Presentational Focus with the right edge of the Clause. (Adapted from Grimshaw and Samek-Lodovici 1998).
      ALIGN-L (TOPIC, CLAUSE) Align the left edge of the Topic with the left edge of the Clause.
      CFOCUS SPEC: Contrastive Focus appears in the specifier position. (cf. OP-SPEC, Bakovic 1998, Grimshaw 1997)

4. An OT analysis of Russian DP splitting

I follow the standard assumption in the literature on Russian word order that split scrambling is motivated by discourse/pragmatic factors (Bailyn 1995, King 1995, Kondrashova 1996, Krylova and Khavronina 1984, Sekerina 1997, Yokoyama 1986). Thus, topics are moved into topic positions, and the two kinds of focus into their focus positions[3], whether or not these topics and foci constitute whole DPs. Adjectives, nouns, possessors, and quantifiers can all be extracted out of DPs if they are the designated topics or foci in the context. In sum, topics, contrastive foci and presentational foci all move *despite* the DP barrier.

In the examples that follow, the discourse status of moved elements is indicated in the gloss. For example, (5) could be an answer to the question 'What kind of

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3.   I follow Kiss (1998) in distinguishing between contrastive (identificational) focus and presentational (information) focus. In the literature on Russian word order, these two types of focus are often dubbed 'emotive,' or 'speaker-oriented' vs. 'non-emotive,' 'listener-oriented,' etc. (Hajicová et al 1998). The relevant properties are position (spec, CP for CFocus and clause-final for PFocus) and quantificational force (CFocus, yes, PFocus, no).

gorillas did you see at the zoo,' where 'big' constitutes new information and is a presentational focus, and 'gorilla' is the central concern of the discussion, or a topic.

(5) <u>Gorillu</u>   my videli   v zooparke   **bol'šuju**.
     gorilla$_{Topic}$ we saw   in zoo   big$_{PresFoc}$
     We saw a **big** gorilla at the zoo.

Sections **4.1-4.3** discuss the three discourse functions along with the relevant rankings.

4.1. Presentational focus

Whether or not both parts of the DP move depends on their discourse status. In (5), both subparts of the DP have special status, but in (6) only the noun is designated as presentational focus by Schwarzchild-style F-marking (Schwarzchild 1999, see also Selkirk 1984, 1995) and therefore only the noun is moved.

(6) My videli [<u>bol'šuju</u> t_1]   v   zooparke   **gorillu**$_1$.
     we saw   big   in   zoo   gorilla$_{PresFoc}$
     We saw a big **gorilla** at the zoo.

The presentational focus position is the clause-final position at the right edge of the clause (King 1995, Kondrashova 1996). Even adjuncts may not appear there if another element is the presentational focus (7). I assume that presentational foci right-adjoin to IP (or CP), and that their movement is obligatory.

(7) Q: Of the big animals, what did you see at the zoo?
     #<u>Bol'šuju</u> my videli   **gorillu**   v   zooparke.
     big$_{Topic}$ we saw   gorilla$_{Focus}$ in   zoo
     #As for big (animals), we saw a **gorilla** at the zoo.

Presentational focus movement motivates the ranking in (8): ALIGN-R (PRESFOCUS) >> DP BARRIER. The losing candidate (8a) does not split up the DP, or attempt to align the presentational focus. It fails the highly ranked ALIGN-R (PFOCUS). Candidate (b) is an attempt to avoid a barrier violation and to reduce the alignment violation by pied-piping the entire DP that contains the presentational focus. This candidate fails because alignment is not perfectly satisfied, since the edge of the presentational focus constituent does not coincide with the edge of the IP. The winner is (c), which leaves the DP remnant in situ and right-aligns 'big'.

(8)   Presentational focus moves despite the DP barrier

	see (x,y,z) x=we, y=**big$_F$** gorilla, z=in zoo	ALIGN-R PFOC	DPBARR
a.	[$_{IP}$we saw [$_{DP}$**big$_{presF}$** gorilla] in zoo $_{IP}$]	*!** (gorilla, in, zoo)	
b.	[$_{IP}$[$_{IP}$ we saw t$_1$ in zoo] [$_{DP}$[$_{AP}$**big**]$_{presF}$ gorilla]$_{IP}$]	*! (gorilla)	
c.→	[$_{IP}$[$_{IP}$we saw [$_{DP}$t$_1$ gorilla] in zoo] [$_{AP}$**big**]$_{presF}$$_{IP}$]		*

Thus, not only must presentational focus move to the right edge, it must move alone. This point will be addressed again in the section on pied-piping, **4.4.**

4.2. Topic

Like presentational focus, topics must appear at the edge of the clause. Several topics may stack at the left edge of the clause (9). Because topics precede even wh-words, I assume that they left-adjoin to the highest clause, be it CP or IP.

(9)   <u>Belogo</u>   včera   kto   videl   <u>medved'a</u>?
       white$_{Topic}$ yesterday$_{Topic}$ who   saw   bear
       Who saw a white bear yesterday?

Thus, the requirement to put topics at the left edge also overrides DP BARRIER. The ranking is shown below. Candidate (a), which moves nothing, loses on the high-ranked ALIGN-L TOPIC. 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. Candidate (b) is the runner-up—it does not split up the DP, but pied-pipes it to the topic position. It would win in a language with the opposite ranking of DP BARRIER >> ALIGN-L (TOPIC).

(10) ALIGN-L (TOPIC) >> DP BARRIER

	see (x,y,z) x=we , y=big **gorilla$_{Topic}$**, z=in zoo	ALIGN-L TOPIC	DP BARR
a.	[$_{IP}$we saw [$_{DP}$big **[gorilla]$_{Top}$**] in zoo]	*!**	
b.	[$_{IP}$[$_{DP}$big **[gorilla]$_{Top}$**]$_1$ [$_{IP}$we saw t$_1$ in zoo]	*!	
c.→	[$_{IP}$**[gorilla]$_{1\,Top}$** [$_{IP}$ we saw [$_{DP}$ big t$_1$] in zoo]		*
d.	[$_{IP}$**[gorilla]$_{1\,Top}$** [$_{IP}$ we saw [$_{DP}$ t$_2$t$_1$] in zoo]big $_{2\,IP}$]		**!

Although split scrambling is routine in Russian, it only happens in appropriate contexts. Gratuitous movement exhibits is disallowed (10d, 11). In (11), 'big' is not designated as presentational focus. Candidate (10d) violates DP barrier twice, once for each trace.[4]

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4.   Of course, (10d) is not the only possible structure. The entire remnant DP can be moved to the right edge after 'gorilla' has been extracted, as in [$_{IP}$**[gorilla]$_{1\,Top}$** [$_{IP}$ we

(11) #<u>Gorillu</u>   my videli v zooparke **<u>bol'šuju</u>**
gorilla   we saw   in zoo   big
#We saw a big gorilla at the zoo.

Topic and presentational focus often move simultaneously, as in (5). This is because both of the alignment constraints dominate DP BARRIER, and STAY.

(12) ALIGN-R PFOCUS, ALIGN-L TOPIC >> DP BARRIER, STAY

see (x,y,z) x=we, y=**big$_F$ gorilla$_{Topic}$**, z=in zoo	ALIGN-L TOPIC	ALIGN-R P FOCUS	DP BARR	STAY
a. [$_{IP}$we saw [$_{DP}$**big$_{presF}$ gorilla$_{Topic}$**] in zoo]	*!**	***		
b. [$_{IP}$[**gorilla$_{Topic}$**]$_2$ we saw [$_{DP}$t$_1$ t$_2$] in zoo][**big$_{presF}$**]$_{IIP}$]]			**	**
c. [$_{IP}$**gorilla$_{1\,Topic}$**[$_{IP}$we saw[$_{DP}$t$_1$ **big$_{presF}$**] in zoo]		*!*	*	*
d.→ [$_{IP}$[**gorilla$_{Topic}$**]$_2$ we saw t$_1$ in zoo][$_{DP}$ **big$_{presF}$** t$_2$]$_{IIP}$]			*	**

4.3. Contrastive focus

Contrastive focus appears in a fixed position, the specifier of CP (IP in King 1995). It is in complementary distribution with wh-words and has similar quantificational force (Rooth 1995).

(13) Context: Yesterday, I thought you adopted a **small** gorilla.
<u>Bol'šuju</u>   my včera   usynovili <u>gorillu</u>.
big$_{CFoc}$ we yesterday adopted   gorilla
Yesterday we adopted a **big** gorilla.

The constraint that motivates contrastive focus movement is CFOCUS SPEC, or 'contrastive focus must appear in specifier position'. Contrastive focus moves to the specifier position despite the DP BARRIER.

(14) CFOCUS SPEC>>DP BARRIER

adopt (x,y,z) x=we, y=**big$_{Foc}$** gorilla, z=yesterday	CFOCUS SPEC	DP BARR
a.→ [$_{CP}$**big$_{1\,CF}$** [$_{IP}$we adopted [$_{DP}$t$_1$ gorilla] yesterday]]		*
b. [$_{IP}$we adopted [$_{DP}$**big$_{CF}$** gorilla] yesterday]	*!	

Topics precede contrastive focus (15). The positioning of topics and contrastive foci does not conflict, since topics are aiming to be at the left edge of the clause, and

saw in zoo][$_{DP}$ big t$_1$] $_{IP}$]. This candidate would not compare to (c) favorably, though, because it would violate STAY in addition to DP BARRIER.

contrastive foci are moving to a specific position. The ranking of CFOCUS SPEC and ALIGN-L TOPIC cannot be established.

(15) Context: Speaking of gorillas, I hear they adopted a small one yesterday.
  <u>Gorillu</u>   včera   **bol'šuju**   oni usynovili.
  gorilla$_{Topic}$ yesterday$_{Topic}$ big$_{CFoc}$ they adopted
  As for the gorilla, yesterday they adopted a **big** one.

Throughout this discussion, the main focus has been on DPs. However, all of the claims apply to movement out of PPs and VPs (see also fn. 2). There are 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 (Nowak 2000, Sekerina 1997):

(16) <u>V berezovoj</u>   oni gul'ali <u>rosche</u>.   *<u>Berezovoj</u> oni gul'ali <u>v rosche</u>.
  in birch   they walked forest   *<u>Berezovoj rosche</u> oni gul'ali <u>v</u>.
  They walked in a birch forest.

With these complications noted, I assume that all movement requirements dominate all the BARRIER constraints and STAY:

(17) ALIGN-R PFOCUS, ALIGN-L TOPIC, CFOCUS SPEC >> DP BARRIER, VP BARRIER, PP BARRIER, STAY

4.4. The pied-piping problem

Because the analysis relies on edge alignment, it makes a problematic prediction: if the element to be moved is already at the target edge of its DP, it will always be better to pied-pipe the entire phrase than to violate DP BARRIER. For example, if the presentational focus is the noun, it will always be better to right-align the entire DP than to extract the noun, because pied-piping satisfies both DP Barrier and Alignment: [adj $N_{F\text{-marked}}$ $_{DP}$]$_{IP}$] > [adj t_1 $_{DP}$].....$N_{F\text{-marked}}$ $_{IP}$]. In effect, the split candidate is *harmonically bounded* by the pied-piping candidate.

The prediction is spelled out in (18): the expected winner for Russian is the split scrambled winner, but the actual winner is the pied-piped candidate.

(18) Wrong prediction:

see (x,y,z) x=we, y=big **gorilla$_F$**, z=in zoo	ALIGN-R PFOCUS	DP BARR
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$_{presF}$** $_{IP}$]		*!
see (x,y,z) x=we, y=**big$_F$** gorilla, z=in zoo	ALIGN-R PFOCUS	DP BARR
c. [$_{IP}$[$_{IP}$ we saw t$_1$ in zoo] [$_{DP}$**big$_{presF}$** gorilla]$_1$ $_{IP}$]	*!	
d.→ [$_{IP}$[$_{IP}$ we saw [$_{DP}$ t$_1$ gorilla] in zoo] [**big**]$_{presF}$ $_{IP}$]		*

What is peculiar about (18) is that the pied-piping winner (a) coexists with the split winner (d), and the only difference between them is whether the F-marked element is canonically on the right edge of its phrase. While it turns out that systems with such asymmetrical pied-piping may exist (e.g. Tzotzil, sec. **4.4.1**), Russian is not such a system—foci and topics move out of DPs regardless of their position in the phrase.

I assume that another constraint prefers the split candidate (18a)—a constraint that demands that only things with features move. I propose that the constraint is *PIED PIPING.[5] This constraint is a version of Chomsky's economy principle (20) (Chomsky 1995: 262).

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

(20) Feature F carries along just enough material for convergence.

In Colloquial English, *PIED PIPING dominates PP BARRIER but not DP BARRIER, so objects of prepositions are routinely extracted, but whole DPs are pied-piped for wh-movement and topicalization. In Colloquial Russian, *PIED-PIPING dominates all of the DP BARRIER constraints, and nothing is pied-piped.

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

see (x,y,z) x=we, y=big **gorilla$_F$**, z=in zoo	*P- PIPING	DP BARR
a. [$_{IP}$we saw t$_1$ in zoo[$_{DP}$big [**gorilla**]$_{presF}$]$_1$ $_{IP}$]	*!	
b.→ [$_{IP}$ we saw [$_{DP}$ big t$_1$] in zoo [**gorilla**]$_{1 presF}$ $_{IP}$]		*

The factorial typology of *PIED-PIPING predicts the existence of asymmetrical pied-piping. Tzotzil might be one example of the type (Aissen 1996, Trechsel 2000).

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5.   This is a departure from the analysis in the earlier version of the paper (Gouskova 2001). I would like to thank Fabian Heck for alerting me to the Tzotzil facts, which led me to reconsider the pied-piping analysis.

(22) Factorial typology of pied-piping

	*P-P	DP BARR	MOVE	Language type
a. ***P-P**, DP>>MOVE			*	No movement
b. ***P-P**, MOVE>>DP		*		Split scrambling
c. DP>>MOVE>>***P-P**	*			Whole DP moves
d. MOVE>>DP>>***P-P**	*			Asymm. pied-piping (Tzotzil)

4.4.1. Tzotzil pied-piping

Tzotzil is a VOS language, in which genitives normally follow the head noun (23). When the possessor is questioned, it is moved to spec, CP, optionally pied-piping the entire DP to the left (24 and 25). The order of possessor-noun is then reversed: the canonical noun-possessor order is ungrammatical if the possessor is interrogative or focused (26) (Aissen 1996).

(23) I-cham   x-ch'amal li   Xun-e.   (24) [Buch'u x-cha'amal]$_1$ i-cham t$_1$?
     CP-died   A3-child   the Xun-ENC   who   A3-child   CP-died
     Xun's child died.   Whose child died?

(25) <u>Buch'u</u>$_1$ i-cham [x'cha'amal t$_1$]?   (26) *[<u>X-ch'amal buch'u</u>]$_1$ i-cham t$_1$?

This pattern is expected in a language of the type (22d). In Tzotzil, the reordering of the pied-piped DP is forced by an alignment constraint ALIGN-L WH, CLAUSE, which requires the wh-word to be at the left edge of the CP, [$_{CP}$[$_{DP}$***whose child*** ≻ [$_{CP}$[$_{DP}$ ***child whose***. DP BARRIER and *PIED-PIPING are optionally satisfied (24/25), at the expense of violating the normal DP structure constraints[6].

5. The typology of barrier constraints

In this section, BARRIER constraints are discussed in more detail. OT constraints are freely re-rankable, and every ranking permutation should yield a possible grammar. It is necessary to check whether the barrier constraints proposed here withstand this test. If they do, we expect to find that different languages restrict movement out of different barriers, and that different types of movement don't have to respect the same barriers. With some adjustments, both of these predictions hold.

Languages do vary in what constituents they count as barriers. English allows VPs and PPs to split, but not DPs (unless L-marked). Malagasy does not even allow the object to leave its VP—it must become a passive subject first (Keenan 1976,

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6.   This proposal could be developed using Grimshaw's (2000) constraints that determine the order of specifiers and heads in phrases.

Pearson 1998a, b)[7]. Yaqui allows discontinuous DPs, but postpositions must doubly
attach to both parts of a discontinuous DP, which suggests that DPs are not barriers but
PPs are (Dedrick and Casad 1999). A small typology of movement possibilities across
languages is given below. Noticeably, VPs are less likely to be barriers compared to
PPs and DPs.

(27) Barriers across languages

	movement out of VP	movement out of PP	movement out of DP
Malagasy	no	no	no
French		no	no
English			no
Yaqui[8]		no	
Russian			

The actual typology is not matched by the factorial typology of BARRIER
constraints, assuming Barriers are freely re-rankable: several of the possible rankings
of barriers with just one hypothetical constraint requiring movement do not correspond
to attested languages (to my knowledge).

(28) Factorial typology of "MOVE", VP BARR, PP BARR, DP BARR

Rankings	VP	PP	DP	Attested
"MOVE" >>VP BRR, PP BRR, DP BRR				Russian
VP BRR>> "MOVE" >>PP BRR, DP BRR	no			?
PP BRR>>"MOVE" >>VP BRR, DP BRR		no		Yaqui
DP BRR>> "MOVE" >>PP BRR, VP BRR			no	English
PP BRR, VP BRR>>"MOVE" >> DP BRR	no	no		?
PP BRR, DP BRR >> "MOVE" >> VP BRR		no	no	French
VP BRR, DP BRR >> "MOVE" >>PP BRR	no		no	?
VP BRR, PP BRR, DP BRR >>"MOVE"	no	no	no	Malagasy

The attested types in the factorial typology all respect VP BARRIER if they respect
either PP or DP BARRIER. This seems to suggest that the Barrier constraints form a
fixed ranking, such that movement out of PP and DP is more marked than movement

7.   Keenan (1976) discusses the Subject-Object asymmetry in raising,
passivization, clefting, wh-movement. Objects may not leave the VP unless they
become passive subjects first. In topicalization, objects but not subjects obligatorily
leave resumptive pronouns in the VP.
8.   Other languages that might fall into this type are Spanish and Italian, which
both allow limited DP splitting (José Camacho and Vieri Samek-Lodovici, p.c.).

out of VP[9]. Movement out of VP may be relatively unmarked for a variety of reasons: V is a theta-role assigner and case-assigner, and VP is simply larger than PP and DP (recall MINLINK, Legendre et al. 1998: crossing several barriers is always worse than crossing just one, and PP and DP are often embedded in VP). The predictions associated with the hierarchy are stated below.

(29) DPBARRIER, PPBARRIER>>VPBARRIER[10]

> **Prediction I**: If a kind of movement can escape DPs or PPs, it should also escape VPs. E.g., if topics move out of DPs or PPs, they also move out of VPs. Conversely, if topics do not move out of VPs, they won't move out of DPs or PPs.
>
> **Prediction II**: Because different constraints can be interspersed with the barrier hierarchy, the barriers for some kinds of movement are not necessarily the same as barriers for other kinds of movement.

Malagasy supports prediction I: there is no wh-movement or topicalization out of VP, and the entire VP is pied-piped to the left edge, resulting in VOS surface order (Pearson 1998a, b). The ranking in (30) derives this pattern. ("VERB FIRST" is a cover term for whatever forces verb movement. See Pearson's work for a hypothesis on the nature of the requirement).

(30) DPBRR, PPBRR>>VPBRR>>"VERB FIRST">>*PIED-PIPING >> WH-SPEC,
     ALIGN-TOPIC, ALIGN-FOCUS

	<verb, x, y> x=subject, y=object	VP BRR	"VERB FIRST"	*P-PIPING
a.	[$_{IP}$ subj [$_{VP}$ **verb obj** $_{VP}$]$_{IP}$]		*!	
b. →	[$_{XP}$[$_{VP}$ **verb obj**]$_1$ subj **t$_1$** $_{VP}$]$_{IP}$]			*
c.	[$_{XP}$ **verb$_1$** [$_{IP}$subj [$_{VP}$ **t$_1$ obj**$_{VP}$]$_{IP}$]$_{XP}$]	*!		

English is a mixed-type language (prediction I), which allows topicalization and wh-movement, but not out of DPs, unless L-marked. The ranking for English is given below.

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

Mandarin Chinese supports prediction II, as it has free topicalization out of DPs, but no Wh-movement.

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9.   This partially ranked hierarchy is reminiscent of the coronal unmarkedness hierarchy in phonology: *labial, *velar > *coronal.

10. Again, this is a departure from the earlier version of the paper, where the hierarchy was claimed to be DP BARRIER>> PP BARRIER>> VP BARRIER.

(32) ALIGN-L TOPIC >> DPBrr, PPBrr>>VPBrr>>WH-SPEC

To sum up, adding the barrier hierarchy to the set of universal constraints appears to make some interesting predictions about movement that appear to be supported by the typology.

6. Conclusion

My analysis attributes the difference between English and Russian with respect to DP splitting to the different ranking of DP BARRIER, which is proposed to be a violable constraint in a hierarchy of barriers. In English, DP BARRIER dominates the Focus/Topic Alignment constraints, whereas in Russian, the Alignment constraints force its violations.

The barrier constraints are a necessary addition to the set of universal constraints in OT syntax. Adding them makes the right predictions if they are in a partially fixed hierarchy. The barrier typology supports the hierarchy.

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