FASL 26, 2017

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The Urbana-Champaign Meeting 2017

edited by Tania Ionin and Jonathan E. MacDonald

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Preface

The twenty-sixth annual meeting of Formal Approaches to Slavic Linguistics was held at the University of Illinois at Urbana-Champaign on May 19-21, 2017. The meeting included a Special Session on the Acquisition and Processing of Slavic Languages. Invited keynote speakers were Stephanie Harves and Darya Kavitskaya for the main session, and Alexandra Perovic, Irina Sekerina and Natalia Slioussar for the special session. We received 66 abstracts. 25 were accepted as paper presentations and 19 as posters; the final program featured 24 paper presentations and 11 posters. All of the presenters were invited to submit papers for this volume. The 25 papers included in this volume were carefully reviewed and revised.

We would like to acknowledge the people and institutions that provided financial support for FASL 26. Without them, the meeting would not have been possible. Funding was provided by the National Science Foundation (BCS-1651183), and the following units at the University of Illinois at Urbana-Champaign: the School of Literatures, Cultures and Linguistics, the Department of Linguistics, the Department of Slavic Languages and Literatures, the Second Language Acquisition and Teacher Education Program, and the Russian, East European and Eurasian Center.

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The Editors

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(No) Variation in the Grammar of Alternatives: Intervention Effects in Russian.*

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1 Introduction

This paper investigates intervention effects in Russian. The goal is to figure out what we can learn from them about the grammar of alternatives (i.e. the semantics of focus and questions) in Russian and about its crosslinguistic variation/uniformity. In this paper, we contribute new data on Russian intervention effects and locate Russian in the crosslinguistic landscape of intervention effects. Intervention effects are a thriving field in the linguistic literature, however, little is known about Russian or Slavic intervention effects (but cf. Fanselow & Féry 2013 on Left Branch Extraction (LBE) in Slavic languages where intervention effects are used to distinguish between strong and weak LBE). This paper sets out to make a contribution to this area of research for Russian.

^{*} We want to heartily thank our Russian consultants Natalia Berezovskaya, Eleonora Bogdanova, Larissa Kaminskaya, Tatiana Liubimkova, Zinaida Touraeva and Maria Yelenevskaya for their native speaker judgments. For feedback and discussion we thank Nadine Bade, Sigrid Beck, Julia Braun, Sehriban Erbektas, Stefan Heck, Verena Hehl, Vera Hohaus, Konstantin Sachs and Benjamin Ulmer. We are also grateful to the FASL 26 audience for useful and thoughtful feedback. Research for this project is conducted within project C1 of the Collaborative Research Center 833, for which funding is provided by the German Research Foundation.

Intervention effects (Beck 1997, Pesetsky 2000, Beck 2006, i.a.) describe the observation that a class of operators including negation, focus-sensitive particles and certain quantifiers lead to ungrammaticality when they occur in a position separating a *wh*-pronoun from its associated Q-complementizer at LF, as in (1).

(1)
$$*[_{CP} Q [(wh) [... [intervener [... wh]]]]]$$

Intervention effects have been observed in a wide range of languages including German, Korean, Hindi, Turkish (Beck 1997), English, Japanese, French (Pesetsky 2000), Mandarin, Malayalam (S.-S. Kim 2002), Palestinian Arabic, Samoan, Yoruba, (Howell et al. under revision) etc. Previous work on intervention effects conjectures that they may even be universal (Beck 2006, p. 10). Some examples from English and German are given below in (2) and (3).¹

- (2) ^{??}Which boy *did* **only** *Mary introduce* which girl *to*? (Pesetsky 2000, p.80)
- (3) *Wen *hat* niemand wo *gesehen*?
 who_{ACC} has nobody where seen
 'Tell me the person-place pairs (x, y) such that nobody saw x at y.'
 (German, Beck 1997, p.29)

Russian is a multiple *wh*-fronting language (Stepanov 1998, Rudin 1988, Boškovic 2002, i.a.), making it a challenging case for intervention. In matrix questions, all *wh*-words must undergo fronting to a clause-initial position leaving *wh*-words in situ. The challenge is to construct configurations where a Q-binder is separated from its *wh*-pronoun. We will provide data showing that in Russian embedded questions, where *wh*-phrases may remain in a lower position, intervention effects are present. Our main claims are that **i.**) In Russian, focus-evaluating operators cause intervention effects when they occur between an alternative-generating item (like a *wh*-phrase) and its associated alternative-evaluating operator (like a *Q*-operator), and **ii.**) Cross-linguistically, the pattern in Russian

¹ Abbreviations in glosses: ACC.-accusative case, DAT.-dative case, EXCL.-exclusive particle, FEM.-feminine, FUT.-future, NEG.-negation.

aligns with observations about intervention in a number of other languages, suggesting that the grammar of alternatives (questions, focus) is subject to less variation than expected. The rest of the paper is structured as follows: Section 2 introduces the theoretical background about alternative semantics and intervention effects, section 3 discusses the structure and semantics of focus association and questions in Russian – the "prerequisites" for understanding and testing intervention. Section 4 presents the core data on intervention effects in Russian and Section 5 discusses conclusions to be drawn on the basis of the Russian data.

2 Theoretical Background: Alternatives and Intervention

Different accounts have been proposed to explain intervention effects, which each identify different syntactic, semantic and information structural properties of interveners as the root cause of intervention effects (see e.g. Beck 1997, Pesetsky 2000, Beck 2006, Mayr 2013). It's still not completely settled in the literature whether intervention is a unified phenomenon, and whether all instances of intervention are caused in the same way. This paper focuses on intervention effects that arise as a result of the way composition of alternative sets happens (Beck 2006). This section will provide a brief introduction to alternative semantics and to an alternative-semantic analysis of intervention effects.

2.1 Alternative Semantics

The semantics of some grammatical phenomena including focus (Rooth 1985, Rooth 1992) and questions (Hamblin 1973, Beck 2006) involves generating and manipulating sets of alternatives. Following Rooth (1985) this is often modeled using a second level of representation where alternatives are calculated in parallel to the ordinary semantic value of an expression. There has been extensive debate surrounding the details of frameworks for computing alternatives (cf. Rooth 1985, Wold 1996, a.m.o.) which we cannot do justice to here because of space constraints. We adopt a variant of a two-tiered alternative semantics that employs binding of variables introduced on the second level of interpretation to create sets of alternatives. In this system, alternative-introducing elements (including focus and *wh*-pronouns) introduce a variable that is assigned a value by a separate (distinguished) variable assignment, h, (in addition to the ordinary variable assignment function, g). The layer of representation

corresponding to a Roothian alternative-semantic tier is the ordinary semantic tier relative to this second assignment function.² Alternativeevaluating operators can bind distinguished variables to create sets of alternatives which can be used in different ways, for example as the question denotation, or to restrict a focus-sensitive operator. The exact inventory and nature of these operators remains an open question in the theoretical literature. A *Q*-operator is responsible for deriving question interpretations by binding one or more distinguished variables in its scope to form a set of propositions and taking this set as the question meaning. We follow Rooth (1992) in assuming that a single operator \sim , which restricts the value of a free variable to a particular set, is responsible for modeling all cases of association with focus.³ Let's look at how this works in sentences like (4). The focus/wh-pronoun introduces a distinguished variable (5)-(6). Composition happens via regular composition rules (function application, predicate abstraction etc.) and the alternativeevaluating operator binds the distinguished variable to form a set of alternatives.

- (4) Who left? / $Alfred_F$ left.
- (5) $[[Alfred_{Fi}]]^g = Alfred$ $[[Alfred_{Fi}]]^{g,h} = h(i)$ if *i* is in the domain of *h*, $[[Alfred_{Fi}]]^g$ otherwise
- (6) $[[Who_i]]^g$ is undefined $[[Who_i]]^{g,h} = h(i)$ if *i* is in the domain of *h*, $[[Who]]^g$ otherwise

Alternative-evaluating operators can either unselectively bind all distinguished variables in their scope, like the \sim -operator in (7) or do so selectively as in (8).⁴ The unselective \sim -operator works by restricting the

² Note that, unlike in a Roothian alternative semantics, the values of this second level of representation are not alternative sets themselves, rather sets are created by binding distinguished variables via alternative-evaluating operators. For a detailed discussion of the technical framework see the recent overview by Beck (2016).

³ Here again, there is debate in the literature (cf. Beaver & Clark 2003).

⁴ Due to space constraints, we have not spelled out meaning rules for a selective ~operator and an unselective Q here. Meaning rules and a discussion of their semantic effect can be found in Howell et. al. (under revision).

value of a free variable, C, to a particular set of propositions. This set is made up of the propositions we get by going through the different values that the distinguished variables within it could take. (For example in (4) we'd get "that Alfred left", "that Bert left", etc.). Crucially, this operator does not allow for higher alternative-evaluating operators to associate with foci in its scope. The "alternative" value of the expression that results from this meaning rule is identical to its ordinary value and no longer contains distinguished variables that could be targeted by higher operators. By contrast, the selective Q-operator only binds co-indexed distinguished variables. This operator creates a set of alternative propositions, i.e. the question set, containing propositions where co-indexed distinguished variables receive each possible value of the right semantic type. The crucial difference to the ~-operator is that non-co-indexed distinguished variables are not affected. The resulting "alternative" value can still contain distinguished variables targeted by a higher alternative-evaluating operator.

- (7) MEANING RULE ~ (unselective) If $\alpha = [\sim C \beta]$, then for any g,h: $[[\alpha]]^g$ is only defined if $g(C) \subseteq \{[[\beta]]^{g,h} | h \text{ is a total distinguished variable assignment}\}.$ Then $[[\alpha]]^g = [[\beta]]^g$ $[[\alpha]]^{g,h} = [[\beta]]^{g,\rho}$
- (8) MEANING RULE Q (selective): If $\alpha = [Q_i \beta]$ then for any g,h: $[[\alpha]]^g = \{[[\beta]]^{g, \rho[x/i]} | \mathbf{x} \in \mathbf{D} \}$ $[[\alpha]]^{g,h} = \{[[\beta]]^{g,h[x/i]} | \mathbf{x} \in \mathbf{D} \}$

Whether an alternative-evaluating operator binds all the distinguished variables in its scope is an empirical question: Unselective operators do not allow other alternative-evaluating operators higher in the structure to bind distinguished variables within its scope. Selective operators, on the other hand, allow for association of higher operators with distinguished variables within their scope.

2.2 Explaining Intervention Effects

Intervention effects arise as a consequence of the way alternativeevaluating operators interact with one another (Beck 2006, 2016): Unselective alternative-evaluating operators block other operators from association with distinguished variables introduced within their scope, as in (9), leading to a crash in the derivation.

(9) *[$Q \dots [\sim_{unselective} [\dots wh]]$]

Consider the example of an intervention effect caused by the focussensitive particle *only* in (10-b), which is associated with the LF-structure in (11). An alternative-semantic account of intervention attributes the badness of (10-b) to the fact that the unselective \sim -operator binds the distinguished variable introduced by the in situ *wh*-phrase *which girl*. By the meaning rule for \sim in (7), the semantic value of the resulting expression, relative to both the ordinary and distinguished assignment functions (i.e. its "alternative-semantic value") is undefined, leading to a crash in the derivation because the Q-operator cannot bind the distinguished variable introduced by its associated *wh*-pronoun.

- (10) a. Which boy *did Maria introduce* which girl *to*?
 b. *Which boy *did only Maria_F introduce* which girl *to*?
- (11) $[Q \text{ [which boy}_2 \text{ [only}_C [\sim_{unselective} C] \text{ [Maria}_F \text{ intro}_w \text{ which girl}_1 \text{ to } t_2]]]]$

Beck (2006) argues that \sim is an unselective binder of distinguished variables and that any item requiring focus association (mediated by \sim) should give rise to intervention effects. Further evidence comes from association of a \sim -operator within the scope of another alternative-evaluating operator, as in (12), which is also judged by many to be unacceptable.

(12) a. */? [~_i ...[~_{ii} ...F_i ... F_{ii}]]
b. CONTEXT: I only introduced Sue to TED.
??I also only introduced MARYLIN to TED.

There is disagreement in the literature about whether these constructions are acceptable or not. Wold (1996) and Krifka (1992) claim that they are acceptable, whereas Beck (2006, 2016) reports them to be unavailable. A quantitative study done by Beck & Vasishth (2009) provides evidence that they are indeed judged as less acceptable by native speakers, compared to similarly complex controls. While these multiple focus constructions are an important data point, the disagreement in the literature over the basic facts in English suggests that quantitative experimental data is a better way to investigate this phenomenon. Since we have not carried out a quantitative study for the Russian data, we leave an investigation of these constructions for future work.

On the other hand, the *Q*-operator does not seem to block association from within its scope, at least in English. Examples like (13) illustrate that the alternative-evaluating Q-operator does not give rise to intervention effects, suggesting that it is a selective binder of distinguished variables.

- (13) a. I only told Peter [Q who read "Anna Karenina"F].
 ...(I didn't tell him who read War and Peace.)
 - b. [only_C [[~C] [I tell Peter [Q_{selective} [who read "Anna Karenina"_F]]]]]

Similarly, a matrix Q-operator can bind a *wh*-pronoun within an embedded question, across the scope of a second Q-operator. This configuration corresponds to the matrix-multiple-question reading of so-called Baker Ambiguities (Baker 1968), as in (14). In this example, the *wh*-pronoun *which book* can be bound by the matrix *Q*-operator to yield the interpretation in (14-c).

- (14) a. $[Q_i \dots [Q_{ii} \dots wh_{ii} \dots wh_i]]$
 - b. Who knows where we bought which book?
 - c. 'Which person-book pairs (x, y): x knows where we bought y.'

2.3 Crosslinguistic Variation Affecting \sim and Q

The theoretical picture we have drawn so far does not constrain which alternative-evaluating operators are selective or unselective, so, in theory, we should expect to find languages with any of the four following combinations of selective and unselective \sim and Q-operators in Table 1. Variation in the selectivity properties of \sim and Q would manifest

themselves via variation concerning intervention effects: Configurations where \sim separates an alternative-evaluating operator from the distinguished variable it binds should be ungrammatical if \sim is unselective and grammatical if it is selective.

Pattern 1	Pattern 2	Pattern 3	Pattern 4
Unselective ~	Unselective ~	Selective ~	Selective ~
Selective Q	Unselective Q	Selective Q	Unselective Q

Table	1.	Possible	crossling	nistic	variation	affecting	\sim and ()
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Similarly, constructions where Q separates a distinguished variable from the operator that binds it should be ungrammatical if Q is *unselective* and grammatical if Q is *selective*. In English the pattern seems to be unselective ~ and selective Q (i.e. Pattern 1). Crosslinguistically we need more data from these configurations to determine which patterns are attested. In this paper, we contribute new data from Russian that cover the relevant configurations (cf. (15)) and locate Russian on the crosslinguistic "map" just described. By this, we draw new insights about Russian intervention effects.

(15) Test configurations for Intervention Effects

- a. ASSOCIATION WITH Q ACROSS FOCUS: $[Q_i \dots [\sim_{ii} \dots F_{ii} \dots wh_i]]$
- b. ASSOCIATION WITH FOCUS ACROSS Q: $[\sim_i \dots [Q_{ii} \dots wh_{ii} \dots F_i]]$
- c. ASSOCIATION WITH Q ACROSS Q: $[Q_i \dots [Q_{ii} \dots wh_{ii} \dots wh_i]]$

3 Prerequisites: Questions and Focus in Russian

Before testing for intervention, we need to understand the structure of focus and questions in Russian, since the configurations discussed above have some syntactic requirements: For one thing, to test for association with ~ across a ~ or a Q boundary, we need to be able to separate a focus particle (and its ~) from the focused phrase with which it associates, as in (16). Similarly, to test for association with Q across a ~ or Q boundary, a

wh-pronoun must be able to grammatically remain in situ (or at least in an LF position within the scope of a focus-sensitive operator), as in (17):

(16)	$[Only \sim \dots [_{XP} \dots F \dots]]$	(Distance association with \sim)

$[17] [Q [_{XP} wh]]$	(Distance association	n with	Q)
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This section will review data from Russian on focus association (in section 3.1) and on questions (in section 3.2). We will show that both of these prerequisites are fulfilled in Russian, although we will see that because of the obligatory multiple fronting in matrix questions, embedded questions must be used instead to test intervention configurations requiring an insitu *wh*-phrase.

3.1 Focus Association in Russian

Russian focus is marked via intonation, and foci can additionally undergo scrambling (but this is not required, cf. Bailyn 2012). We use the exclusive particle *tol'ko* as an exemplary focus-sensitive particle. Syntactically, it can stand adnominally, adjacent to a focused constituent, or it can be adverbial, located at a distance from the focused constituent it associates with. The example in (18) illustrates that *tol'ko* associates with the object of the embedded clause long-distance, across a CP.

(18) CONTEXT: A cook has decided to poison his guests because he owes them big sums of money and is afraid of revenge. He decides to put poison into the soup. He doesn't realize, however, that the poison also gets into the meat and the potatoes. *Vanja tol'ko dumaet*, [CP čto otravil sup_F]. Vanja EXCL. thinks that poisoned soup 'Vanja only thinks that he poisoned the soup_F.' (He doesn't think that he also poisoned the potatoes, the meat...)

We'll assume a single unified lexical entry for both adverbial and adnominal *tol'ko* that operates on propositions with the lexical entry in (19) and, consequently, has a high position at LF, as in (20):

(19) $[[tol'ko]] = \lambda w_{<.} \lambda C. \lambda p: p(w). \forall q [q \in C \& (p \subseteq q \lor \neg q(w))]$

(20) [tol'ko_C [\sim_C [Vanja thinks [_{CP} he poisoned the soup_F]]]]

In this semantics for *tol'ko* its second argument is filled by a free variable of type $\langle st,t \rangle$ that is co-indexed with the variable restricted by \sim . What *tol'ko* asserts is that no non-entailed proposition in this set of alternatives is true. So, for example in (20) this would give us the assertion that the propositions "*that Vanja thinks he poisoned the potatoes*", "*that Vanja thinks he poisoned the meat*", etc. are false.

3.2 Questions in Russian

Russian is a multiple *wh*-fronting language (cf. e.g. Stepanov 1998, Rudin 1988, Bošcovic 2002), which is a problem when it comes to looking for cases of association with Q at a distance. The example in (21-b) where one *wh*-word is left in situ is not generally accepted by native speakers.⁵

(21) a. Kto kogo vstretil? Who who_{ACC} met
b. ^{??}Kto vstretil kogo? Who met who_{ACC}. 'Who met whom?'

It is also worth noting that the availability of pair-list readings for multiple questions in Russian has been questioned (cf. the discussion in Bailyn 2012, p.105), however our work with native speakers has supported the conclusion by Bailyn (2012) that pair-list readings are indeed available. We will assume a structure for multiple questions following Bailyn (2012) (and along the lines of Citko 1998, Dornisch 1988 for Polish, and Boškovic 1999 for Serbo-Croatian) as in (22) in which the highest *wh*-word moves into the Spec,CP position and the subsequent ones move into Spec,OpP positions. While the details concerning, for example, the precise landing site of moved *wh*-phrases don't play a big role for us, what is important is that both alternative-introducing *wh*-words undergo fronting to a position outside the scope of any potential ~-operator. Because of this, we do not

⁵ One of the younger consultants accepted this kind of sentences (where a *wh*-word is left in situ in matrix questions) without restrictions. This might point to a change in progress.

expect to observe any intervention effects with multiple (matrix) questions.

(22) $\left[S_{pecCP} wh_i \left[C' C \left[S_{pecOpP} wh_{ii} \left[O_{p'} Op \left[T_P t_i verb t_{ii} \right] \right] \right] \right] \right]$

Interestingly, in embedded multiple questions, we found that the requirement on multiple *wh*-fronting appears to be less strict than in matrix clauses. While doubly fronted *wh*-phrases are possible (and preferred), native speaker intuitions and corpus examples suggest that, at least in some cases, a lower *wh*-phrase is possible. The examples in (23) stem from elicitation with Russian native speakers⁶. Of 5 native Russian speakers, all accepted (a), 1 person accepted (b) without any restrictions and 2 stated that they would accept (b) in colloquial speech.

(23)	a. <i>Maria</i>	sprosila	[q	kto	čto	s "el].
	Maria	asked		who	what _{ACC.}	ate
	b. [?] Maria	sprosila	[q	kto	s"el	čto].
	Maria	asked		who	ate	what _{ACC.}
	'Maria	asked who	o ate	what.	,	

We also found instances of non-fronted embedded *wh*-phrases in corpora. The following examples are taken from the National Corpus of Russian Language (http://www.ruscorpora.ru/searchmain.html) and the Araneum Russicum Maius (www.korpus.cz).⁷

(24) CONTEXT: Éto okazalos' delom krajne trudoëmkim, poskol'ku nužno bylo vspomnit',... (This turned out to be a very time-consuming thing, because you had to remember,...)⁸.
...kto pokupal kakuju čašku, č''ja imenno mama ...who bought which cup, whose exactly mom

⁶ We have to point out that speakers varied with respect to how good they found nonfronted *wh*-questions in embedded contexts. We only tested the intervention data with those speakers who did accept non-fronted embedded questions and, as we will see Section 4, these speakers found intervention configurations within them markedly worse than the corresponding sentences without intervention.

⁷ We express our gratitude to Stefan Heck who helped us with the corpus search.

⁸ The transliteration and glossing are ours.

darila Zjabrikovoj šuhu offered ZjabrikovaDAT. fur coat... "...who bought which cup, exactly whose mom offered the fur coat to Zjabrikova...' Source: National Corpus of Russian Language (25) I ja ne znaju, **kto** pobeždaet kogo tot v And I NEG. know who conquers who_{ACC.} at that moment,... moment,... 'And I do not know who is conquering who at that moment ...,' Source: Araneum Russicum Maius

We assume that the lower *wh*-phrases are interpreted in their (in situ) surface position, so that, for example (23-b) has an LF structure as in (26). Support for this comes from quantified NPs: Ionin and Luchkina (2014), for instance, show for quantifiers that covert movement is dispreferred to derive inverse scope readings, i.e. a change in word order changes quantifier scope. We suggest that, similarly, covert movement of *wh*-phrases in Russian is dispreferred.⁹

⁹ A reviewer points out that Ionin and Luchkina's observation about DP quantifiers might not extend to *wh*-movement. Another reason to believe that overtly in-situ *wh*-phrases are interpreted in-situ in Russian comes from so-called split constructions:
(i) *Čto za interesnye knigi tol'ko Olja mne prinesla?*

What for interesting books EXCL. Olja $I_{DAT.}$ brought_{FEM.} (ii) *Čto tol'ko Olja mne za interesnye knigi prinesla?

What EXCL. Olja I_{DAT} for interesting books brought_{FEM}. 'Which interesting books did only Olja_F bring me?'

According to introspective intuition, the sentence in (ii), where the exclusive intervener separates the two parts of the construction, is bad. Now, when the intervener *tol'ko* is absent, (ii) is well-formed. Beck (2006) argues that the interpretative contribution of the *wh*-phrase must take effect in the position of the remnant, i.e. that both parts of the *wh*-phrase have to be interpreted in situ in (ii) as in this LF:

 $[[]Q_1 [_ [tol'ko_C [~C [[Olja]_{F2} [čto_1 za interesnye knigi] mne prinesla]]]]]]$ The moved part thus behaves as if it occupied its original position. The parallel

behavior of these examples and the in-situ *wh*-phrases with respect to intervention suggests that in both cases, interpretation of the *wh*-phrase happens in the lower LF position.

(26) $[_{CP}$ Maria sprosila $[_{CP}$ Q kto $[_{VP}$ s"el čto]]]

Another place that we can still look for intervention effects in Russian is alternative questions. Some analyses of alternative questions treat disjunction on a par with a *wh*-phrase (A or $B \simeq$ which of A or B) and similar intervention effects have been observed with alternative questions in other languages (cf. Beck and Kim 2006). In Russian, since disjunction in alternative questions is not fronted, we can use them to test for intervention effects as well:

(27) *Ivan pil caj ili kofe*? – (*On pil*) čaj./kofe. Ivan drank tea or coffee? – (He drank) tea./coffee. 'Did Ivan drink tea or coffee? – (He drank) tea./ coffee.'¹⁰

Now that we have verified the prerequisites for testing intervention in Russian, we will turn to the data from intervention configurations in the next section.

4 Data: Intervention Effects in Russian

4.1 Selectivity Properties of ~ in Russian

First, let's look at cases where the ~-operator intervenes between a Q-operator and its associated *wh*-item. The data from intervention by a ~ in embedded multiple questions, cf. the configuration in (28) (cf. (15-a)), are in (29-b) and (30-b). Russian native speakers perceived sentences in which a focus-sensitive exclusive particle (*tol'ko*) occurred in a position between an embedded Q complementizer and a lower *wh*-phrase as degraded.

- (28) $[\dots [_{CP} Q_i \dots [\sim \dots [\dots wh_i]]]]$ (= (15-a))
- (29) CONTEXT: Masha has certain information on different people, namely pairs (*x*, *y*) such that she knows that Nadja gave x to y. There were different items on the picture that Nadja gave to different people.

¹⁰ Note that for the Russian alternative question reading, it is important to phonologically stress the disjuncts. For the polar question reading, the phonological stress is on the main verb of the sentence.

- a. [?]*Masha znaet* [komu *Nadja* čto *podarila*]. Masha knows who_{DAT}. Nadja what_{ACC}. offered 'Masha knows whom Nadja offered what.'
- b. **Masha znaet* [komu **tol'ko** *Nadja*_F čto *podarila*] Masha knows who_{DAT.} EXCL. Nadja what_{ACC.} offered 'Masha knows whom only Nadja_F offered what.'
- (30) CONTEXT: Petja is a detective. He is investigating a murder and has been working with different informants to find out where the suspects were on the day of the murder. He recently found out that one of his witnesses, Kolja, has been working with the mafia. So any information coming only from him cannot be trusted. Unfortunately, Petja didn't keep very organized notes, so he needs to ask his colleague for help to figure out which tips came from Kolja.
 - [?]Petja sprosil svoego kollegu [0 kogo Kolja a. Petia asked own_{ACC} colleague_{ACC} who_{ACC} Kolja gde uvidel]. where saw 'Petja asked whom Kolja saw where.' b. **Petja sprosil* svoego kollegu [0 kogo tol'ko Petja asked own_{ACC.} colleague_{ACC.} who_{ACC.} EXCL. $Kolja_F gde$ uvidel]. Kolja where saw

'Petja asked whom only Kolja_F saw where.'

Similarly, native speakers rejected alternative question interpretations of disjunctive questions when a focus-sensitive *tol'ko* occurred in an LF position between a *Q*-operator and the disjunction, illustrated in (31). An example is given in (32).

(31) *[$Q_i \dots [\sim \dots [\dots [_{DisjP} A \text{ or } B]_i]]$]

(32) CONTEXT: I know that of all of my friends, only Katja is planning to go to one of the two biggest Russian cities for her holidays, but I don't know to which one. I ask the following question:
Tol'ko Katja poedet [DisjP v Moskvu ili (v) Petersburg]?
EXCL. Katja go_{FUT.} to Moscow or (to) Petersburg Intended: 'For my friend Katja: is it the case that she (and no one else) will go to Moscow or Petersburg?'
- #V Moskvu./ V Petersburg.
- 'To Moscow./ To Petersburg.'

These data indicate that intervention effects do arise in Russian under the expected LF configurations. When a \sim -operator intervenes between an alternative *Q*-operator and its associate, this leads to ungrammaticality, suggesting that in Russian the squiggle binds distinguished variables unselectively, similar to what we observe in English.

4.2 Selectivity Properties of Q in Russian

Next, we'll look at whether the *Q*-operator causes intervention effects when it intervenes between an alternative-evaluating operator and the distinguished variable it binds. Let us first look at association with focus across an intervening *Q*-operator, as shown schematically in (33), cf. (15-b). (34) is an example of the exclusive particle *tol'ko* associating with a focus within an embedded question ('Petja' in our example). It is judged acceptable by native speakers.

- (33) $[\sim ... [Q...[...F...]]]$ (= (15-b))
- (34) CONTEXT: Masha is doing a study on the voting patterns of students. At a party, she meets Petja, Borja and Sonja. Of the three, Petja is the only student, so...
 Masha tol'ko sprosila, [Qza kogo progolosoval PetjaF]
 Masha EXCL. asked for who_{ACC}. voted Petja.
 'Masha only asked who PetjaF voted for.' (She is not interested in other people, since they are not students.)

Similarly, native speakers judged instances of association with a Q-operator from across an embedded Q (i.e. the matrix multiple question

reading of Baker Sentences, cf. (15-c)), as in (35), to be acceptable. An example is given in (36).

- (35) $[Q_i \dots [Q_{ii} \dots [wh_{ii} \dots wh_i]]]$ (= (15-c))
- (36) Kto *znaet* [Q gde *my* čto *kupili*]? who knows where we what_{ACC} bought 'Who knows where we bought what?'
 - 1. For which person x: x knows where we bought what
 - 2. For which x and y: x knows where we bought y

The fact that these sentences are judged acceptable on both readings shows that both of the relevant LF structures are possible and, since the second requires a selective Q, Russian must have a selective Q-operator.

The conclusion we draw for the Q-operator is that it does not lead to ungrammaticality when it intervenes between a \sim -operator or another Q and the distinguished variable it binds. That suggests that in Russian Q is a selective binder of distinguished variables.

5 Discussion

The data from intervention discussed in the previous section suggest that in Russian we need a selective Q-operator to model the alternative semantics of wh-questions (and, as a consequence, a semantic system for alternative semantics that allows us to express selective alternativeevaluating operators). We need an unselective ~-operator to model the alternative semantics of focus-sensitive particles like tol'ko. Considering at the crosslinguistic picture, the results for Russian align with what we have found for other languages in a collaborative crosslinguistic project looking at eight languages from different language families (Howell et al., under revision). Given the theoretical room for variation in this area, the crosslinguistic uniformity is surprising. The results from Russian support the crosslinguistic generalization put forward in Howell et al. that all languages associate with focus via an operator that unselectively binds distinguished variables in its scope and that in all languages the Q-operator binds distinguished variables introduced by wh-items or disjunction selectively.

Under the theory of intervention effects pursued in this paper, two things determine whether or not intervention effects are predicted: The selectivity/unselectivity of the "intervening" alternative-evaluating operator and its position at LF relative to a second alternative-evaluating operator (the "intervenee") – any time we get an LF configuration in which the intervener separates the "intervenee" from the distinguished variable it binds at LF our theory predicts intervention. Other characteristics, like clause-boundedness or the presence of syntactic islands should not affect intervention. As a reviewer points out, we might therefore expect to find intervention configurations in a wider range of different constructions in Russian and across other Slavic languages beyond what we discuss in this paper. We hope to look into these questions in future work.

The results from Russian also highlight an important methodological takeaway. Intervention effects arise under particular structural configurations, so it is important to consider the particular facts about the structure of questions and focus-sensitive particles in each language individually. In Russian, looking at the matrix questions yields no evidence for intervention, but looking at embedded and alternative questions, provides us with environments to test intervention effects.

This leaves us with some questions for further work. So far, only a very small sample of languages has been systematically tested for intervention effects and for the selectivity properties of its alternative-evaluating operators. Does this pattern generalize to other Slavic languages? A related but still unexplored question concerns the behavior of other alternative-evaluating operators, like the EXH-operator: Does the uniform crosslinguistic behavior of ~ and Q extend to these operators as well? Finally, what is the underlying reason for the observed crosslinguistic uniformity?

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Slavic Obviative Subjunctives*

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In this article, I investigate Slavic obviative subjunctives embedded under the volitional verb 'want'. I propose an analysis which is based on the operation Upward and Multiple Agree and which uses a quasi imperative operator. In contrast to most previous approaches, the proposal can also derive weakened obviation effects.

1 Subjunctives and Tense

Let us first look at tense properties of obviative subjunctives. East and West Slavic languages have the subjunctive (irrealis) marker by, which can only co-occur with the *l*-participle form of the verb (in Russian and Polish also with infinitives, in contrast to e.g. Czech), as shown by the following example from Russian.¹

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¹ A tense restriction can also be found in South Slavic languages, which do not use the irrealis *by* in subjunctive complements and use the particle *da* 'that' (plus e.g. *naj* 'let' in Slovenian); subjunctive complements can only contain the present tense marking.

 (1) Oleg chočet, čto-by Artur čital / * čitaet / * budet čitať Oleg wants that-by Artur read_{PAST} reads will read_{INF} gazetu.
 newspaper
 'Oleg wants Artur to read a newspaper.'

However, the embedded clause can refer to a past, present or future time, as shown by the Czech example in (2), containing all three types of temporal adverbials.

(2) Jan chtěl, a-by Jirka dneska / včera / zítra Jan wanted and-by Jirka today yesterday tomorrow koupil noviny.
bought newspaper
'Jan wanted Jirka to buy a newspaper today/yesterday/tomorrow.'

Volitional verbs like the Russian *chotet*' 'want' select a complement without an independent semantic tense and the event of the embedded clause must follow the matrix volitional event.² This holds for subjunctives, as in (1) and (2), as well as for infinitives, as in the Polish example (3).

(3) Kasia chciała kupić pralkę. Kasia wanted buy_{INF} washing.machine 'Kasia wanted to buy a washing machine.'

The remainder of the paper is structured as follows. The next section briefly introduces obviation effects. Section 3 discusses previous approaches to obviative subjunctives and shows that they mostly have a problem with weakened obviation effects. Sections 4 and 5 present an analysis that is based on the operation Upward Agree and Multiple Agree and which uses a quasi imperative operator. Section 6 concludes the paper.

² Indexicals present in the subjunctive clause like 'in two days' can be anchored either to the speech time or the reference time of the matrix clause; compare *zitra* 'tomorrow' in (2) (as in the case of non-subjunctive embedded clauses).

2 Subjunctives and Obviation

North Slavic languages also show obviation effects in embedded subjunctive clauses, i.e., the subject of the embedded clause must be disjoint in reference from the subject of the matrix clause. For instance, the following Russian example shows that the embedded subject *on* 'he' cannot be coreferential with the matrix subject *Oleg*.³

(4) Oleg₂ chočet, čto-by $on_{1,*2}$ čital gazetu. Oleg wants that-by he read newspaper 'Oleg wants that he reads a newspaper.'

This contrasts with the behavior of embedded infinitives, as in (5), repeated from (3), and embedded indicatives, as shown in the Polish example (6). Specifically, contrary to the obviative *on* in (4), the big PRO in (5) must corefer with the matrix subject *Kasia*.

- (5) Kasia1 chciała PRO1,*2 kupić pralkę.
 Kasia wanted buy washing.machine 'Kasia wanted to buy a washing machine.'
- (6) Jacek₂ powiedział, że pro_{1,2} kupił rower Jacek said that bought bicycle
 'Jacek said that he had bought a bicycle.'

As shown in (6), *pro* in the indicative complement is also non-obviative; it can either refer to the matrix subject or to some other person.

3 Approaches to Obviative Subjunctives

In this section, I briefly discuss recent approaches to obviative subjunctives.

Avrutin & Babyonyshev (1997) and Costantini (2005, 2006) show that competition approaches to obviation (in which PRO/infinitive blocks

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³ The situation in South Slavic languages is more complicated, e.g. Bulgarian and Standard Serbian do not exhibit subject obviation (Krapova 2001, Tomić 2006), whereas Standard Croatian shows obviation effects (Tomić 2002-2003; Stojanović & Marelj 2004). From now on, I will concentrate on North Slavic languages.

pro/subjunctive with respect to coreference; see e.g. Bouchard 1982, Farkas 1992, Schlenker 2005) have a problem with data in which the subjunctive and infinitive are not in complementary distribution, as illustrated in (7) and (8).

- (7) a. Volodja ugovoril Nadju₁, čto-by ona₁ poechala v Volodja persuaded Nadja_{ACC} that-by she went to Evropu.
 Europe
 'Volodja persuaded Nadja to go to Europe.'
 - b. Volodja ugovoril Nadju₁ PRO₁ poechat' v Evropu. Volodja persuaded Nadja_{ACC} go_{INF} to Europe 'Volodja persuaded Nadja to go to Europe.'
- (8) a. Jirka₁ chtěl PRO_{1,*2} dostat pusu od všech holek. Jirka wanted get_{INF} kiss from all girls 'Jirka wanted to be kissed by all girls.'
 - b. Jirka₁ chtěl, a-by pro_{1,2} dostal pusu od všech holek. Jirka wanted and-by got kiss from all girls 'Jirka wanted to be kissed by all girls.'

Given the proposed blocking effect, it is not obvious why both PRO and *ona* 'she' are possible in the Russian (7), taken from Avrutin & Babyonyshev (1997:233), and why both PRO and *pro* are grammatical in the Czech example in (8).⁴

- b. Volodja skazal Nade₁ PRO₁ poechat' v Evropu. Volodja told Nadja_{DAT} go_{INF} to Europe 'Volodja told Nadja to go to Europe.'
- (ii) a. Oleg₁ chotel PRO_{1,*2} polučiť chorošie ocenki.

⁴ A reviewer asks how robust the data in (7) and (8) are. All my four Russian speaker informants find (7) fully acceptable (besides Avrutin & Babyonyshev 1997, the data in (7) are also discussed in Szucsich 2009a). All my informants also find (i), with the coreferential dative object, fully grammatical. The same also holds for (ii), a Russian counterpart of the Czech (8). Czech informants also judge the Czech pendant of (7) and (ia) (not shown here because of lack of space) as perfectly acceptable. (ib) cannot be derived in Czech because the Czech *říci* 'tell' is not compatible with infinitives.

 ⁽i) a. Volodja skazal Nade₁, čto-by ona₁ poechala v Evropu. Volodja told Nadja_{DAT} that-by she went to Europe 'Volodja told Nadja to go to Europe.'

Avrutin & Babyonyshev (1997) also argue that binding domain extension approaches (which are based on Principle B; see Picallo 1984; 1985; Terzi 1992; Progovac 1993a,b; Oshima 2003) have a problem with the following exceptions from obviation. According to binding domain extension approaches, in (9), the binding domain of the embedded pronoun includes the matrix subject; hence the sentence should be ungrammatical under the given coindexation.⁵

(9) Volodja₁ chočet, čto-by Nadja pocelovala ego₁.
 Volodja wanted that-by Nadja kissed him
 'Volodja wants Nadja to kiss him.'
 (Russian, Avrutin & Babyonyshev 1997:232)

The same reasoning applies to Russian examples in (10)-(12), taken from Avrutin & Babyonyshev 1997:233-236, which contain an embedded pronoun coindexed with a matrix R-expression. The binding domain extension approach predicts all of them to be ungrammatical.

- (10) Volodja ugovoril Nadju₁, čto-by ona₁ poechala v Evropu.
 Volodja persuaded Nadja that-by she went to Europe
 'Volodja persuaded Nadja to go to Europe.'
- (11) Volodja₁ chočet, čto-by ego₁ žena poechala v Evropu. Volodja wanted that-by his wife went to Europe 'Volodja wants his wife to go to Europe.'
- (12) Volodja₁ chočet, čto-by emu₁ bylo veselo.
 Volodja wanted that-by him was fun
 'Volodja wants to be having fun.'

Oleg wanted receive_{INF} good grades 'Oleg wanted to receive good grades.'

b. Oleg₁ chotel, čto-by on_{1,2} polučil chorošie ocenki. Oleg wanted that-by received good grades 'Oleg wanted to receive good grades.'

⁵ A phase approach to binding with a non-active CP phase and the active vP phase in the subjunctive clause could explain the contrast between (4) and (9) but it would have a problem with (10) and (11) (depending on the position of *emu*, possibly also with (12)).

Avrutin & Babyonyshev (1997) successfully derive the data above because in their approach, only nominative arguments (related to the pronominal AgrS) are problematic for coindexation. However, Szucsich (2009b) argues that there is a problem with the pronominal status of the verbal category AgrS.

Syntactic approaches like Szucsich (2009b) and Antonenko (2010), which are based on Tense-features of Pesetsky & Torrego (2006, 2007), can derive data with obviation restricted to nominative subjects, as in (9)-(12). At the same time, however, they have a problem with weakened obviation examples in (13)-(20), which also contain two nominative arguments that are coindexed (see also Ruwet 1991, Farkas 1992, Szabolcsi 2010, Citko 2012). In (13)-(14), the embedded verb is unaccusative; in (15)-(16) the verb is passive; in (17)-(18) the embedded clause contains a modal verb; and in (19)-(20) the embedded pronoun is focused. Except (19) and (20), agentivity is decreased in these examples.⁶

- (13) Jirka₁ chce, a-by pro_{1,2} se uzdravil. Jirka_{NOM} wants and-by pro_{NOM} self became.healthy 'Jirka wants to become healthy.' (Czech)
- (14) $Oleg_2$ chočet, čto-by $on_{1,2}$ vyzdorovel. $Oleg_{NOM}$ wants that-by he_{NOM} became.healthy 'Oleg wants to become healthy.' (Russian)

⁶ There is certain variation in speaker judgements. According to a reviewer, the Russian (4) and (16) are more marked then (14) under the coreference reading. In contrast, one of my Russian speaker informants prefers passive embedded subjunctives and judges the coreferential (16) as slightly better than (14). Besides passivization, there are also other factors, like the lexical meaning of elements present in the sentence and the type of modality. One Russian speaker prefers epistemic modality (possibility) over deontic modality (permission) with respect to the coreference reading of (18) and deontic modality works better for her in (i).

⁽i) Arestant₁ chotel, čto-by on_1 smog pozvoniť svoej mame. prisoner_{NOM} wanted that-by h_{NOM} could call self mother 'The prisoner wanted to be allowed to call his mother.'

A reviewer finds (18) ungrammatical under the coreference reading in contrast to all my informants. One of my informants also finds the modal subjunctive in (18) with the coreference reading slightly better than unaccusative coreferential subjunctives like (14). The Czech (17) can also have the epistemic interpretation, in which case the coreference reading is also possible.

(15)	Jan ₁ chce, a-by pro _{1,2} byl pochválen všemi. Jan _{NOM} wants and-by pro _{NOM} was praised by.all 'Jan wants to be praised by all.' (Czech)
(16)	Oleg ₂ chočet, čto-by on _{1,2} byl nagraždën (direktorom Oleg _{NOM} wants that-by he _{NOM} was rewarded by.manager firmy). of.company 'Oleg wants to be rewarded (by the manager of the company).' (Russian)
(17)	Pavel ₁ chce, a-by pro _{1,2} tu árii mohl zazpívat Pavel _{NOM} wants and-by pro _{NOM} the aria could sing už dneska večer. already today evening 'Pavel wants to be allowed to sing the aria already today evening.' (Czech)
(18)	Oleg ₂ chočet, čto-by on _{1,2} smog posmotreť ėtot Oleg _{NOM} wants that-by he _{NOM} could watch this fil'm uže segodnja. movie already today 'Oleg wants to be allowed to watch this movie already today.' (Russian)
(19)	$\begin{array}{llllllllllllllllllllllllllllllllllll$
(20)	Oleg ₂ chočet, čto-by $ON_{1,2}$ posmotrel ėtot fil'm. Oleg _{NOM} wants that-by he watched this movie

Oleg_{NOM} wants that-by he watched this movie 'Oleg wants for himself to watch this movie.' (Russian)

These data are, of course, also problematic for the domain extension approach and for the operator approach by Avrutin & Babyonyshev (1997). Competition approaches like Farkas (1992) can derive weakened obviation data but they have a problem with the non-competing data presented in (7), (8) and footnote 4. In the next two sections, I propose an

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analysis that can handle the standard obviation examples as well as the weakened obviation data.

4 Deriving Tense Properties

Let us begin with tense properties of obviative subjunctives. We know that the subjunctive clause lacks its own speech time and the ability of expressing the relation between the speech time and the reference time because it uses only the *l*-participle. We have also seen that the time of the embedded event is dependent on the time of the matrix event. For these reasons, I assume that the Tense-feature of the embedded T (*by*) is unvalued. Since in the minimalist framework, a probe is an unvalued feature and the goal is a matching valued feature, the embedded head T must be a probe. Furthermore, since the goal – the matrix T in our case – c-commands the probe, we deal with the operation Upward Agree here (see e.g. Baker 2008, Béjar & Řezáč 2009 and Zeijlstra 2012). Given this, I propose the following definition of the operation Agree, which allows both Upward and Downward Agree.

- (21) Agree
 - α agrees with β iff:
 - 1. α has an unvalued feature.
 - 2. β has a matching valued feature.
 - 3. There is a c-command relation between α and β .
 - 4. β is the closest goal to α .

1, 2 and 4 are the usual conditions on the operation Agree. What is important is the condition 3, which does not determine the direction of the c-command relation. This allows us to derive tense properties of obviative subjunctives with Upward Agree and the obviation phenomena with Multiple Agree, which will combine both Upward and Downward Agree.

Concerning the tense properties, the probing embedded T gets the value *present*, *future* or *past* from the matrix T. The Czech example (22a) confirms that these values of the matrix T can be spelled out by *by*. (22b) then shows the compatibility of *by* with these values for the main clause.

(22)	a.	Jan chtěl / chce / bude	e chtít, a-by	Jirka koupil				
		Jan wanted wants will	want and-b	y Jirka bought				
		noviny.						
		newspaper 'Jan wanted/wants/will want Jirka to buy a newspaper.'						
	b.	Včera / teď / zítra	by-s	zpíval.				
		yesterday now tomor	row by-2SG	sang				
		'Now/tomorrow you would sing.'						
		'Yesterday you would ha	ve sung.'					

That by spells out the head T is supported by the fact that it agrees with the subject in (22b) – which is a typical property of T – and also by the fact that it blocks the agreeing auxiliary *jsi* 'are' in (23), which is standardly taken to realize the head T.

(23)	a.	Včera	jsi	zpíval.		
	yesterday are _{2SG} sang					
	'You sang yesterday.'					
	b. *	* Včera	by-s	jsi	zpíval.	
	yesterday by-2SG are2SG sung					(Czech)

Since I assume the phase model with the weak version of the Phase Impenetrability Condition, for by not to be trapped in the CP phase of the embedded clause, it must move at least to the head C. This movement is corroborated by the existence of composed conjunctions like the Russian *čtoby* (e.g. in (1), (4), (7a)), like the Polish *żeby* (e.g. in (29a)) and by the Czech *aby* (e.g. in (2), (8b), (13)); see also Tomaszewicz (2009) for movement of *by* in Polish and Oshima (2003) for movement of *by* in Russian. This predicts that if *by* does not move and is spelled out in the subjunctive CP phase, the sentence will be bad. This prediction is borne out; consider the following Russian example.

(24) *Oleg chočet, čto Artur by čital gazetu. Oleg wants that Artur by read newspaper

The movement of by to C makes the unvalued Tense-feature visible for the volitional verb, which selects a complement without a finite Tensefeature (subjunctive or infinitive). Thus, the derivation of subjunctives

under 'want', with *by* escaping from the phase complement and agreeing upward with the matrix [past] T, proceeds as shown in (25).



As to the ordering between the matrix event and the event of the subjunctive complement, it is encoded in the matrix T, which locates the reference time of the embedded clause after the reference time of the matrix clause. The ordering relation cannot be encoded in the subjunctive or infinitive because they also occur in contexts without a precedence relation, as demonstrated in the Czech examples below (see also Wiltscho's 2014 arguments for the time dependency not introduced by subjunctives). Moreover, we know that the presence of the ordering between the matrix event and the embedded event depends on lexicosemantic properties of the selecting predicate.

- (26) František by to zazpíval.František by it sang'Pavel would sing/have sung it.'
- (27) Je velmi obtížné prodat novou myšlenku. is very difficult sell_{INF} new idea 'It is difficult to sell a new idea.'

Having derived the tense properties, let us now look at obviation effects present in subjunctive complements.

5 Deriving Obviation Effects

The generalization we can draw from data in section 3 is that coreference between the matrix subject and a phrase within the embedded clause is not possible if the embedded clause is subjunctive and the referent of the appropriate phrase is responsible over the event of the embedded clause (see already Farkas 1992).

This seems to be correct because if the matrix subject does not have a control over the embedded event (is not coreferential with the referent of the embedded phrase), using irreality (subjunctive) makes sense. But if the matrix subject controls (is responsible over) the embedded event – is coreferential with the agent of the embedded event – using the irrealis/subjunctive form does not make sense. Recall from the discussion of the weak obviation data in section 3 that with the exception of (19) and (20), agentivity was decreased.

I follow Farkas (1992) in that an individual is responsible over an event if it is the initiator of the event. In addition, I assume that initiators are represented by agents in syntax and that θ -roles are decomposed into features like in Reinhart (2002). That is, agents have features [+c(ausative) +m(ental)].

According to Kempchinsky (1986, 2009), subjunctives contain a quasi imperative operator, which is parallel to the imperative operator in imperatives and has the meaning 'anyone other than the matrix subject' (cf. also Giannakidou's 2009 directive operator in Greek subjunctives). This can explain why the subjunctive (28a) has the obviative and imperative interpretation, whereas (28b), without movement of *by*, has the non-obviative and conditional meaning.⁷

- (28) a. Jacek₂ powiedział, że-by pro_{1,*2} kupił rower. Jacek said that-by bought bicycle 'Jacek ordered him to buy a bicycle.'
 - b. Jacek₂ powiedział, że pro_{1,2} kupił-by rower. Jacek said that bought-by bicycle 'Jacek said that he would buy a bicycle.' (Polish)

⁷ The imperative force of subjunctives like (28a) is weaker than the imperative force of direct imperatives, as in the case of indirect speech with the verb 'order'.

A closer look at data, however, shows that it is not the matrix subject, but the matrix initiator (i.e. agent), that is relevant; consider the passive example (29), in which it is the complement clause that is the subject of the construction. In contrast to the indicative complement in (29a), *pro* in the subjunctive complement in (29b) cannot corefer with the matrix agent (marked by the index on PP *v parlamentu* 'in the Parliament'). Thus, the quasi imperative operator wants the embedded initiator to be different from the matrix initiator and its meaning should be 'anyone other than the matrix initiator'.

- (29) a. V parlamentu₁ bylo řečeno, že pro₁ nakoupí auta. in Parliament was said that buy cars 'The Parliament said that it would buy cars.'
 - b. V parlamentu₂ bylo řečeno, a-by pro_{1,*2} nakoupili auta. in Parliament was said and-by bought cars 'The Parliament said that they should buy cars.' (Czech)

(30) shows how the derivation works.⁸ The subjunctive C with the quasi imperative operator (QIO) has an unvalued [+c(ause)]-feature and via Multiple Agree, it receives referential indices of agents as its value. The operation Downward Agree delivers the referential index of the embedded agent (in our case, 3) and Upward Agree delivers the value of the matrix agent (1). These two operations are allowed by the definition of Agree in (21). At LF, the quasi imperative operator, with the meaning that the embedded initiator must be other than the matrix initiator, applies and filters out the case containing initiators (agents) with identical referential indices. Note that it is not Principle B since the proposed system also works with referential indices of R-expressions.

⁸ It shows only the relevant part of the derivation. I assume that the volitional 'want' has an agent (causer) since Lakoff (1977) and Dowty (1991) associate the agentive θ -role with volitional involvement in the event, causing the event and intention. To keep the system as simple as possible, I only use the [+c(ause)]-feature on the embedded C.



The connection between obviation and temporal restrictions is indirect; it is encoded in the irrealis *by*, which is attracted from T to C by the operator head. This is parallel to verb movement triggered by mood operators in questions and imperatives.

As to lexical restrictions on these constructions, CPs headed by the quasi imperative operator are semantically selected by volitional and desiderative verbs like 'want' and by directives like 'tell'.

Let us now look at how the proposal derives the data discussed in section 3. Consider first the exception from obviation with the embedded experiencer subject in (31), repeated from (12), and the weakened obviation effect with the unaccusative verb in (32), repeated from (13). Since experiencers and themes do not have the [+c]-feature, Downward Agree fails (see e.g. Preminger 2014), and the requirement of the quasi imperative operator is trivially satisfied, given that there is only one value (referential index) on the operator C. Consequently, coreference between the coindexed elements in (31) and (32) is possible.

(31) Volodja₁ chočet, čto-by emu₁ bylo veselo. Volodja_{NOM} wanted that-by him_{DAT} was fun 'Volodja wants to be having fun.'

(32) Jirka₁ chce, a-by pro_{1,2} se uzdravil. Jirka_{NOM} wants and-by pro_{NOM} self became.healthy 'Jirka wants to become healthy.'

Now consider (33), with the recipient *pro*, taken from (8b); the exception from obviation in (34), with the coindexed embedded object, taken from (9); the exception from obviation in (35), with the possessive within the subjunctive subject, repeated from (11); (36), with the coindexed matrix object, taken from (10); and (37), containing weakened obviation with the passive complement, repeated from (15). In all these cases, there are two distinct indices on agentive elements and the [+c]-feature of the subjunctive Operator is satisfied and coreference between the coindexed elements (which are not both agentive) is possible.

- (33) Jirka₁ chtěl, a-by pro_{1,2} dostal pusu od všech holek₃. Jirka wanted and-by got kiss from all girls 'Jirka wanted to be kissed by all girls.'
- (34) Volodja1 chočet, čto-by Nadja3 pocelovala ego1.
 Volodja wanted that-by Nadja kissed him
 'Volodja wants Nadja to kiss him.'
- (35) Volodja₁ chočet, čto-by ego₁ žena₃ poechala v Evropu. Volodja wanted that-by his wife went to Europe 'Volodja wants his wife to go to Europe.'
- (36) Volodja₁ ugovoril Nadju₃, čto-by ona₃ poechala v Evropu. Volodja persuaded Nadja that-by she went to Europe 'Volodja persuaded Nadja to go to Europe.'
- (37) Jan₁ chce, a-by pro_{1,2} byl pochválen všemi₃. Jan wants and-by pro was praised by.all 'Jan wants to be praised by all.'

It is a well-known fact that with modals agentivity decreases; therefore in (38) and (39), repeated from (17) and (18), obviation is missing. For this reason, I assume that that modals assign [-c]-feature. Since *pro* in (38) and

on in (39) then have contradictory features ([+c] from the main verb and [-c] from the modal verb), Downward Agree fails and only one value occurs on the operator C. Hence, the requirement of the quasi imperative operator is trivially satisfied, with the result that coreference between the coindexed elements is possible.

- (38) Pavel₁ chce, a-by pro_{1,2} tu árii mohl zazpívat už
 Pavel wants and-by the aria could sing already dneska večer.
 today evening
 'Pavel wants to be allowed to sing the aria already today evening.'
- (39) Oleg₂ chočet, čto-by on_{1,2} smog posmotreť ėtot fil'm Oleg wants that-by he could watch this movie uže segodnja.
 already today
 'Oleg wants to be allowed to watch this movie already today.'

The cases with the coreferential focused pronoun in (40), taken from (19), and (41), repeated from (20), are explained in terms of markedness.

- (40) Pavel₁ chce, a-by tu árii zazpíval ON_{1,2}. Pavel wants and-by the aria sang he 'Pavel wants for himself to sing the aria.'
- (41) $Oleg_2$ chočet, čto-by $ON_{1,2}$ posmotrel ėtot fil'm. Oleg wants that-by he watched this movie 'Oleg wants for himself to watch this movie.'

Specifically, there is a correlation between the focused status, overtness and the marked status; and between the backgrounded status, covertness and the unmarked status. Moreover, markedness (the overt pronoun) can reverse the reference value – coreferential vs. non-coreferential –, as demonstrated by the contrast between the coreferential *pro* in the Czech example (42a) and the non-coreferential *on* 'he' in (42b). I propose that the same happens in (40) and (41), just in the opposite direction. Given the

relation between the focused status and markedness, the reference value of the focused on in (40) and (41) can be reversed.⁹

- (42) a. Jirka₁ si koupil knihu a pro₁ šel domů. Jirka self bought book and went home 'Jirka bought a book and went home.'
 - b. Jirka₂ si koupil knihu a $on_{1,*2}$ šel domů. Jirka self bought book and he went home 'Jirka bought a book and he went home.'

It has been observed that only an immediately adjacent clause is relevant to reference; consider the Russian example in (43), taken from Avrutin & Babyonyshev (1997:239).

(43) Volodja1 skazal, čto Felix2 chočet, čto-by on1,*2 poceloval Volodja said that Felix wants that-by kissed Nadju.
Nadja
'Volodja said that Felix wants him to kiss Nadja.'

This is derived in the current proposal by the fact that Volodja is too far away for the probing [+c]-feature of the subjunctive C. Since there are three phase boundaries between Volodja and the probing [+c]-feature, Upward Agree cannot be established.

6 Conclusions

I have shown that in contrast to most recent approaches, the flexible Agree system, with the operations Upward Agree and Multiple Agree, in connection with the quasi imperative operator can derive not only the standard cases of obviation with embedded subjunctives, but also the problematic weakened obviation effects.

⁹ It remains to be seen whether the difference between (40) and (41), in which both reference options are possible, and (42b), in which only one option (non-coreference) is possible, can be traced back to the direction of the reversal.

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On the Clausemate Condition in Polish Multiple Sluicing and Ways to Remedy It^{*}

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Polish is one of the many languages that have been shown to allow multiple sluicing; not a surprising fact for a multiple wh-fronting language. Crosslinguistically, multiple sluicing has also been shown to be subject to the so-called Clausemate Condition, i.e. the restriction that requires the two remnants to originate within the same finite clause. The goal of this paper is to test the adequacy of the existing accounts of this restriction against the Polish data, to argue in favor of the account that assimilates multiple sluicing to gapping (at least for Polish), and to discuss ways to remedy the violations of the Clausemate Condition.

1 Multiple Sluicing in Polish

Polish, in addition to multiple wh-sluicing (1a), allows so-called whremnant sluicing, where the first remnant is a wh-pronoun and the second one a focused element, as shown in (1b) (see Lipták 2015 for analogous sluicing in Hungarian; Grebenyova 2007, 2009, among others, on multiple sluicing in Russian and Polish more generally):

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każdy student coś (1) a. Wiem. studiuie. że know that every student something studies ale nie wiem, kto CO. know who what but not 'I know that every student studies something but I don't know who (studies) what.' Wiem, kto studiuje składnie, ale nie wiem, b. know who studies syntax but not know kto fonologię. who phonology 'I know who studies syntax but I don't know who (studies) phonology.'

In this paper, I focus on the Clausemate Condition on multiple sluicing, which requires both remnants in multiple sluicing to originate within the same finite clause (see Takahashi 1994, Nishigauchi 1998, Merchant 2001, Marušič and Žaucer 2013, Lasnik 2014, Abels and Dayal 2017, among others). First, both multiple wh-sluicing and wh-remnant sluicing in Polish are subject to this condition, as shown in (2a-b).

(2) a. *Ktoś Jan coś wie. że przeczytał, ale nie someone knows that Jan something read but not pamietam, kto co. remember who what 'Someone knows that Jan read something but I don't remember who (knows that Jan read) what.' b. *Ktoś wie, że Jan przeczytał Aspekty, ale nie someone knows that Jan read Aspects but not pamietam, kto **Bariery**. remember who Barriers 'Someone knows that Jan read Aspects but I don't remember who (knows that Jan read) Barriers.'

By contrast, multiple wh-questions involving an analogous configuration are possible, as shown in (3).¹

¹ There is some speaker variation here. Some speakers only allow long distance extraction from subjunctive clauses, and find corresponding extraction from indicative

(3) Kto_i co_j t_i chce, żeby studenci studiowali t_j? who what wants that students studied 'Who wants students to study what?'

This is also not a constraint on sluicing in general; singular sluices where the remnant crosses a finite clause boundary are well-formed:

(4) Jan powiedział, Piotr coś ukrywa, ale nie że Jan said that Piotr something hides but not usłyszałam, co. heard what 'Jan said that Piotr is hiding something but I didn't hear what (Jan said that Piotr is hiding).'

Even though the focus of this paper is not on islands, it is worth noting that Polish multiple sluicing differs from singular sluicing in that it does not tolerate all island violations. In particular, the configurations in which one remnant is outside the island, and the other one inside the island, are ungrammatical, as shown in (5a) for the Complex DP Island and in (5b) for the Adjunct Condition.

(5) a. *Każdy profesor polecił antologię, która zawiera every professor recommended anthology which contains jakiś artykuł Chomskiego, ale nie wiem, który profesor some article Chomsky but not know which professor jaki artykuł. what article
'Some professor recommended an anthology that contains some

article by Chomsky but I don't know which professor (recommended an anthology which contains) what article.'

b. *Każdy profesor polecił antologię, bo jest every professor recommended anthology because is

clauses ungrammatical. One of the reviewers finds even extraction from subjunctive clauses ungrammatical.

w niej jakiś artykuł Chomskiego, ale nie wiem, **który** in it some article Chomsky but not know which **profesor jaki artykuł**. professor what article 'Every professor recommended the anthology because it contains some article by Chomsky but I don't know which professor (recommended the anthology because it contains) which article.'

Interestingly, when both remnants are inside an island, the result is grammatical, as shown in (6) (noted by Szczegielniak 2016).² Similar results have been reported by Marušič and Žaucer (2013) for Slovenian, and Barros, Elliott and Thoms (2014) for English and Russian.³

(6) Znam profesora, który polecił każdemu studentowi know professor who recommended every student some article but not know, which student what jakiś artykuł, ale nie wiem, któremu studentowi jaki artykuł. article

'I know a professor who recommended every student some article but I don't know which student which article.'

Barros, Elliott and Thoms (2014) attribute the improvement that we see in (6) to the availability of short ellipsis sources that do not violate any island constraints. Thus, the source for the ellipsis in (6) is (7a) (with no island) rather than (7b), which involves an island.

(7) a. **któremu studentowi**_{*i*} **jaki artyku**^{*i*}_{*i*} profesor which student what article professor polecił $t_i t_j$ recommended

² This is what Abels and Dayal (2017) refer to as Island Amelioration Generalization, given in (i) below:

⁽i) The clause where remnants originate may be inside of an island.

³ Barros, Elliott and Thoms (2014) credit Grebenyova (2009) for the Russian data. I have not been able to locate that source.

b. **któremu studentowi**_i **jaki artyku**_i profesora znam, which student what article professor know który polecił $t_i t_j$ who recommended

The ungrammatical island examples in (5a-b) above arguably are reducible to the Clausemate Condition. However, not all island effects are; the example in (8) is ungrammatical on the interpretation that would be the result of extracting the second remnant from the coordinate structure, which shows that island violations are *in principle* independent of the Clausemate Condition violations.

(8) *Ktoś czyta Chomskiego i Lakoffa, ale nie wiem, someone reads Chomsky and Lakoff but not know kto Jackendoffa. who Jackendoff
'Someone reads Chomsky and Lakoff but I don't know who (reads Chomsky and) Jackendoff.'

2 **Previous Accounts**

2.1 Constraints on Rightward Movement

Lasnik (2014) attributes the Clausemate Condition to an independent constraint on rightward focus movement (see also Ortega-Santos, Yoshida and Nakao 2014). He takes the second remnant in a multiple sluicing construction to undergo rightward movement, which is also clause-bound, as shown in (9).

 (9) *Some students said [that Mary will speak *t_i* yesterday] <u>to some</u> <u>professors</u>_{*i*}. (Lasnik 2014: 10)

Support for assimilating movement of the second remnant to rightward movement, as Lasnik points out, comes from the fact that in multiple sluicing the remnant 'strongly prefers' to be a PP, paralleling in this respect extraposition. This is shown by the contrast between the a and b examples in (10) and (11).

- (10) a. ?Someone talked about something, but I can't remember who about what.
 - b. ?*Someone saw something, but I can't remember who what.
- (11) a. Some students spoke yesterday to some professors.b. *Some students saw yesterday some professors.

(Lasnik 2014: 8-10)

However, Polish multiple sluicing is *not* subject to this restriction; the equivalent of (10b) is well-formed, as shown in (12). Other Polish examples given so far also involved two DP remnants (see (1a-b), (6)).

(12) Ktoś coś zobaczył, ale nie pamiętam, **kto co.** someone something saw but not remember who what 'Someone saw something but I don't remember who (saw) what.'

2.2 Constraints on Pair List Readings

An alternative account, due to Abels and Dayal (2017), attributes the Clausemate Condition to an independent condition on the availability of pair list interpretations in multiple questions. Pair list readings are similarly clause-bound, as shown in (13).⁴

(13) Which student believes that Mary read which book? SP, *PL (Dayal 2002: 517)

However, sluicing of non wh-phrases is also subject to the Clausemate Condition:

(14) *Ktoś wie, że Jan przeczytał Aspekty, ale nie someone knows that Jan read Aspects but not pamiętam, kto Bariery. remember who Barriers
'Someone knows that Jan read Aspects but I don't remember who (knows that Jan read) Barriers.'

This makes it unlikely that interpretative constraints are the culprit.

⁴ In this respect, Abels and Dayal follow Nishigauchi (1998). However, their account is more nuanced than Nishigaughi's.

2.3 Constraints on Gapping

Yet another line of thought on the nature of the Clausemate Condition is to assimilate multiple sluicing to gapping (Nishigauchi 1998), which is subject to the same constraint, as first noted by Neijt (1979) for English gapping. This is illustrated in (15) for Polish:

(15) *Jan powiedział, że Piotr czyta Chomskiego, a Maria Jan said that Piotr reads Chomsky and Maria Lakoffa. Lakoff
'Jan said that Piotr reads Chomsky and Maria (said that Piotr reads) Lakoff.'

This direction of assimilation (i.e. assimilating multiple sluicing to gapping) has been largely discounted for English, where the licensing conditions on gapping are different from the licensing conditions on multiple sluicing (see, among others, Takahashi 1994, Richards 2001, Lasnik 2014). For example, gapping, unlike multiple sluicing, is subject to the so-called No Embedding Constraint (Hankamer 1979):

- (16) a. ?I know somebody talked to somebody but I can't remember who to whom.
 - b. *I know somebody talked to somebody, and I'm pretty sure (that) John to Mary. (Richards 2001: 107)

However, this direction of assimilation is not unreasonable for Polish. Citko (2015) shows that embedded gaps are possible under certain circumstances, as shown in (17b).⁵

(17) a. Zosia powiedziała, że Jan nadaje się na burmistrza. Zosia said that Jan fit REFL for mayor 'Zosia said that Jan will make a good mayor.'

⁵ There are some restrictions though; the Polish equivalent of (16b) is not well-formed. This might have to do with the lack of contrast between the two conjuncts.

b. A Maria twierdzi, że Piotr na wojewodę. and Maria claims that Piotr for governor 'And Maria claims that Piotr (would make a good) governor.' (Citko 2015: 41)

Takahashi (1994: 297-298) notes the parallelism between gapping and multiple sluicing with respect to the Clausemate Condition. However, he argues against assimilating the two based on the following considerations. In addition to the No Embedding Constraint, illustrated in (16) above, gapping is impossible with subordinating conjunctions (see Jackendoff 1971), as shown by the contrast between the multiple sluicing example in (16a) above and the gapping in (18).⁶

(18) *John likes coffee but Mary tea.

And while English gapping tends to be restricted to two remnants, as noted by Jackendoff (1971), no such restriction is present in multiple sluicing, as shown in (19a-b). Interestingly, Polish gapping is not subject to this restriction, as shown in (19c).

(19) a. *Arizona elected Goldwater Senator, and Massachusetts McCormack Congressman. (Jackendoff 1971: 25)

- b. Ktoś ale nie pamiętam, coś komuś dał. someone something someone gave but not remember komu. kto co who what whom 'Someone gave something to someone but I don't remember who what to whom.' C. Jan dał Marii ciastko, a Piotr Zosi czekoladę.
- Jan gave Maria cookie and Piotr Zosia chocolate 'Jan gave Maria a cookie and Piotr Zosia chocolate.'

⁶ Takahashi marks corresponding examples with one question mark. The Polish equivalent is also ill-formed; see the next section though for well-formed Polish gapping examples with *bo* 'because'.

3 The Unified Account of Gapping and Multiple Sluicing

Citko (2015, 2018) also shows that Polish gapping differs from its English counterpart in that it allows non-linguistic antecedents, as shown in (20a), and that it allows polarity mismatches, as shown in (20b) (see also Przepiórkowski and Kupść 1999). In (20b), the elided verb has to be negative in spite of the fact that its antecedent is positive, since the gapped clause contains a strict negative polarity item.⁷

(20) a. **My na obiad**. we for dinner 'We came for dinner.'

> b. Jan coś przeczytał, a **Piotr nic.** Jan something read and Piotr anything 'Jan read something but Piotr (didn't read) anything.'

The example in (21) below illustrates two additional properties that are somewhat unexpected of gapping. First, the gapped verb is in an answer to a question containing the antecedent verb, which shows that gapping is possible across utterances. Second, it involves a subordinating conjunction *bo* 'because'.

(21) Kogo wolisz? Bo ja żadnego z nich.
 who prefer because I anyone_{GEN} of them
 'Who do you prefer? Because I (prefer) none of them.'
 (demotywatory.pl/.../W-koncu-ktos-napisal-cala-prawde-o-walce-K..)

This raises the question of whether we are dealing with gapping or multiple fragments (or stripping). I take them to involve the same derivation, in which the remnants in both (22) and (23b) move to a left-

⁷ One of the reviewers wonders why the negative *nic* is marked accusative, rather than genitive, and observes that the genitive form instead is 'rather bad'. This seems to be a quirk of the pronoun *nic*; it can surface as accusative in non-elliptical contexts as well. Note also that example (21) has the expected genitive form.

⁽i) Jan nic nie przeczytał. Jan anything $_{ACC}$ not read

^{&#}x27;Jan didn't read anything.'

peripheral position (such as [Spec, FocP] or [Spec, PolP]), and the TP undergoes ellipsis, as shown in (24) (see Citko 2015, 2018, for details of such an analysis for Polish, and Boone 2014 for arguments in favor of assimilating gapping to fragments more generally).

(22) Jan czyta Chomskiego, a Maria Jackendoffa. GAPPING Jan reads Chomsky and Maria Jackendoff 'Jan reads Chomsky and Maria (reads) Jackendoff.' (23)a. Czy Jan czyta Chomskiego? Q_{PART} Jan reads Chomsky 'Is Jan reading Chomsky?' b. Nie, Maria Jackendoffa. MULTIPLE FRAGMENTS Maria Jackendoff not 'No, Maria (is reading) Jackendoff.' (24)... FocP (PolP) Maria, FocP Jackendoff; Foc Foc ТP

ti reads ti

Furthermore, I adopt the same approach to multiple sluicing, following Grebenyova (2007, 2009) in this respect:

(25) a. Ktoś coś przeczytał, ale nie pamiętam, **kto co.** someone something read but not remember who what 'Someone read something but I don't remember who what.'



b.

If both sluicing and gapping remnants/fragments target the same position ([Spec, FocP]) and involve clausal ellipsis, we could attribute the Clausemate Condition to an economy condition that would force movement of the second wh-phrase (*co* 'what' in (26b) below to its *closest* [Spec, FocP]. Since each remnant is in a different [Spec, FocP], neither TP₁ nor TP₂ deletion could yield the multiple sluicing example in (26a).^{8,9}

- (26) a.*Ktoś wie, że Jan coś przeczytał, ale nie someone knows that Jan something read but not pamiętam, kto co. remember who what 'Someone knows that Jan read something but I don't remember who (knows that Jan read) what.'
 - b. [FocP who_i [Foc' Foc [TP2 *t*_i knows [CP that [FocP what_j [Foc' Foc [TP1 Jan read *t*_j]]]]]

The question then is what rules out (27a) below, where the second whphrase undergoes further movement, and both remnants end up in the same (matrix) [Spec, FocP]. One possibility would be to attribute it to the availability of a shorter (i.e. monoclausal) source in (27b).

- (27) a. $[FocP who_i [FocP what_j [Foc' Foc] TP t_i knows [CP that [FocP t_j [Foc' Foc] TP Jan read t_j]]]]]]$
 - b. [For who_i [For what_j [For For Tr t_i read/knows t_j]]]

However, if this were the case, we would expect this example to be grammatical, contrary to fact. This would be in line with the research that attributes the grammaticality of island violations in sluicing to the availability of an alternative (not isomorphic) source for the ellipsis that does not violate an island. If such a source is not available, the result

⁸ For the sake of clarity, I use English glosses in bracketed and arboreal representations.

⁹ An alternative, suggested by one of the reviewers, could be that multiple sluicing obligatorily involves a monoclausal source, and such a source is unavailable in (26). However, as pointed out by the same reviewer, the fact that the presence of the complementizer between the two remnants remedies the violations of the Clausemate Condition, illustrated in (30-31) below, is an argument against such an account.

remains ungrammatical (see Barros, Elliott and Thoms 2014 for a defense of this view).

The alternative that seems most plausible for Polish follows Park (2014), who, focusing on English, provides a unified account of the Clausemate Condition in Multiple Sluicing, Gapping and Multiple Fragments.¹⁰ He attributes it to the parallelism requirement that requires the remnants and their correlates to occupy parallel positions at LF (see also Griffiths and Lipták (2014), Fox and Lasnik 2003, Thoms 2014 for the role of parallelism in various ellipsis types). In all three constructions under consideration, the remnants in the antecedent clause do not occupy [Spec, FocP] positions, as shown in (28a). In the antecedent clause, the second correlate stays in situ and is separated from the first correlate by a finite clause boundary. For parallelism to be obeyed, it would have to undergo covert movement to the specifier of the matrix FocP, as shown in (28b). However, this covert movement is clause-bound, as shown by the clause-boundedness of Quantifier Raising.¹¹

- (28) a. [FocP [Foc' Foc [TP **someone** knows [CP that [FocP [Foc' Foc [TP Jan read **something**]]]]]]]
 - b. [FocP **someone**_{*i*} [FocP **something**_{*j*} [Foc' Foc [TP t_i knows [CP that [FocP t_j [Foc' Foc [TP Jan read t_j]]]]]]]

Let me conclude with a discussion of when violations of the Clausemate Condition can be voided. One known way to remedy the violation of it involves a situation when the embedded subject is bound by the matrix subject. This was noted by Nishigauchi (1998) (see also Lasnik and Grano

¹⁰ It is not clear how such an account for English gets around the differences between gapping and multiple sluicing.

¹¹ This makes a prediction that if the correlates undergo overt movement to the specifier of the matrix [FocP], where they occupy the positions that parallel the positions of the remnants in the elided clause, the ungrammatical examples should improve. While this remains to be investigated in more detail, to my ear, (i) is better than (26a).

 ⁽i) ?Ktoś coś wie, że Jan przeczytał, ale nie someone something knows that Jan read but not pamiętam, kto co. remember who what
 'Someone knows that Jan read something but I don't remember who (knows that Jan read) what.'

2016, Barros and Frank 2017, among others). It is illustrated in (29), with the Polish example modeled upon Abels and Dayal's English example.

(29) [Każdy student]_i twierdzi, że pro_i rozmawiał z jakimś student with some every claims that talked profesorem, ale nie pamietam, który student z jakim but not remember which student with what professor profesorem.

professor

'Every student claims that he talked to some professor but I don't remember which student with what professor.'

Instead of discussing this principled exception, which has received a fair amount of attention in the relevant literature, I focus on another way to remedy violations of the Clausemate Condition, having to do with the presence of an overt complementizer. The ungrammatical gapping in (30a) improves when the complementizer is present, as shown in (30b), and so does the ungrammatical wh-remnant sluicing, as shown in (31b).¹²

(30) a.*Jan powiedział, że Piotr czyta Chomskiego, Piotr reads Jan said that Chomsky Maria Lakoffa. а and Maria Lakoff 'Jan said that Piotr likes Chomsky and Maria (said that Piotr reads) Lakoff.' b. Jan powiedział, że Piotr czyta Chomskiego,

Jan said that Piotr reads Chomsky a **Maria, że Lakoffa.** and Maria that Lakoff 'Jan said that Piotr likes Chomsky and Maria (said that Piotr reads) Lakoff.'

¹² The examples in (30a) and (31b) are possible on the interpretation in which both remnants originate inside the same (embedded) clause.

(31) a. *Ktoś Jan czyta Chomskiego. A kto wie. że Jan reads Chomsky someone knows that and who Lakoffa? Lakoff 'Someone knows that Jan reads Chomsky. And who (knows that Jan reads) Lakoffa.' b. Ktoś wie, Jan czyta Chomskiego. że А kto, someone knows that Jan reads Chomsky and who że Lakoffa? that Lakoff 'Someone knows that Jan reads Chomsky. And who (knows that Jan reads) Lakoff?

Attested examples of what I take to be the same phenomenon are given in (32a-c).

(32)a. Kto twierdził, że Ziemia jest okragła. kto, że А who claimed that is round who that earth and płaska? flat 'Who claimed that the Earth is round? And who (claimed) that (it is) flat?' (zadane.pl > Gimnazjum > Historia) b. Kto uważa, że Walter żyje, a kto, że nie? who claims that Walter lives and who that not 'Who claims that Walter lives and who (claims) that (he does) not? (www.filmweb.pl > fora tematyczne > Breaking Bad) Kto uważa, że Natalia Lesz ma ładny głos, a kto C. who claims that Natalia Lesz has nice voice and who że do kitu? that for nothing 'Who claims that Natalia Lesz has a nice voice and who (claims) that (it is good) for nothing? (zapytaj.onet.pl/.../2,178466,Kto uwaza ze Natalia Lesz ma ladn...)

The crucial difference is that the second remnant does not cross the finite clause boundary; note that it follows the complementizer. Thus, its correlate will not have to cross the finite clause boundary, either. More specifically, these examples involve two independent cases of ellipsis:

gapping in the main clause and sluicing in the embedded clause, as shown in (33), which represents the gapped portion of (30b).¹³ First, the embedded remnant *Lakoffa* moves the embedded [Spec, FocP], and licenses deletion of the embedded TP, as shown in (33a). Next, the first remnant (*Maria*) and the entire embedded CP (which becomes the second remnant) move to [Spec, FocP] of the matrix clause, and the matrix TP deletes, as shown in (33b).¹⁴



The two instances of ellipsis are in principle independent, which supports the derivation in (33a-b). In (34a) below, the matrix clause has no ellipsis (step (33a) is missing), and in (34b), the embedded clause has no ellipsis (step (33b) is missing).

¹⁴ One of the reviewers asks whether this kind of CP pied-piping is independently possible in Polish in non-elliptical contexts. The status of the following examples suggests that it is not. This is in line with other cases of ellipsis 'licensing' otherwise ungrammatical derivations.

(i)?*Że co	Maria zrob	iła Piotr	wie?
that what	Maria did	Piotr	knows
(ii)?*Kto że c	o Maria	zrobiła s	krytykował?
who that v	vhat Maria	did c	riticized

¹³ On the account proposed here, gapping and sluicing involve the same process (i.e. clausal ellipsis).

(34) a. Jan twierdził, że Piotr czyta Chomskiego, a Piotr reads Chomsky Jan claimed that and Maria myślała, że Lakoffa. Maria thought that Lakoff 'Jan claimed that Piotr reads Chomsky and Maria thought that (Piotr reads) Lakoff.' b. Jan powiedział, że Piotr czyta Chomskiego, a Piotr reads Chomsky Jan said that and Maria, że Adam woli Lakoffa.

Maria that Adam prefers Lakoff 'Jan said that Piotr reads Chomsky and Maria (said) that Adam prefers Lakoff.'

4 Conclusion

To conclude briefly, this paper has examined violations of the Clausemate Condition on multiple sluicing in Polish and has shown that the accounts that assimilate sluicing to gapping and fragments fare best when it comes to accounting for this condition in Polish. This paper has also shown why the presence of an overt complementizer remedies violations of the Clausemate Condition.

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Case Sharing: Evidence from Slavic.*

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This paper argues for the possibility of case licensing through *feature-sharing* (based on Frampton and Gutmann (2000) (FG). Focusing on case distribution in Serbo-Croatian complex adjectival possessors and Polish distributive preposition *po* in coordinate and topicalized structures, as well as floating quantifier, numeral and predicative nominal constructions, I show that case as feature-sharing enables us to account for some otherwise puzzling case facts regarding the availability of case assignment in certain displaced positions. Additionally, I will show that certain constructions, like those when predicative adjectives share a case with quantified subjects, provide evidence for a system of case licensing where an XP probes down, licensing (in effect assigning) case to its goal. I also propose a locality condition on the system where nominal elements probe down for case, as in Bošković (2007).

1 Adjectival Possessors in Serbo-Croatian

In Serbo-Croatian (SC) (1), the noun *čiča* is grammatical only when it occurs *in-situ*, as in (1a). Left Branch Extraction (LBE) of 'uncle' in this configuration is ungrammatical (1b), despite LBE being widely attested in the language (see Bošković 2005; see also fn3).

^{*}I thank Željko Bošković, Aida Talić, FASL 26 audience, and the FASL reviewers for comments and the discussion of the data.

(1) a. On jesrušio čiča Tominu kolibu. he is torn-down uncle_{NOM} Tom's_{ACC} cabin 'He tore down uncle Tom's cabin.' [Bošković 2009: (7d)]
b. *Čiča je on Tominu kolibu srušio. uncle_{NOM} is he Tom's_{ACC} cabin_{ACC} torn-down 'He tore down uncle Tom's cabin.' [Bošković 2009: (7b)]

On the other hand, (2a) shows that when 'uncle's' is realized as an adjective (see Zlatić 1997, Bošković 2005, 2012, Despić 2011 for evidence that such possessors are adjectival), it cannot be *in-situ*. (2a) improves significantly when *čičinu* appears in a higher position (2b). I will argue that the contrast between (2a) and (2b) shows that 'uncle's' can share a case with the remnant NP only in a displaced position.¹

(2)	a.	*On je	srušio	čičinu	Tominu	kolibu.			
		he is	torn-down	uncle's _{ACC}	Tom's _{ACC}	cabin			
		'He tore down uncle Tom's cabin.' [Bošković 2009: (7c)]							
	b.	Čičinu	jeon Toi	ninu kolib	u srušio.				
		uncle's _{ACC}	ishe Toi	n's _{ACC} cabin	ACC torn-do	wn			
		'He tore down uncle Tom's cabin.' [Bošković 2009: (7a)]							

Comparing accusative case on *čičinu* in (2a) with accusative in (2b), we can conclude that they cannot have the same source. Unless 'uncle's' undergoes movement, it cannot receive accusative. The movement of *čičinu* is confirmed by the sensitivity to movement constraints, e.g. extraction out of an island in (3).

(3) *Čičinu je sakrio činjenicu da je srušio Tominu uncle's_{ACC} he hid fact that he torn-down Tom_{ACC} kolibu cabin_{ACC}
Int: 'He hid the fact that he tore down uncle Tom's cabin.'

I argue that the fact that accusative case on 'uncle's' cannot be assigned *in-situ* in the basic case indicates that movement here creates a new case

¹ As there is some variation in grammaticality judgments, the analysis accounts for the grammar of the speakers with contrast between (2a) and (2b).

licensing possibility. Therefore, we need a system that accounts for the accusative case on the displaced element and predicts its lack *in-situ*. Case assignment via feature-sharing (based on FG) will be shown to be a viable candidate for the former. I will return to the details of the derivation of (2b) after laying down the theoretical mechanism behind the proposed analysis in the next section.

2 Theoretical Background: Feature Sharing and Probing Down

FG propose a feature-sharing mechanism where two elements with uninterpretable features (an uninterpretable case feature in the cases we are considering) can enter an *Agree* relation under c-command, where the uninterpretable case feature in question is shared in such a way that the two instances of the case feature become one. As a result, when one of the case features is valued later in the derivation, the other one is automatically valued as well. Feature sharing thus does not immediately result in case valuation but enables it to occur later.

Another mechanism that will be used in the analyses proposed below is probing down by a nominal to license its case. Bošković (2007) proposes a system of case licensing in which traditional roles of probes and goals are reversed. Traditionally, a case licenser probes down an NP it ccommands. Bošković suggests that it can also be the other way around, i.e. an NP can probe down its case licenser.

One argument for this comes from Spanish multiple-complementizer constructions of the form *que DP que*, where the DP is base generated in its surface position. In particular, Villa-Garcia (2015) shows that *su hijo* in (4) is base generated in pre-secondary *que* position in the left periphery, never being c-commanded by its case licenser, *v*. One argument to this effect comes from the fact that unlike regular cases without the secondary *que*, elements dislocated between the two complementizers do not exhibit any reconstruction effects, as illustrated in (4). Compare (4a) and (4b) from Villa-Garcia (2015: 145-6).

(4) a. Dice que a su_{i/j} hijo todo el mundo lo tiene que says that DOM his son all the world cl. has that dejar fuera.
leave outside 'S/he says that everybody has to leave his/their son outside.'

b. Dice que a su_{i/j} hijo, que todo el mundo, lo tiene says that _{DOM} his son that all the world cl. has que dejar fuera that leave outside.
'S/he says that everybody has to leave his/their (=somebody else's) son outside.'

The bound variable reading of 'his son' is available in (4a) (expected under the assumption that the pronoun is c-commanded by the quantified nominal 'all' at some point of the derivation), but is impossible in (4b), with both complementizers present. This suggests that *a su hijo* is basegenerated in pre-secondary *que* position. (See Villa-Garcia 2015 for a number of additional arguments to this effect.) As Villa-Garcia argues, the case on this DP must therefore be licensed by probing its case valuator from its surface position, the DP not being c-commanded by it at any point of the derivation.

I assume, therefore, that the option of XP probing down to get its case valued is independently attested. Next section shows that this operation paired with feature-sharing is responsible for some interesting case facts in Slavic languages.

3 Feature Sharing Between AP and NP

Let us now see how the system of case licensing via feature sharing explains the SC data introduced in section 1. Let us start with simple cases like (5), which is an instance of case concord in SC.

(5) On čita dobre romane. He reads good_{ACC} novels_{ACC} 'He reads good novels.'

The NP and AP in (5) both have an unvalued uninterpretable case feature (uC). They undergo feature-sharing, but neither of them has their case valued as a result of that. When small v values the NP, they both get case-valued simultaneously. In this respect, I propose that modifying adjectives can only be case-licensed through feature-sharing. In other words, traditional case concord is feature-sharing.

Consider now (2). Recall that agreeing SC possessors are adjectival: both 'uncle's' and 'Tom's' are APs. Recall also that APs bear case in SC. In (5) the adjective modifies the noun. This is, however, not the case with both adjectives in (2). Only 'Tom's' modifies the noun 'cabin.' 'Uncle's' modifies 'Tom's', the other AP (I assume it is located in its specifier). *Čičinu*, therefore, cannot undergo feature-sharing with the NP in the base position, since there is no c-command relationship between the two. The first AP could only undergo feature-sharing with the second AP, i.e. in (2a), 'uncle's' and 'Tom's' would need to undergo feature-sharing, and that whole AP-AP structure would then need to enter feature-sharing with the NP 'cabin'. However, I suggest that this first step is disallowed. More precisely, I propose that when an AP modifies an AP, feature-sharing between them is not possible².

In grammatical (2b), on the other hand, 'uncle's' with an unvalued case feature moves out of the full NP to Spec vP. After that the NP tucksin into the lower Spec vP (see Richards 2001 on tucking-in). Now, the AP c-commands the NP, therefore they can enter feature-sharing. When the NP probes down v to have its case valued, this results in case valuation on all elements in this feature-sharing relation, including the displaced AP 'uncle's' (which then undergoes further movement). Notice that all these operations occur within one cycle (vP), therefore no problem regarding the cycle arises here, assuming that the cycle is defined as phases (vP here).

(6) $\begin{bmatrix} v_{P} [AP uncle's_{[uC:2]}]_{i} \begin{bmatrix} v_{P} [AP[APt_{i}]Tom's_{[uC:2]}]cabin_{[uC:2]}] \end{bmatrix} \begin{bmatrix} v_{P}v_{[iC:val:2]} \end{bmatrix} \end{bmatrix}$

feature-sharing valuation

² This may be a part of a more general pattern. Bošković (2005) shows that more generally, adjectives cannot modify adjectives in SC. Thus (i) can only have the meaning where 'rich' modifies 'horse':

⁽i) *bogati susedov konj

rich neighbor's horse

The proposed ban on feature-sharing between APs may in fact deduce the generalization behind (i), but I will leave this for future work.

Sentence (7) shows that for some speakers (hence '%' indicating variation among speakers), accusative on the displaced AP can also be licensed when the NP does not move.

(7) %Čičinu on čita Tominu kolibu. uncle's_{ACC} he reads Tom's_{ACC} cabin_{ACC} 'He reads uncle Tom's cabin.'

The AP *čičinu* in (7) again fails to undergo feature-sharing in its base position and moves to Spec vP, from where it c-commands the NP. The AP and the NP undergo feature-sharing and the AP gets its case licensed when the NP gets case valued by small *v*. (Recall that modifying APs can only be case-licensed through feature-sharing with an NP.) The AP then undergoes further movement.

(8) $[_{vP}[uncle's_{[uCase: 2]}]_{i'}[_{vP} v_{[iC: 2]}[_{NP} [_{AP} [_{AP} t_i]Tom's_{[uC: 2]}]cabin_{[uC: 2]}]]$

What is important for our purposes here is that this AP crucially needs to undergo displacement in order to get its case valued, which is only possible through feature-sharing, as I argue here.³

4 Feature-Sharing with Distributive *po* in Polish

Another application of feature-sharing in the case domain can be observed in Slavic distributive construction with prepositional marker *po*. In Polish, bare NP complements of *po* bear locative, which also holds when they are modified by numeral 'one' (9a), regardless of their syntactic position.

When the complement of *po* contains a numeral higher than 'one', e.g. 'five', the NP bears genitive of quantification (GQ) licensed by the head of the QP projection which takes the NP as its complement. Consider (9a-d):

 (9) a. Chłopcy przeczytali po (jednej) książce boys read PO (one_{LOC})book_{LOC}
 'Boys read one book (each).'

³ Regarding (1), I refer the reader to Bošković (2009). As discussed there, NP *čiča* in (1a) bears default nominative case. See also Bošković (2009) regarding the unacceptability of LBE in (1b) (basically, LBE requires agreement in such cases).
- b. Chłopcy przeczytali po pięć książek/*pięciu książkach.
 boys read PO five_{ACC} books_{GEN}/*five_{LOC} books_{LOC}
 'Boys read five books (each).'
- c. Po jednym liściu spadło /po pięć liści spadło PO one_{LOC} leaf_{LOC} fell_{SG} /PO five_{ACC} leaves_{GEN} fell_{SG}
- d. *po pięciu liściach spadło z każdego drzewa. PO five_{LOC} leaves_{LOC} fell_{SG} from every tree '1 leaf/5 leaves fell from each tree.'

Importantly, with higher numerals we never get locative case assigned by po (9b-d). The observed contrast may be due to a categorial difference between higher numerals and 'one', where the latter is an adjective adjoined to NP, whereas with higher numerals we have the QP projection/Q, which I assume blocks locative assignment to the NP (see also Franks 1995, 2002, Bošković 2006, 2013 a.o.).⁴

- (10) a. [NP [AP jedna] książka] => [po [NP [AP jednej] [książce]] one_{NOM} book_{NOM} PO one_{LOC} book_{LOC}
 'one book / one book each'
 b. [OP pięć [NP książek]] => [po [OP [pięć] Q [NP książek]]]
 - b. $[QP \ piec \ [NP \ ksiqzek]] => [po \ [QP \ [piec] \ Q \ [NP \ ksiqzek]]]$ five_{ACC} books_{GEN} PO five_{ACC} books_{GEN} 'five books/ five books each.'

Interestingly, there are contexts where higher numerals (which are then adjectival) and the following NP can bear locative case in distributive constructions with *po*. Two such cases are discussed below.

The complements of *po* with high numerals can surface with the locative in conjunctions. Consider sentence (11) (which is based on Franks 1995:163):

(11) Dostaniecie po jednym jabłku, pięciu gruszkach, i you-will-get PO one_{LOC} apple_{LOC} five_{LOC} pears_{LOC} and pięciu śliwkach.
five_{LOC} plums_{LOC}
'You will get one apple, two pears, and five plums each.'

⁴ As discussed in section 6, there are reasons to believe that a null Q head, not the numeral, assigns genitive. This point will not be relevant until section 6.

Crucially, this is possible only when high numerals are not the first conjunct. Compare (11) with (12a-d):

(12)	a. I	Dostaniecie p	o *pięciu	śliwkach i *pięciu gruszkach
	У	ou-will-get P	O five _{LOC}	plums _{LOC} and five _{LOC} pears _{LOC}
	b	po pięć	śliwek	i *pięciu gruszkach.
		PO five _{ACC}	$plums_{\text{GEN}}$	and five _{LOC} pears _{LOC}
	c	*po pięciu	śliwkach	i pięć gruszek
		PO five _{LOC}	$plums_{LOC}$	and five _{ACC} pears _{GEN}
	d	po pięć	śliwek	i pięć gruszek
		PO five _{ACC}	plums _{GEN}	and five _{ACC} pears _{GEN}
	'You	will get five	plums and	five pears each.'

We know independently that po cannot assign locative case to its complement with a higher numeral (12a-c). The option of the locative in the second (and the third) conjunct in (11) must be due to feature-sharing between the elements in the second /third conjunct and the NP in the first conjunct, which receives it directly from po. All coordinated elements enter the feature-sharing relation and get valued simultaneously by powhen it values the accessible element (i.e. the first conjunct). This is predicted if we allow case sharing between an NP and another NP, which later obtains locative from the distributive prepositional marker.

 $(13) \left[PO \underbrace{P_{[iCval:4]}[ConjP\left[NP1\left[AP \ 1_{[uC:4]}\right]N_{[uC:4]}[Conj'\left[NP2\left[AP \ 5_{[uC:4]}\right]\left[NP3 \ N_{[uC:4]}\right]\right]}_{I} \right] \right]$

In fact, sharing a case in NP coordination is not limited to the prepositional case assignment in distributive constructions, as discussed in Bošković (2006). Note the SC inherent case in coordination:

- (14) a. *Oni su ovladali pet zemalja. they aux conquered five countries_{GEN} Int: 'They conquered five countries.'
 - b. Oni su ovladali Andorom. they aux conquered Andorra_{INSTR} 'They conquered Andorra.'

- c. *Oni su ovladali pet zemalja i Andorom. they aux conquered five countries_{GEN} and Andorra_{INSTR} 'They conquered five countries and Andorra.'
- d. Oni su ovladali Luksemburgom i Andorom. They aux conquered Luxemburg_{INSTR} and Andorra_{INSTR} 'They conquered Luxemburg and Andorra.'

Higher numerals such as 'five' in SC are caseless undeclinable frozen forms, and inherent case assigning predicates like *ovladali* cannot take them as direct complements (14a) due to the condition that inherent case must be assigned (see Bošković 2006). However, what is important for our purposes is that the verb also cannot assign instrumental to the second conjunct, *Andorom*, which is too deeply embedded within the coordination to be accessible to this outside case assigner (14c).

A question arises, therefore, how *Andorom* gets the instrumental case in (14d). This sentence is grammatical, but we have seen that *Andorom* cannot get instrumental from V here, given (14c). As discussed in Bošković 2006, the only option for obtaining the instrumental case in the second conjunct is by feature-sharing with the first conjunct, i.e. by casesharing established before V values instrumental in the first conjunct. The case-sharing mechanism makes it possible for the second conjunct to bear the case if the first conjunct can get it valued. Hence the situation in (14d) is reminiscent of Polish (11). In both cases coordinated elements enter a feature-sharing relation with each other and get valued at the same time when the element accessible to the valuator gets valued.

There is another interesting case with Polish distributive construction where we can observe that displacement has a potential to change the case distribution. In (15a), the NP 'tickets' is separated from the head P^0 by the QP blocking locative case assignment to this NP. In (15b), however, displacing 'tickets' with the distributive marker while stranding the numeral leads to strong ungrammaticality.

- (15) a. Obiecano nam po pięć biletów. promised us PO five_{ACC} tickets_{GEN}
 'We were promised five tickets (each).'
 - b. *Po biletów, (to) obiecano nam pięć!
 PO tickets_{GEN (TOP)} promised us five_{ACC}
 Int: 'As for the tickets, we were promised five (each)!

Sentence (15b), therefore, is a familiar situation where the relevant NP is adjacent to *po*.

Sentence (16a) is interesting, as it stands in contrast with (15b) despite displaying similar displacement.⁵ Crucially, the NP in (16a) bears locative:

- (16) a. ?Po biletach, (to) obiecano nam pięciu! PO tickets_{LOC (TOP)} promised us five_{LOC} 'As for the tickets, we were promised five (each)!
 - b. *Obiecano nam po pięciu biletach! promised us PO five.LOC tickets.
 Int: 'We were promised five tickets (each).

The reason behind the difference is that topicalization of *po* with NP to the exclusion of the numeral changes the case configuration: without an intervening Q, *po* can assign locative to 'tickets'.

In (16a), therefore, we have another instance of *po* assigning locative case to the NP associated with a higher numeral. This configuration is impossible in a structure without displacement. In examples like (16a), the NP and the numeral(s) enter a feature-sharing relation and become instantiations of the same case feature, which is eventually valued by *po* as locative.⁶

Island sensitivity of the configuration in question indicates actual movement:

⁵ Sentence (16a) cannot be uttered out of the blue. Speakers find it better with 'five' focused, in the context where the number of the promised tickets is at stake, e.g. when correcting the number of promised tickets: 'As for the tickets, we were promised *five* each, and not *three*!'

⁶ I leave open here how exactly the displacement in (16a) occurs. I suggest that it may be related to cases of extraordinary Left Branch Extraction, like Polish (i) below (see here Bošković 2005 and references therein).

⁽i) Z małym ona przyszła pieskiem. / Z pieskiem ona przyszła małym. with small she came dog / with dog she came small 'She came with a small dog.'

 ⁽ii) *Po biletach, to każdy zgodził się zanim obiecano mu pięciu.
 PO ticketsLOC TOP everyone agreed SE before promised him fiveLOC Int: 'Everyone agreed before they were promised five tickets each.'

5 Floating Quantifiers

Case valuation in the feature-sharing system can occur after featuresharing, as we have seen in the previous sections. This does not have to be the only option, however. Quantifier float may provide us with examples of case valuation occurring before feature-sharing.

Overt movement approach to quantifier float (Postal 1974, Sportiche 1988) assumes floating quantifiers (FQs) such as *all* in (17a) are stranded in caseless positions. Additionally, Bošković (2004) argues that FQs are never floated in θ -positions. Sentence (17b) illustrates this, with the FQ being stranded in a caseless, but a thematic position of a passive verb.

- (17) a. The students were all forgiven.
 - b. *The students were forgiven all.

Bošković (2004) argues that FQ constructions are derived by adjunction of the quantifier to the NP that *has already moved* after getting its θ -role, which I will also assume here. The adjunction here proceeds acyclically, which is independently allowed (Lebeaux 1988). The reason why FQs cannot be floated in θ -positions is because adjunction to arguments interferes with θ -role assignment (see Chomsky 1986). The derivation of (17a) is given in (18).

- (18) a. The students were all forgiven
 - b. [v] forgiven the students]
 - c. the students₁ [$_{v'}$ forgiven t₁] (movement to the edge of vP)
 - d. all the students [v] forgiven t_1 (merge of *all*)
 - e. The students were all t_1 [v forgiven t_1] (movement to the higher subject position, stranding *all*)

Slavic languages show that despite being floated in seemingly case-less positions, FQs in these languages bear cases which they share with the NPs they associate with. Consider (19) where floated 'all' shares case with the associated NP:

(19) Studentów wszystkich zupełnie (oni) zapomnieli. Students_{ACC} all_{ACC} completely they_{NOM} forgot 'They completely forgot all students.' In (19), the subject 'they' is in the specifier of vP. A low manner adverb 'completely' is adjoined to this projection (see Bošković 2004). Quantifier 'all' precedes the adverb, therefore I assume that it is floated outside of small vP.

Now, under the assumption that an element that is base generated within vP will get its accusative case licensed (i.e. valued) within vP ⁷, as 'all' is added outside of small vP, the case valuation must have happened early here. 'Students' in (19) is case valued before 'all' is added to it and undergoes feature-sharing with it.

We can therefore conclude that feature-sharing may occur before valuation, but also that valuation may precede feature-sharing, as with FQs. In both cases, elements undergoing feature-sharing bear the same case which is valued by the same case licenser.⁸

6 'Dual' Agreement: Case Assigning XPs and Feature Sharing

This section introduces an additional mechanism that leads to case valuation, i.e. case assignment by phrasal elements. This is a non-standard option, but I will argue that it is attested. In fact, the construction discussed below provides evidence that both feature-sharing and case-valuation by XPs are necessary components of case licensing.

Polish quantified subjects with numeral 'five' and above may trigger genitive case with predicative adjectives and participles (20):

 (20) [QP Pięć piosenek] było szybkich/ zaśpiewanych. five_{ACC} songs_{GEN} was_{3SM} fast_{GEN} / sung_{GEN}
 'Five songs were fast/were sung fast.'

The genitive case that appears on the predicative adjective 'fast' and the participle 'sung' is genitive of quantification (GQ) assigned by the Qhead

⁷ Another option could be to assume that case valuation occurs at the phase level.

⁸ Another candidate for the case-as-feature-sharing analysis is the reciprocal construction. In many languages, like Polish, reciprocals share case with their antecedents, which can be analyzed as involving feature-sharing.

 ⁽i) Chłopakom zachciało się jednemu z drugim bić.
 boys_{DAT} wanted SE one_{DAT} with other_{INSTR} fight
 'Boys felt like fighting with each other.'

of QP to its NP complement. The genitive noun is however too deeply embedded to c-command the predicative adjective/participle and undergo feature-sharing with it. To account for the appearance of genitive on 'fast' and 'sung', I propose that the whole QP in the subject position values the predicative adjective/participle. What this means is that XPs can serve as case assigners in addition to syntactic heads.

Polish quantified subjects with higher numerals may display another case pattern, when the predicative adjectives/participles that appear in these constructions bear accusative case ⁹.

(21) [QP Pięć piosenek] było szybkie/ zaśpiewane. five_{ACC} songs_{GEN} was_{3SM} fast_{ACC} / sung_{ACC} 'Five songs were fast/were sung fast.'

What could be the source of this accusative case? What is important here is that the numeral bears accusative. Its source is not clear (and I will have to leave it open here), but it is a fact of the language that these numerals are genuinely accusative, even when the QP appears in subject position.¹⁰ Structurally, I assume that the numeral is not the head of QP but is instead adjoined to it. QP is headed by the null head Q which is responsible for GQ licensing (see Franks 1994, Bailyn 2004, Bošković 2013 for evidence that GQ is not assigned by numerals themselves; notice that as observed by Bošković 2013, the numeral can undergo LBE, which shows that it is not the head of QP). Since such an adjoined position enables the numeral to c-command out, it can enter into feature-sharing with predicative adjectives and participles. The accusative case on these elements is not accidental, then, as it appears as a result of feature-sharing argued for in this paper.

Summarizing, Polish dual case pattern in the constructions under consideration in this section gives us an indication of the presence of two independent case licensing possibilities, captured by the proposed mechanisms of case valuation by XPs and feature-sharing.

⁹ See Willim (2015) and Witkoś & Dziubała-Szrejbrowska (2016) for overviews of various proposals regarding case licensing in the construction under consideration here.

¹⁰ For relevant discussion see e.g. Franks (1995), Willim (2015), Witkoś & Dziubała-Szrejbrowska (2016).

7 Intervention Effects in Predicate Nominals

The final section of this paper presents new facts related to the interaction of two mechanisms already discussed, XP probing down for a case and feature-sharing. I will show that XP elements participating in feature-sharing may display certain minimality effects when probing down their case-licensers.

NPs introduced by a particle *jako* 'as' in many Slavic languages agree in case with the NP they are predicated of. Polish (22a-b) show predicative nominals (PN) with dative and accusative arguments.

(22)	a.	Jan wyjawił	mi s	wój	sekret	jako	przyjacielowi.
		Jan revealed	me _{DAT}	his	secret _{ACC}	as	friend _{DAT}
		'Jan revealed	me his s	ecret	as a friend	1.'	
	b.	Jan wyjawił	mi	swć	j sekret	jako	tajemnicę.
		Jan revealed	me _{DAT}	his	secret _{ACC}	as	mystery _{ACC}
		'Jan revealed	me his s	ecret	as a myste	ery.'	

With multiple *wh*-elements, however, PN display intervention effects: only the second *wh*-phrase can agree in case here.¹¹

(23)	a.	Kogo	komu	Jan	przedstawił	jako	swojemu
		who _{ACC}	whom _{DAT}	Jan _{NOM}	introduced	as	his
		zwierzc	hnikowi?				
		superior	DAT				
		'Whom	did John i	ntroduce	to whom as	to his	superior?'
	b.	??Komu	ı kogo	Jan p	rzedstawił ja	ako s	wojemu
		whom	AT who ACC	Jan _{NOM} in	ntroduced as	s h	is dat
		superior	DAT				
		zwierzc	hnikowi?				
		'Whom	did John i	ntroduce	to whom as	to his	superior?'

¹¹ For some speakers, these effects are weak.

(24)	a.	Komu	kogo	Jan	przedstawił	jako	swojego
		whom _{DAT}	who _{ACC}	Jan _{NOM}	introduced	as	his _{ACC}
		zwierzchn	ika?				
		superiorAc	CC				
		'Whom di	id John iı	ntroduce	to whom as	his sup	perior?'
	b.	??Kogo	komu	Jan	przedstaw	ił jako	o swojego
		who _{ACC}	whom _D	AT Jan _{NO}	M introduced	d as	his _{ACC}

who_{ACC} whom_{DAT} Jan_{NOM} introduced as his_{ACC} zwierzchnika? superior_{ACC} 'Whom did John introduce to whom as his superior?'

Why do intervention effects arise in multiple *wh*-movement constructions in a language that otherwise does not display superiority effects (see Rudin 1988)?

Let us start with the base-generated word order, as in (22). This is a ditransitive construction with both Indirect and Direct object case-licensed by the amalgamated v-V head. I assume that V must be involved in case assignment and raises to v. This is reminiscent of the older system in which the case assigned by AgrO really depended on the verb. The PN is right-adjoined to vP and participates in feature-sharing with either of the NPs, depending on which one it is actually predicated of. When this NP is valued by the amalgamated v-V head, the case of PN is automatically valued as well. In such a configuration, no intervention effects occur, as indicated by the grammaticality of both (22a) and (22b).

Sentences (23) and (24) involve multiple *wh*-movement. This proceeds as movement of both *wh*-phrases to the edge of *vP*. This movement can occur in any order (since Polish does not show superiority effects), with the second moving *wh*-phrase tucking-in (see Richards 2001). I suggest that this movement to the edge of *vP* occurs before case-valuing of both *wh*-phrases by the *v*-V head (see also section 3). Before a *wh*-phrase moves, however, it undergoes feature-sharing with the PN. After the *wh*-phrase moves, it probes down *v* in search of valuation. The PN gets valued automatically as a consequence of that.

Now, I propose that this is where potential intervention effects emerge. Notice that degraded (23b) and (24b) have an intervening NP, which is not part of the same feature-sharing configuration but probes down the same complex head. This may explain the sudden emergence of minimality effects in this particular configuration. It happens only when an XP participating in feature-sharing probes down to reach its goal, with another intervening XP seeking valuation by the same goal which does not participate in the same feature-sharing relation. The problematic configuration of (23b) is presented schematically in (25).

(25)
$$Wh_{-uCase [DAT]} Wh_{-uCase [ACC]} v - V_{iCase [ACC]} PN_{uCase [DAT]}$$

Sentence (24b) involves a similar situation, with wh-DAT intervening between wh-ACC and the v-V head. This configuration is analogous to (25).

I conclude that case valuation with an XP probing down its case licenser comes with an additional minimality effect detected only in the configuration where feature-sharing also occurs.

8 Conclusion

This paper aimed shows that many otherwise puzzling case facts receive a uniform account under the possibility of licensing case through featuresharing (Frampton and Gutmann 2000, see also Pesetsky and Torrego 2007, Bondaruk 2013, Willim 2015 for various implementations). I also argued that XPs can not only probe down to receive a case value, as in Bošković (2007), but can also assign a case by probing down, just like heads. These arguments broaden the landscape of possibilities regarding case licensing.

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Two Types of Verb Fronting in Russian*

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Russian has two types of verb fronting with doubling: when the fronted verb is an infinitive, and when it is fully inflected. I explore the semantic differences between the two types of verb fronting, previously ignored in the literature, and argue that in uninflected verb fronting the fronted constituent is semantically a predicate, while in inflected verb fronting it's an assertion. Syntactically, thus, the two fronted constituents differ in size: it is the largest Aspect Phrase in uninflected verb fronting and a (Speech) Act Phrase with its complement elided in inflected verb fronting.

1 Introduction

Verb fronting with doubling (VF) is a common phenomenon crosslinguistically (Cable 2004, Landau 2006, Kandybowicz 2007, a.o.). Russian has two types of VF: in the first one the fronted verb is an infinitive (uninflected verb fronting, UVF) while in the second one the fronted verb is fully inflected (inflected verb fronting, IVF):

(1) a. Pet' (-to) on poët, no ploxo. [UVF] sing_{IPFV.INF} TOP he sing_{IPFV.PRS.3SG} but badly 'As for singing, he does that, but poorly.'

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b. Poët *(-to) on poët, no ploxo.^{1,2} [IVF] sing_{IPFV,PRS.3SG} TOP he sing_{IPFV,PRS.3SG} but poorly 'As for the fact that he sings, that's indeed true, but he does so poorly.'

The previous literature on VF in Russian either didn't recognize the existence of IVF (Abels 2001) or didn't discuss the semantic differences between the two types of VF (Aboh and Dyakonova 2009).

In this paper I explore novel data on the semantic differences between UVF and IVF and propose an account of the syntax/semantics mapping in the two cases. In particular, I argue that UVF picks an antecedent predicate from the discourse and says whether it's true of its continuation (i.e., the rest of the sentence, in the sense of continuation semantics, as in Barker 2002, a.o.), or what it needs to combine with to return a true proposition. IVF, however, can only pick an assertion and confirm it. I further propose that in UVF the fronted constituent is the largest Aspect Phrase (AspP), in which the verb has acquired all the aspectual but not yet tense and φ -feature morphology, and in IVF it is an Act Phrase (ActP) with an elided complement, in which the verb has already acquired all the morphology.

The rest of the paper is organized as follows. In section 2 I discuss the semantic differences between UVF and IVF, focusing, in particular, on the contexts in which the two can be used, their interaction with negation, and their interaction with Focus. In section 3 I lay out my semantic and syntactic accounts of the said differences. In section 4 I discuss some open questions. Section 5 is a conclusion.

2 Differences between UVF and IVF

In this section I review the differences between UVF and IVF along three dimensions: felicity in different contexts, interaction with negation, and

¹ As can be seen from (1), the *to* Topic marker on the fronted constituent is optional in UVF and obligatory in IVF; the reasons for the obligatoriness of *to*-marking in IVF might have to do with avoiding ambiguity, since a *VINFL Subject VINFL* sequence (with a somewhat different prosodic pattern than the one in IVF) in Russian can be interpreted as an iterative or temporally prolonged eventuality.

 $^{^2}$ A caveat: not all native speakers of Russian accept IVF in the first place. Thus, the judgements I report in this paper only come from those speakers who accept IVF to begin with, but for them the contrasts reported here are robust.

interaction with Focus. I argue that all the differences thus identified suggest that in UVF the fronted constituent is semantically a predicate, and in IVF it is an assertion.

2.1 Contexts

UVF and IVF have a similar structure: (i) they include a fronted constituent that requires an antecedent in the preceding discourse³ and carries a prosodic contour associated with that of Contrastive Topics in the sense of Büring 2003, (ii) they assert something about that fronted constituent lower in the clause, with some part of that assertion being in Focus (again, in line with the Contrastive Topic + Focus configuration), and (iii) they are followed by a contrastive continuation, overt or implied.

However, for the fronted constituent in UVF a predicative antecedent is enough, while in IVF the antecedent has to be at least a proposition. For example, IVF is impossible in B's response in (2a), since there is no antecedent proposition 'B sings' in A's utterance, but possible in (2b), since A's utterance contains the antecedent proposition 'Ivan sings'. UVF is possible in both cases, since it only requires the predicate antecedent 'sing', which is present in A's utterance.

(2) Context: A and B are discussing casting for a musical film.

A: My možem vzjať na roľ Ivana — on ved' poet. we can take on role Ivan he EMPH sings 'We can cast Ivan — [I'm reminding you that] he sings.' B: a. Pet'- / *pojuto ja poju i sing_{IPFV.INF} sing_{IPFV.PRS.1SG} TOP and I sing_{IPFV.PRS.1SG} tol'ko ploxo. only badly 'As for singing, I do that, too — only poorly.' b. Pet'- / poëtto on poët, no ploxo sing_{IPFV,INF} sing_{IPFV,PRS,3SG} TOP he sing_{IPFV,PRS,3SG} but badly 'As for singing, he indeed does that / As for the fact that he sings, that's indeed true, but he does so poorly.'

³ I use the term *antecedent* loosely here, to mean something in the preceding discourse that licenses VF. I certainly don't mean to say that fronted constituents in VF constructions are anaphoric elements.

Furthermore, IVF cannot be used in response to unbiased, informationseeking polar questions, only in response to assertions (and possibly to biased, confirmation-seeking polar questions):

- (3) A: Rasskaži mne pro Ivana. On poët? tell_{IMP.2sg} me about Ivan he sings 'Tell me about Ivan. Does he sing?'
 - B: Pet'- / #poët- to on poët, no ploxo sing_{IPFV.INF} sing_{IPFV.PRS.3SG} TOP he sing_{IPFV.PRS.3SG} but badly 'As for singing, he does that, but poorly. / #As for the fact that he sings, that's indeed true, but he does so poorly.'

I take (3) to suggest that in IVF the antecedent is not just a proposition, but an assertion, since, under the standard assumptions about the semantics of questions (Hamblin 1973 et seq.), A's question in (3) denotes the set {Ivan sings, Ivan doesn't sing}, making the proposition 'Ivan sings' a possible antecedent, which, however, is not enough to license IVF in B's response.

Furthermore, that antecedent assertion has to contain a proposition that is already in the common ground or is supposed to be there (that's why A's utterance in (2) contains the *ved'* particle, which is essentially used to remind the addressee of something or to request a confirmation for a proposition that is supposed to be in the common ground). The only thing IVF can do is reaffirm the status of that proposition, and then the contrastive continuation states that that proposition, albeit true, is somehow irrelevant or less important than some other fact. In other words, IVF cannot be used to disagree with the antecedent assertion. Informally, its sole purpose is to say to the addressee, 'Your speech act was justified, but irrelevant'.

2.2 Negation

The next dimension to consider is interaction with negation. Whenever there is negation on the lower occurrence of the verb, the higher occurrence can't contain negation in UVF, but must contain one in IVF: (4) a. Pet'- / *poëtpoët, to on ne sing_{IPFV.INF} $sing_{IPFV.PRS.3SG}$ TOP he NEG sing_{IPFV.PRS.3SG} no tancuet xorošo. but dances well 'As for singing, he doesn't do that, but he dances well.' b. Ne *pet'- / poëtto on ne poët, NEG sing_{IPFV.INF} sing_{IPFV.PRS.3SG} TOP he NEG sing_{IPFV,PRS,3sg} no tancuet xorošo. but dances well 'As for the fact that he doesn't sing, that's indeed true, but he dances well.'

UVF in (4b) can be saved, if the fronted constituent is interpreted as a "negative predicate", i.e., if 'not sing' is interpreted as something like 'be a non-singer'. Thus, predicates that always come with built-in negation, can be easily fronted in UVF:

(5) Ne-vzljubit'- to on menja ne-vzljubil, NEG-like_{PFV.INF} TOP he me NEG-like_{PFV.PAST.M.SG} no gadostej nikakix ne delal. but mean things none NEG did 'Dislike me he did, but he didn't do anything mean to me.'

The ungrammaticality of UVF in (4b) is to be expected if the fronted constituent in UVF is a predicate and, thus, can only contain negation if it's a "negative predicate". The ungrammaticality of IVF in (4a) is similarly expected, if the fronted constituent in IVF is an assertion that can only be confirmed, and, thus, whatever the polarity of the fronted assertion, it has to be matched by the polarity of the lower one.

2.3 Focus

As mentioned above, both UVF and IVF are essentially Contrastive Topic + Focus constructions. The difference between the two, however, is that in UVF the focused constituent can be any one that can plausibly participate in constructing a set of alternatives, while in IVF it can only be the lower occurrence of the verb:

(6)	A:	A vy	kak	spali?			
		and you	how	slept			
		'And how	did you	ı sleep?'			
	B:	Spat'- /	*spal-		to	ja	spal
		sleep _{IPFV.INF}	sleep	IPFV.PAST.M.SG	TOP	Ι	sleep _{IPVF.PAST.M.SG}
		HOROŠO					_
		well					
	'As for sle	eping, l	slept WE	LL'		[corpus example]	

The data above support the idea that in UVF the fronted constituent is a predicate, and Focus placement lower in the clause will then depend on what is asserted about that predicate. Since IVF can only be used to confirm an assertion, the only locus for Focus placement is the lower occurrence of the inflected verb, since inflected verbs bear polarity in Russian (for example, they can be used in short polar responses (Gribanova 2017, a.o.)).

Note also that the Focus facts are intertwined with the facts discussed in section 2.1 on contexts. In particular, the IVF sequence in (2a) isn't just infelicitous, it's ungrammatical, due to Focus being on ja ('I').

3 My Proposal

Now that I have demonstrated that there are plenty of reasons to believe that UVF and IVF differ in the size of the fronted constituent, I proceed to lay out my account of the semantics and syntax of UVF and IVF.

3.1 Semantics of UVF and IVF

As anticipated in the previous section, I propose that both types of VF in Russian are semantically Contrastive Topic + Focus constructions in the sense of Büring 2003, i.e., they both evoke a nested question under discussion (QUD; in the sense of Roberts 1996, a.o.) structure.

UVF evokes a pair-list super-QUD one of whose sub-QUDs is about the antecedent predicate. One option for UVF is to map predicates to truth values when fed a certain fixed continuation, in which case the Focus will be on the lower occurrence of the verb:

(7) Pet'- to Ivan POËT, no ploxo. sing_{IPFV.INF} TOP Ivan sing_{IPFV.PRS.3SG} but badly
'As for singing, Ivan does that, but poorly.' Super-QUD: Which predicate returns which truth value, with Ivan as the agent and the existential closure over events applied? Answer: λe.sing(e) → T, λe.sing(e) ∧ well(e) → F.

Another possibility is for UVF to map predicates to arguments or modifiers so that those predicates combined with those arguments or modifiers (and fed a certain continuation) return 'true':

(8) Spat'to ja spal HOROŠO, sleep_{IPFV.INF} TOP Ι sleep_{IPFV.PAST.M.SG} well no prosnulsia trudom. S but wake-up_{PVF.PAST.M.SG} with effort 'As for sleeping, I slept well, but I woke up with effort.' Super-QUD: Which predicate combined with which modifier returns 'true', with the speaker as the experiencer and the existential closure over events applied? Answer: $\lambda e.sleep(e) \rightarrow \lambda e.well(e)$, $\lambda e.wake-up(e) \rightarrow \lambda e.with$ effort(e).

As for IVF, I have shown above that the only thing it can do is confirm that the antecedent speech act was justified, but then the contrastive continuation indicates that the truth of the asserted proposition is somehow irrelevant/unimportant. One way of thinking about it is in terms of sorting assertions into justified vs. relevant/important for the larger context. For example, if (9) is uttered in the context of a discussion on whether we should cast Ivan in a musical film, it evokes the super-QUD about which facts are simply true and which facts are relevant for the issue at hand:

(9) Poët- to Ivan POËT, no ploxo. sing_{IPFV.PRS.3SG} TOP Ivan sing_{IPFV.PRS.3SG} but badly
'As for the fact that Ivan sings, that's indeed true, but he does so poorly.' Super-QUD: Which assertions are justified and which are relevant for whether we should cast Ivan?

Answer: 'Ivan sings' \rightarrow justified, 'Ivan sings poorly' \rightarrow relevant.

3.2 Syntax of UVF and IVF

3.2.1 Syntactic Assumptions. In this section I will lay out a syntactic account that ensures the right semantics for UVF and IVF and captures the morphological differences between the two.

My account relies on the following general assumptions:

- The Copy theory of movement (Chomsky 1995).
- Word formation is syntactic (e.g., Distributed Morphology (Halle and Marantz 1993)).
- Russian verbs don't move to T (Bailyn 1995), but they move through several aspectual projections to acquire aspectual morphology, and eventually land in a certain intermediate position below T (and below Neg) let's call it φ where they get tense and φ-feature morphology.

I will further assume that both VF constructions are formed via phrase movement to the specifier of a Contrastive Topic (CTop) projection. An alternative would be that the higher occurrences of the verbs are base-generated. One argument against the base-generation analysis would be that at least UVF seems to be sensitive to island violations, as shown in (10).⁴ It's hard to make the same argument for IVF, since, due to its peculiar semantics, it's pretty much unembeddable.

(10)	a.	Pet'-	to	ja	dumaju,	čto	on	poët.	
		sing _{IPFV.INF}	TOP	I	think	that	he	sing	V.PRS.3SG
		'As for sin	nging,	I thi	ink that h	e does t	hat.'		
	b. '	*Pet'-	to	ja	slyšal	slux,	čto	on	poët.
		sing _{IPFV.INF}	TOP	Ι	heard	rumor	that	he	sing _{IPFV.PRS.3SG}
		'As for sin	nging,	I he	ard a rum	nor that 1	he do	bes that	t.'

Another argument against the base-generation analysis is that the two occurrences of the verb in both types of VF in Russian have to be

⁴ With the understanding that many Russian speakers don't particularly like extraction from embedded clauses in general.

aspectually identical, including super-lexical aspectual prefixes (see, e.g., Svenonius 2004 on the distinction):

(11)	a. '	*Pet'- / *pel- to on za-pel
		sing _{IPFV.INF} sing _{IPFV.PAST.M.SG} TOP he INCH-sing _{PFV.PAST.M.SG}
		Intended: 'As for singing, he started singing / As for the fact
		that he sang, he started singing'
	b.	Za-pet'- / za-pel- to on
		INCH-sing _{IPFV.INF} INCH-sing _{IPFV.PAST.M.SG} TOP he
		za-pel
		INCH-sing _{PFV.PAST.M.SG}
		'As for starting singing, he did so / As for the fact that he
		started singing, that's indeed true'

If the two occurrences of the verb in VF are two copies of the same item, aspectual identity follows (given an appropriate constraint on the minimal size of the fronted constituent), while it isn't clear what would ensure aspectual identity if the higher occurrence of the verb was base-generated. Once again, the argument only truly works for UVF, since in IVF aspectual identity should follow from its semantics: all the aspects of the antecedent assertion should be preserved in the confirmation.

While the two arguments above do not extend to IVF, let me note that a movement-based analysis allows us to capture the fact that IVF can only be used to confirm the antecedent assertion: assuming the fronted constituent is large enough to contain polarity, if it is a copy of the lower constituent, there can be no polarity mismatch between the two.

3.2.1 Syntax of UVF. I propose that in UVF the constituent fronted is the largest AspP (to ensure aspectual identity), so that the verb will have acquired all the aspectual, but not yet tense and ϕ -feature morphology. A tree for a UVF example, (1a), is given in Fig. 1.

Now, the tree in Fig. 1 relies on the assumption that there are aspectual projections above v (in particular, for super-lexical aspectual prefixes, absent in (1a), but present in examples like (11b)), in line with Gribanova 2013, thus, the fronted constituent will contain the silent copies of the verb's arguments (both internal and external), which will remain both (unpronounced) and uninterpreted. The latter is required for the correct predicative interpretation we are after.



Fig. 1: A tree for (1a) ('sing_{IPFV.INF} TOP he sing_{IPFV.PRS.3SG}'), UVF

One might want a neater analysis whereby the fronted constituent is smaller and thus doesn't contain the copies of the verb's arguments to begin with (at least, not the external one — I come back to the question about internal arguments in UVF in section 4). That would require adopting the view that Russian verbs acquire all aspectual morphology before merging with their arguments (contra Gribanova 2013).

3.2.2 Syntax of IVF. I propose that in IVF the fronted constituent is an ActP (Krifka 2013, \approx PolP in Gribanova 2017) with its TP complement elided (but interpreted).⁵ By the time the verb gets to Act, it will, of course, have acquired tense and ϕ -feature morphology. A tree for an IVF example is given in Fig. 2.

In Fig. 2 the TP complements of both ActPs get elided, and it is the two verb copies in the two Act heads that get pronounced. Some material can escape the TP to be elided via ordinary topicalization, as is the case in Fig. 2, but it is not obligatory:

⁵ Thanks to David Pesetsky (p.c.) who insisted that I investigate this possibility.



Fig. 2: A tree for (1b) ('sing_{IPFV.PRS.3SG} TOP he sing_{IPFV.PRS.3SG}'), IVF

(12) A: Ivan ved' poet. Ivan EMPH sings '[I'm reminding you that] Ivan sings.'
B: Poët- to poët, no ploxo. sing_{IPFV.PRS.3SG} TOP sing_{IPFV.PRS.3SG} but badly

'As for the fact that he sings, that's indeed true, but he does so poorly.'

An alternative way to obtain the same linear string as in Fig. 2 would be to have no TP-ellipsis in the lower ActP and allow for the lower TP-internal copy of the verb to get pronounced instead of the copy in the lower Act head. Since I do not propose any new account of linearization in VF constructions here (previous literature on VF constructions contains quite a few relevant proposals: Kandybowicz 2007, Aboh and Dyakonova 2009, Bleaman 2016, a.o.), I will remain neutral between these two possibilities.

A reasonable question at this point is what the nature of the TP-ellipsis in IVF is. I assume that it is essentially the same TP-ellipsis that happens in general in Russian short polar responses to questions or assertions:

(13) A: Ivan poët ? / . Ivan sing_{IPFV.PRS.3SG}
'Does Ivan sing? / Ivan sings.' B: Da, poët. / Net, ne poët. yes sing_{IPFV.PRS.3SG} no NEG sing_{IPFV.PRS.3SG} 'Yes, he does. / No, he doesn't.'

Such short polar responses are discussed at great length in Gribanova 2017, who argues that they involve movement of the Focus-bearing element (the verb in B's responses in (13)) to the Pol head (roughly corresponding to the Act head in my analysis) and subsequent TP-ellipsis.

Based on their function and behavior, IVF constructions are just a special case of polar responses. David Pesetsky (p.c.) also pointed it out to me that, to his knowledge, languages that have IVF-like constructions are also languages that allow polar responses such as in (13), which supports the parallel between the two phenomena.

Now, Gribanova (2017) argues that the TP-ellipsis in short polar responses is not obligatory, although "the pragmatically preferred strategy is the elided one", which I tentatively agree with (I simplify Gribanova's original example):

(14) A:	Maša	otp	ravila	pis'ma	a v	Moskvu?		
	Masha	a sen	d _{PFV.PAST.F.SG}	letters	s to	Moscow		
	'Did N	Masha	send the le	etters to	o Mo	oscow?'		
B:	Da,	otprav	vila o	na pi	is'ma	ı. /		
	yes	send	FV.PAST.F.SG S	he le	etters			
	Net,	ne	otpravila	01	na	pis'ma.		
	no	NEG	send _{PFV.PAS}	_{T.F.SG} sł	ne	letters		
	'Yes,	she di	d send the	letters.	/ No	o, she didn't s	send the letters.	,

Yet, in IVF, TP-ellipsis seems to be obligatory in at least one of the ActPs:

(15)	a.	Poët-	to	Ivan	poët
		sing _{IPFV.PRS.3SG}	TOP	Ivan	sing _{IPFV.PRS.3SG}
	b.	Poët	Ivan-	to	poët
		sing _{IPFV.PRS.3SG}	Ivan	TOP	sing _{IPFV.PRS.3SG}
	c.	*Ivan poët-		to	Ivan poët
		Ivan sing _{IPFV.E}	PRS.3SG	TOP	Ivan sing _{IPFV.PRS.3SG}
	d.	*Poët	Ivan-	to	Ivan poët
		sing _{IPFV.PRS.3SG}	Ivan	TOP	sing _{IPFV.PRS.3SG}
		'As for the fac	t that I	Ivan si	ngs, it's indeed true'

This discrepancy between ellipsis in polar responses and IVF is potentially alarming, but the redundancy-reducing requirements can very well differ across utterances and/or clauses (as is the case in polar responses and in some other types of ellipsis) vs. within a clause (as is the case in IVF).

Also, I don't find the very possibility of obligatory ellipsis particularly scandalous, especially, in contrastive environments. For example, going back to Gribanova 2017, she also discusses a case of what she (to my mind, rightfully) claims to be obligatory ellipsis in the following Contrastive Topic + Focus constructions (again, the original examples are simplified):

- (16) A: Maša otpravila pis'ma v Moskvu? Masha send_{PFV,PAST,F,SG} letters to Moscow 'Did Masha send the letters to Moscow?'
 - B: Včera otpravila (*ona pis'ma). а yesterday send_{PFV.PAST.F.SG} she letters and-contrastive segodnja — ne otpravila (*ona pis'ma). today letters NEG send_{PFV,PAST,F,SG} she 'Yesterday she did, but today she didn't.'

4 Some Loose Ends

There are, of course, still quite a few loose ends to tie up. I will briefly discuss two of those in this section.

4.1 Internal Arguments in UVF

First, as promised in 3.2.1, I come back to the issue of internal arguments in UVF. There are two questions to be asked: do internal arguments get interpreted in the fronted constituent, and if yes, do they ever get pronounced up there?

Regarding the first question, it seems that sometimes internal arguments of transitive verbs do get interpreted as part of the fronted constituent, as in (17a), whereby the UVF configuration addresses the sub-QUD about the antecedent predicate 'shoot movies', but sometimes they don't, as in (17b), whereby the UVF configuration addresses the sub-QUD about the antecedent predicate 'shoot' (there isn't an antecedent predicate 'shoot thrillers' to begin with; furthermore, 'thrillers' in B's response is focused and, thus, new information):

- (17) a. A: Rasskaži mne pro Ninu. Ona snimaet kino? tell_{IMP.2sg} me about Nina she shoots movies 'Tell me about Nina. Does she shoot movies?'
 - B: Snimat'to kino ona SNIMAET. shoot_{IPFV,INF} TOP movies she shoot_{IPFV.PRS.3SG} no vvxodit poka tak sebe. but come-out so-far so-so 'As for shooting movies, she does that, but the results are for now so-so.' Super-QUD: Which predicate returns which truth value, with Nina as the agent and the existential closure over events applied? Answer: $\lambda e.shoot(e) \land movies(th(e)) \rightarrow T, \lambda e.shoot(e) \land$ **movies**(**th**(e)) \land **well**(e) \rightarrow F. b. Context: A and B are planning a movie night and want to invite Nina, who is a film director. A asks B what kind of movies Nina makes to decide on the genre for the movie night. A: A čto Nina snimaet?
 - what Nina shoots and 'What does Nina shoot?' B: Snimat'to ona snimaet TRILLERY, shoot_{IPFV.INF} shoot_{IPFV,PRS,3SG} thrillers TOP she no smotret' možet i KOMEDII. even comedies but watch_{IPFV,INF} can 'As for shooting, she shoots thrillers, but as for watching, she can even watch comedies.'
 - Super-QUD: Which predicate combined with which theme returns true, with Nina as the agent and the existential closure over events applied?
 - Answer (simplified): $\lambda e.shoot(e) \rightarrow {}^{\cap}thrillers$, $\lambda e.watch(e) \rightarrow {}^{\cap}comedies$.

Such interpretations whereby the internal argument is not interpreted as part of the fronted predicate are similarly available when the doubled predicate contains super-lexical prefixes:

(18) Ot-snjat'- to ona ot-snjala COMPL-shoot_{PFV.INF} TOP she COMPL-shoot_{PFV.PAST.F.SG} TRILLER, no reklamiruet KOMEDIJU. thriller but promote_{IPFV.PRS.3SG} comedy 'As for completing shooting, she completed shooting a thriller, but she is promoting a comedy.'

This suggests that if one wants a neat movement-based analysis of UVF in which the constituent fronted does not contain any uninterpreted copies of the verb's arguments, they will have to assume that Russian verbs acquire all of their aspectual morphology before merging with any of their arguments. I would prefer to remain neutral on the matter for now, however.

As for where the internal argument is pronounced, there are some naturally occurring examples of UVF that suggest that the object can at least sometimes be pronounced next to the higher copy of the verb:

- (19) Tak čto kupiť mašinu ja kupil (...), so buy_{IPVF.INF} car I buy_{IPFV.PAST.M.SG}
 no obŝenie s sotrudnikami ostavilo nepr[i]jatnyj osadok. but interaction with employees left unpleasant residue 'As for buying the car, I did that (...) but talking to the employees left a bad aftertaste.' (Google; car store review)
- (20) Kupit' vannu[-] to ja kupil (\ldots) , no ostavljať buy_{IPVF.INF} bath Ι buy_{IPFV.PAST.M.SG} but leave TOP pomeŝenie v takom sostojanii bylo nevozmožno. room in such state was impossible 'As for buying a bathtub, I did that (...), but leaving the room in such a state was impossible.' (Google; website on renovations)

That said, since Russian in principle allows multiple topicalization, the objects in (19) and (20) could've been topicalized independently from the verb. However, the position of the *to* particle might suggest that in (19) 'buy bath' is a constituent⁶, although the position of such particles is not necessarily a reliable indicator of the constituency structure. Note that a

⁶ While the original example didn't contain it, one can also have a *to* particle after *mašinu* 'car' in (19).

similar point can be made for (15b), although that raises again the question about what exactly the obligatoriness of the *to* marker in IVF is due to and whether it can be satisfied by any *to* marker.

The judgements on where the copy of the object is pronounced are gradient, variable across speakers, and seem to depend on various factors, including, for example, prosodic weight. Investigating these preferences further, as well as how they correlate with those in ordinary VP fronting without doubling in Russian is, however, a matter of further research.

4.2 Other Doubling Constructions

Even though I have only talked about verb fronting so far, it would seem that IVF is just a special case of a more general construction in which the focused part of the antecedent assertion gets doubled to confirm the said assertion and then discard it as less important/relevant than whatever is brought up in the contrastive continuation:

- (21) a. A: Začem uvol'njat' Ivana? On že HOROŠIJ rabotnik! why fire Ivan he EMPH good worker 'Why fire Ivan? [I am reminding you that] he is a good worker!'
 - B: Horošij-to horošij, no u nas deneg net. good TOP good but at us money no 'As for the fact that he's good, that's indeed true, but we have no money.'
 - b. A: Davaj pozovëm Ivana. On že HOROŠO poët. let's call Ivan he EMPH well sings 'Let's call Ivan. [I'm reminding you that] he sings well.'
 - B: Horošo-to horošo, no bez duši.well TOP well but without soul'As for the fact that he sings well, he does indeed sing well, but he does so without soul.'

This further supports the claim that IVF is just a special case of polar responses, since the fronted constituents in (21) would also be the ones used in non-doubled short responses to questions or ordinary assertions with the same Focus structure as A's utterances in (21).

Naturally, there are no counterparts of UVF for such doubling constructions, but the analysis proposed here for IVF extends straightforwardly to the cases in (21).

5 Conclusion

In this paper I have looked at the previously understudied distinction between uninflected and inflected verb fronting in Russian (UVF and IVF respectively). Drawing from the semantic differences between UVF and IVF, I have argued that the two differ in the size of the fronted constituent. In particular, I have shown that UVF takes an antecedent predicate and says something about it, e.g., whether it's true or false of a certain continuation, or what arguments/modifiers it needs to combine with to return a true proposition. IVF in its turn can only take an antecedent assertion and confirm it. I have proposed a syntactic analysis to reflect this semantics in which in UVF the fronted constituent is the largest Aspect Phrase, while in IVF it's a (Speech) Act Phrase with an elided complement. The morphological facts follow from that.

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PCC Violations and Their Resolutions*

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This paper examines variation in so-called "Person Case Constraint" (PCC) effects in various Slavic languages. Section 1 identifies four PCC systems that have been described for Slavic. Adapting Franks (2017) on clitic deficiency, Béjar and Řezáč (2003) on person licensing, and Halle (1997) on PERS(on) features, section 2 argues that clitic pronouns may be deficient in PERS features and have these valued by a higher functional head. The different PCC systems-Strong, Weak, Me-First, Strictly Descending—are then shown to and derive from underspecification of PERS features. Finally, section 3 deals with two repair strategies employed by Slavic languages. Violations in Polish, Czech, or Slvn, which do not impose strict DAT » ACC order, can be repaired by scrambling, whereas violations in strict DAT » ACC languages, such as Bg or BCS, are repaired by replacing one of the clitics with a tonic pronoun. Why which one is replaced is argued to follow from the proposed feature geometric system.

1 Some Systems

The observation that certain combinations of clitic pronouns are incompatible goes back at least to Perlmutter (1971) in the generative literature. He handled the Spanish and French restrictions by positing idiosyncratic surface filters, remarking (p. 27) that "there is no intrinsic reason why they [the clitics] should have to come in one order and not another." Since Perlmutter's seminal work on what is now known as the

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PCC, much ink has been spilled trying to understand what is going on and, more importantly, why, greatly expanding the range of languages under consideration and, concomitantly, the typology of PCC systems.¹ This paper is a small contribution with those same aims.

1.1 The Strong Constraint

The traditional PCC, due to Bonet (1991), states that in a combination of weak direct and indirect object pronouns (i.e., accusative and dative), the direct object has to be third person. Her original "Strong" version of the PCC, based on Romance data, is given in (1):

(1) Strong Person-Case Constraint: In a combination of a weak direct and indirect object, the direct object has to be 3^{rd} person.

Despite this standard description, as shown by the data in section 3.1 below, the PCC really has nothing to do with case *per se*. Instead, it is just about the relative order of the two pronouns, and that is how my characterizations will be expressed. (1) should thus be rewritten as (1'):

(1') **Strong Person Ordering Constraint**: In a combination of clitic pronouns, the last one has to be 3^{rd} person.

According to Stegovec (2016), standard Slvn instantiates this pattern; Harizanov's (2014) description of Bg is similar. Their examples follow:

- (2) a. Sestra **mi/ti ga bo** predstavila. 1/2.DAT » 3.ACC sister me/you_{DAT} him_{ACC} FUT_{3SG} introduce_F 'The sister will introduce him to me/you.'
 - b. *Sestra **mu me/te bo** predstavila. *3.DAT » 1/2.ACC sister him_{DAT} me/you_{ACC} FUT_{3SG} introduce_F 'The sister will introduce me/you to him.'
 - c. *Sestra **mi/ti te/me bo** predstavila. *1/2.DAT » 2/1.ACC sister me/you_{DAT} you/me_{ACC} FUT_{3SG} introduce_F 'The sister will introduce me/you to you/me.'

¹ Relevant studies include Bonet (1995), Béjar and Řezáč (2003), Nevins (2007), Walkow (2012), Sturgeon et al. (2012), Preminger (2014), Charnavel and Mateu (2015), Stegovec (2016), and especially Pancheva and Zubizarreta (2017).

(3)	a.	Vera	mi/ti	go	predstavi.	1/2.0BL » 3.0BJ
		Vera	me/yousg-c	obl himobj	introduced	
		'Vera	introduced	l him to me/	you.'	
	b.	*Vera	a mu	me/te	predstavi.	*3.0bl » 1/2.0bj
		Vera	himobl	me/yousg-on	BJ introduced	
		'Vera	introduced	l me/you to l	nim.'	
	c.	*Vera	a mi/ti	te/me	predstavi.	*1/2. OBL » 2/1.OBJ
		Vera	me/yousg			
		'Vera	introduced	l me to you.	,	

1.2 The Weak Constraint

The weak PCC can be described as in (4):

(4) Weak Person Ordering Constraint: In a combination of clitic pronouns, if there is a 3^{rd} person, then it has to come last.

This means that the (c) examples above are acceptable. Stegovec (2016) writes that some Slvn speakers allow (2c), reflecting the weak pattern.

1.3 The Me-First Constraint

A third fairly common type is given in (5):

(5) **Me-First Person Ordering Constraint**: In a combination of clitic pronouns, if there is a 1st person, it has to come first.

BCS, as described by Runić (2013), belongs to this system:

(6)	a.	Toplo	mu	te	preporučujem.	3.DAT » 2.AC	С
		warmly	himdat	youacc	recommend _{1SG}		
		'I warml	y recom	mend yo	ou to him.'		
	b.	??(*)Toj	olo mu	me	preporučuješ.	*3.DAT » 1.A	СС
		warmly	him	рат тел	cc recommend _{2sg}		
		'You war	mly rec	ommend	me to him.'		
(7)	a.	Toplo	mi t	e p	reporučuje.	1.DAT » 2.AC	С
		warmly	терату	ouace re	ecommend _{3SG}		
		'He war	mly reco	mmends	s you to me.'		
	b.	??(*)Toj	olo ti	me	preporučuje.	*2.DAT » 1.A	СС
		warmly	you	DAT meac	c recommend _{3SG}		
		'He war	mly reco	mmend	s me to you.'		

Runić's example (6) shows that 3^{rd} person can precede 2^{nd} but not 1^{st} and her (7) shows that 1^{st} person can precede 2^{nd} but not vice versa:

1.4 The Strictly Descending Constraint

Lastly, there is the type in (8):²

(8) **Strictly Descending Person Ordering Constraint**: In a combination of clitic pronouns, the argument with the "higher" person specification (where $1^{st} \gg 2^{nd} \gg 3^{rd}$) has to come first.

This is how Sturgeon et al (2012) describe Czech,³ and it may be that some Macedonian speakers adhere to this system as well.⁴

2 Analysis

This section puts forward an explicit account of these systems.

2.1 Background assumptions

Before laying out the specifics, it will be necessary to clarify certain ideas required to make the technical details work. There are three distinct conceptual components.

First, I adopt a fairly standard dissection of PERS, stemming from Halle (1997), in terms of features for [Participant] and [Author]. It will be noted that (9) expresses these features as privative rather than polar features, so that PART and AUTH are possible values of PERS.⁵

² These four types are laid out in Sturgeon et al. (2012). In his catalog of PCC types, Nevins (2007) also describes what he calls the "Super-Strong PCC," and he uses the term "Ultra-Strong" for what is referred to here as the "Strictly Descending PCC." See also Pancheva and Zubizarreta (2017).

³ Sturgeon et al. (2012) did admittedly find a few Strictly Descending PCC violations in their Czech National Corpus study, but state that these "are often judged as ungrammatical or degraded by native speakers." On the other hand, Peter Kosta (p.c.) tells me that, for him, $2^{nd} \gg 3^{rd}$ and $3^{rd} \gg 2^{nd}$ are equally acceptable, concluding that he is a Me-First speaker instead.

⁴ Space considerations prevent consideration of Mac; for discussion see Franks (2017: section 5.2.4.4).

⁵ Conversely, Nevins (2011) contends that person is best analyzed in terms of polar features, although person differs in this regard from number. Note however that the alternative account of section 2.6 requires AUTH and PART to be privative features.

(9) Person features:

- a. 1st PERSON: [PERS PART, AUTH]
- b. 2nd PERSON: [PERS PART]
- c. 3^{rd} **PERSON**: $[_{PERS} \emptyset]$

Next comes the idea, developed in section 4.1 of Franks (2017), that clitics, as minimal lexical items, may lack specifications enjoyed by contentful words. I claim that, starting from the hallmark fact that clitics are prosodically deficient, potential semantic and syntactic deficiencies are optimal clitic properties as well. So, on top of their semantic deficiency (clitics do not instantiate lexical features),⁶ I argue that clitics may have additional defects—which I call "overlay" restrictions— limiting what morphosyntactic information they contain:

(10) Overlay Semantic Restrictions:

- a. **Restriction**_{PERS}: A clitic may *not* have PERS features.⁷
- b. **Restriction**_{PART}: A clitic may *not* have PART features.
- c. Restriction_{AUTH}: A clitic may not have AUTH features.

The effect of these restrictions in deriving the various PCC patterns will be demonstrated below.

The last component of the analysis concerns how person is licensed on clitics when their PERS features lack specified values. Here again I adopt familiar minimalist mechanisms. The basic idea, stemming from Cardinaletti and Starke (1994), is that person must be licensed. A popular instantiation of this is to treat PERS as a probe for the operation Agree, in order to satisfy Béjar and Řezáč's (2003: 53) "Person Licensing Condition," which states that "an interpretable 1st/2nd person feature must be licensed by entering into an Agree relation with a functional category." I following Stegovec (2016), however, in that it is the clitics which can come with unvalued features, as in the overlay restrictions in (10). For the purposes of Spell-Out, these need to be valued in the course of the derivation. This is implemented through feature spreading in the

⁶ Clitics express grammatical rather than substantive information—a language can have clitics for things like case, mood, or voice, but not for *rock, bleed*, or *sad*.

⁷ In the alternative model without PERS, proposed in section 2.6, (10a) should be understood as simply combining the deficiencies of (10b) and (10c), so that, in the Strong system, both PART and AUTH are absent on clitic as vocabulary items.

multiattachment model developed in Franks (2017). That is, clitics derive the featural content that specifies their PERS values from some higher functional category searching down the tree. Crucially, when there is more than one clitic, it is the highest (=first) that is reached first.

2.2 Strong (Standard Slovenian and Bulgarian)

In the Strong system, clitics respect (10a). PERS has no specification on the clitics, thus 1st or 2nd person spreads as follows:⁸

(11) Strong System: Spreading of PERS



This means the second clitic (clitic_B) can only surface as a completely unspecified form, i.e., it must be 3^{rd} person.⁹

2.3 Weak (Alternative Slovenian)

In the Weak system, clitics respect (10b), which disallows them from expressing the PART feature but is silent about AUTH. Because PART has no specification on the clitics, it speads as in (12).¹⁰

⁸ Parentheses indicate optionality, although AUTH without PART is ineffable. I return to my choice of Agr in section 2.6, suggesting that it be revised (to Appl, following Pancheva and Zubizarreta 2017), and adopt an anonymous reviewer's suggestion that PERS not be an actual component of the feature geometry. Instead, in (11), AUTH would be a feature of PART (which in turn is dependent on Appl) and it is PART that spreads to clitic_A.

⁹ A anonymous reviewer asks why PERS could not continue to spread, identifying clitic_B as 1^{st} or 2^{nd} person, just like clitic_A Indeed nothing prevents this; the only issue, as discussed in Franks (2017: 277–279), is whether the result would lead to a subsequent Binding Condition B violation.

¹⁰ As noted in section 2.6, since it is PART which spreads in (12), to accommodate the Weak system without PERS (as per fn. 8) we would need to let languages differ in the geometries that express person (and presumably other kinds of) features.
(12) Weak System: PERS has no value for PART



2.4 Me-First (BCS)

In the Me-First system, in which 1^{st} is required to precede 2^{nd} or 3^{rd} , but that is all, clitics respect (10c). This can be instantiated as follows:

(13) Me-First System: PERS has no value for AUTH



In (13), the PERS of either clitic can be endowed with a PART feature and AUTH spreads from Agr. The most striking aspect of this analysis is that it allows for 3^{rd} person to precede 2^{nd} , as in (6a). This is what emerges if Agr adds no person values to either clitic, and if clitic_B bears PART, as in (14). On the other hand, any combination in which 1^{st} person accusative follows a 3^{rd} or 2^{nd} person dative clitic, as (6b) and (7b), respectively, cannot be derived if AUTH is removed from the clitics and placed under Agr. The reason is simply that the PERS of clitic_A cannot be skipped in accessing the PERS of clitic_B. This in effect ensures that, if there is a 1^{st} person clitic, then it must precede all others, which is, after all, what the *Me-First* Person Ordering Constraint means.



2.5 Strictly Descending (Czech? Macedonian?)

The difference between Strictly Descending and Strong lies in the fact that the latter does not allow 1^{st} person to precede 2^{nd} person, as in (15c):

(15)		Strictly Descending PCC	Strong PCC
. ,	a.	$1^{\text{st}} \gg 3^{\text{rd}}$	$1^{st} \gg 3^{rd}$
	b.	$2^{nd} \gg 3^{rd}$	$2^{nd} \gg 3^{rd}$
	c.	$1^{st} \gg 2^{nd}$	$*1^{st} \gg 2^{nd}$

To make this work, PART and AUTH must be able to operate independently on the probe; the highest goal, $clitic_A$, can thus be valued as AUTH and the next, $clitic_B$, just as PART, as in (16):

(16) Stricty Descending System: PERS has no values



Thus, both systems share the fact that what defines them is the overlay restriction in (10a), namely that the clitics do not come with person values. The difference is that the clitics themselves have a PERS node in the Strictly Descending system, but not in the Strong one. The result is that clitic_A can be 1^{st} person and clitic_B can be 2^{nd} . This is precisely what

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is needed to derive the Strictly Descending PCC order in $(15c)^{11}$ and to make it diverge from the Strong PCC in just this one way.

2.6 Some technical adjustments

I have used Agr for the purpose of introducing and spreading person features, despite minimalism's rejection of Agr-projections as being purely theory-internal (in that they lack interpretive motivation). An anonymous reviewer raises important questions about its status, such as (i) how is this Agr related to the T/Agr head associated with nominative, (ii) how are their φ -features kept apart, and (iii) why doesn't the subject intervene. Related questions concern the structure of the clause and how clausal functional heads explain how and where clitics congregate. While addressing these latter issues would take us too far afield, the approach I have argued for elsewhere is that the clitics are pulled up by the verb (to which they adjoin) as it moves all the way up along the clausal functional spine, and are then pronounced high (either adjacent to the verb, as in Mac and Bg, or not, if a lower occurrence of the verb is pronounced instead, as in Slvn and BCMS). I also adopt a "split VP" model in which AgrP (for objects) is between vP (which introduces the subject) and VP, hence (iii) does not arise. This being said, Agr is not the best placeholder for the locus of clitic ω -features: following Charnavel and Mateu (2015). what is really being established here is a logophoric center.¹² Pancheva and Zubizarreta (2017) build on this insight, employing Appl(icative) to introduce the indirect object as a point-of-view center, and also to value the direct object. My proposals are consistent with their ideas.

Another reviewer raises questions about my use of person features, suggesting I eschew PERS and adopt the suggestion in fn. 7 for (10a) instead. Indeed, in Franks (2017) I used "PERS" just for what is called "clitic_{A/B}" here, akin to Harley and Ritter's 2002 "Referring Expression"; hence the four patterns could be handled without PERS. At issue is the relationship between AUTH and PART: since the former without the latter is meaningless, one might treat AUTH as a feature of PART to

¹¹ The analysis in (16) derives the other Strictly Descending orders as follows: (15a) involves spreading both PART and AUTH to the first clitic, and (15b) requires spreading PART to both PERS nodes but AUTH just to the first one.

¹² Charnavel and Mateu understand the PCC as an antilogophoricity effect deriving from a conflict of perspective between indirect and direct objects.

reflect the insight (embodied in the Strictly Descending system) that 1^{st} person is "higher" than 2^{nd} . But to avoid any kind of interaction between 1^{st} and 2^{nd} person, these must be pulled apart to capture the Weak system. Perhaps then, as I argued in Franks (2017), the difference between Weak and Strong lies not in the deficiency (and what spreads), but rather in the geometry of features: in both, it is PART that is lacking and spreads, but in the Strong system AUTH is a feature of PART, whereas in the Weak system they are independent. This allows for the elimination of PERS and in fact solves another problem: How does clitic_B get PERS in (11)? If instead there is no PERS, then the answer is that it doesn't, 3^{rd} person simply being the lack of any reference to a speech act participant.

Adopting both revisions thus means: (i) Agr can be replaced by Appl in (11)–(14) and (16); (ii) PERS can be eliminated throughout; and (iii) in (11) AUTH depends on PART, whereas in (16) both depend on Appl.

3 Two Repair Strategies

We now turn to repair strategies. One is available for languages in which the order of the clitics is not fixed as DAT » ACC, and involves putting the accusative clitic above the dative one. The other is available more generally, and involves substituting a tonic pronoun for one of the clitics.

3.1 *Reordering Repairs*

By placing the accusative clitic above the dative one, it is possible to have two clitics and, at the same time, respect whatever Person Ordering Constraint would otherwise be violated. Polish, Czech, and Slvn avail themselves of this strategy, since the order of the clitics is not fixed in these languages. I thus pointed out in Franks (1998/2010) that, instead of expected (17) in Polish, which (assuming no special pragmatics or accompanying prosody) is degraded but preserves the base order, (18) may be used as a neutral utterance, with the opposite order of clitics:

- (17) ??Pokazali mu cię wczoraj. showedvir him_{DAT} you_{ACC} yesterday.
 ??'They showed 'im you [mju] yesterday.'¹³
- (18) Polish Style "Reordering" Repair Strategy: Pokazali cię mu wczoraj.
 'They showed you to him yesterday.'

I argued that this strategy for getting the 3^{rd} person clitic last was viable in Polish because the pronominal clitics can be phrasal in that language, an account I still believe to be the correct one. This allows accusative *cię* to adjoin above dative *mu* in (18). Such facts also show that standardly adopted wordings of the PCC are not quite right, since *cię* and *mu* are just as much direct and indirect objects in (18) as they are in (17). The same of course holds for characterizations of these elements in terms of case: they remain dative and accusative regardless of position.¹⁴

Its West Slavic neighbor Czech also uses this reordering strategy, implying that clitics can be weak pronouns in that language as well; cf. Franks, Junghanns, and Law (2004: 21), citing Lenertová (2004: 153):

(19) Já **tě mu** nedám! I you_{ACC} him_{DAT} not-give_{1SG} '...I won't give you to him!'

In a series of recent papers, Stegovec also reaches the conclusion that the PCC is not about case. Space considerations preclude comprehensive treatment of his Slvn data, but recall example (2b), in which 3^{rd} person dative *mu* illegally precedes either 1^{st} or 2^{nd} person accusative *me* or *te*.

¹³ The phonetic transcription in the English translation is meant to show that the same kind of effect (phonological reduction) arises in English, so long as the pronouns are weak. On weak pronouns, see Cardinaletti and Starke (1994).

¹⁴ The status of the PCC in Polish, as well as the need for reordering, is under debate. Reacting to my FASL poster, Krzysztof Migdalski (p.c.) commented that (17) is perfect, whereas the noncanonical order in (18) "requires a special context" in which *cię* 'you' is highlighted. Polish for him is not even of the Me-First type, since 1^{st} person can precede 3^{rd} person. Cetnarowska (2003: 17) similarly concludes that "the PCC does not hold for Polish." If so, Polish is simply irrelevant to the discussion of repair by reordering, with the clitics presumably inserted fully specified for φ -features.

As in West Slavic, this can easily be repaired by reordering me/te before mu. This means that Slvn clitics can scramble as phrases, a possibility consistent with proposals in Franks (2014) that they can enjoy additional nominal structure. The scrambling account is buttressed by the fact that in Slvn the inverse order can apply much more generally (so long as the PCC is respected). Stegovec (2016) provides the pair in (20):

(20)	a.	Gospa	mu	ga		je		opisala.
		lady	him	AT him	ACC	AUX3	SG	describe _F
		'The la	dy descr	ibed him	to h	im.'		
	b.	Gospa	ga	mu	je		opisa	la.
		lady	himacc	him _{DAT}	AU	X3SG	descr	ibe _F
		'The la	dy descr	ibed him	to h	im.'		

Of course, viability of the marked order in (20b) depends on imagining an appropriate discourse context.¹⁵ Sturgeon et al. (2012), on the other hand, also note that PCC effects can be avoided in Czech by putting the accusative clitic before the dative, but comment that "this clitic order only surfaces when the clitic combination violates the PCC." Since, as (20b) shows, Slvn can exhibit the non-canonical order even when the PCC does not come into play, I am suspicious of the ostensible last resort nature of the reordering solution in other languages. Indeed, a quick web search of Polish and Czech texts suggests the same may be true there. This is good, because one would expect the movement—allowed because these clitics can be weak pronouns, with (additional but silent) phrasal structure—to be in principle motivated by reasons beyond the PCC, and when that happens it comes with various concomitant pragmatic effects. This is a complicated matter in need of closer investigation.

¹⁵ Adrian Stegovec (p.c.) suggests (20b) as a natural response to the question in (i), with *lopova* '(the) thief' fronted:

^{&#}x27;Who described the thief to Peter?'

This makes perfect sense if, just like the phrases for which they substitute, clitics can scramble in Slvn to reflect the exigencies of functional sentence perspective.

3.2 Tonic Substitution Repairs

Combinations of clitics can also be eliminated by replacing one of them with a tonic/full pronoun, with the result that there is only one clitic and no Person Ordering Constraint is invoked in the first place. As will be shown below, this is where the feature-spreading system developed in section 2 leads to some novel insights. The effects of tonic substitution repair thus constitute the topic of the remainder of this paper.

In a language like Bg, in which clitics are necessarily heads, tonic substitution is the only repair strategy available. So instead of (21) we have (22), where tonic forms are glossed using small caps:

(21) *Pokazvat mu te. show_{3PL} him_{OBL} you_{OBJ} ??'They are showing 'im you [mju].'

(22) Bulgarian Style "Tonic Pronoun" Repair Strategy:

- a. Pokazvat **te** na nego. show_{3PL} you_{OBJ} TO-YOU_{OBL} 'They are showing you to him.'
- b. Pokazvat **mu** tebe. show_{3PL} him_{OBL} YOU_{OBJ} 'They are showing him YOU.'

Both variants circumvent the infelicitous string *mu te* 'him_{OBL} you_{OBJ}', which comes up against the PCC.¹⁶ But there is a difference: (22b) with 3^{rd} person clitic *mu* is marked, in that *tebe* 'you' bears contrastive focus, whereas (22a) with 2^{nd} person clitic *te* and tonic *na nego* is stylistically neutral, not contrastive. More generally, Bg speakers consistently report that, for clitic combinations of 3^{rd} person oblique plus 1^{st} or 2^{nd} person objective, the unmarked resolution is for the 3^{rd} person to be expressed

¹⁶ Languages that allow the phrasal analysis of pronominal clitics may exhibit both options. Stegovec provides the Slvn examples in (i), which instantiate the tonic pronoun solution of Bg, alongside the reordering solution in (ii): (i) a Sestra **mu bo** predstavila mene/tebe

(1)	a.	Sestra	mu	DO	predstavna	mene/tebe.
		sister	him _{DAT}	FUT3SG	introduce _F	ME/YOU _{ACC}
	b.	Sestra	me/te	bo	predstavila	njemu.
		sister me	/you _{ACC}	FUT3SG	introduce _F	HIM _{DAT}
(ii)		Sestra	me/te	mu	bo	predstavila.
		sister	me/you _A	_{.cc} him	DAT FUT3SG	introduce _F

with a tonic pronoun and for the 1^{st} or 2^{nd} person objective to be retained as a clitic.¹⁷ The objective 1^{st} or 2^{nd} person tonic form is then perceived as bearing contrastive focus, so that one expects (22b) to be followed for example by *a ne mene* 'and not me.' Why might this be?

Our point of departure is the claim that clitics can be un- (or under-) specified for person, receiving their values from a higher functional category. Let us assume that one difference between a clitic form and a full form is that the lattermust be fully specified for φ -features. Clitics, on the other hand, are optimally un(der)specified. I showed in section 2.2 that Bg clitics, as they conform to the Strong system, lack both PART and AUTH values. Being minimally specified, they are canonical clitics. Thus, the sole clitics in the two alternatives cannot differ in terms of their person features-because they have none. However, from the perspective of the features of Appl they diverge, in that spreading to a 1st person clitic requires Appl to be more specified (i.e., [PART-AUTH]) than spreading to a 2nd person clitic (i.e., just [PART]). And a 3rd person clitic requires no input from Appl, since a non-participant in the speech act, as Harley and Ritter (2002) emphasize, receives a default "non-person" interpretation. It appears, then, that there is a flip side to the desideratum that clitics bear minimal feature values, namely that the Appl node which expresses point of view and identifies the clitics should be maximally specified. What this means is that the more specified the logophoric center of the sentence, the better. In this way, 1st person is the optimal point of view perspective, with 2nd person next, and 3rd person, as not part of the speech act at all, cannot provide a point of view perspective.

Let us make this explicit. In a Strong system, such as Bg, all person features are spread to the clitics from above.¹⁸ Thus, in (22a), features are valued on *te* as follows (adjusted as per modifications in section 2.6):

(23) Spreading of PERS in (22a): Appl te PART

¹⁷ I thank Boris Harizanov, Iliyana Krapova, Roumyana Pancheva, and Vesela Simeonova for helpful discussion.

¹⁸ The same is expected to be true of Slvn, so that (ib) of fn. 16 should be unmarked with respect to (ia), which presumably implies contrastive focus.

From the perspective of Appl this is superior to what is needed for (22b): here mu is unmarked 3^{rd} person, hence needs no features from Appl. The approach makes additional predictions, some of which are quite delicate. For example, (25a) and (26a) should beat (25b) and (26b) as the neutral resolutions of Bg (3c), repeated as (24):

(24) *Vera **mi/ti te/me** predstavi. *1/2. овL » 2/1.овJ Vera me/you_{SG-OBL} you/me_{OBJ} introduced 'Vera introduced me you/you me.'

(25)	a.	Vera	me	predstavi	na teb(e).
		Vera	me _{OBJ}	introduced	TO-YOUOBL
	b.	Vera	ti	predstavi	mene.
		Vera	youoe	al introduce	ed MEobj
(26)	a.	Vera	mi	predstavi t	ebe.
		Vera	meobl	introduced Y	ИОUobj
	b.	Vera	te	predstavi	na men(e).
		* *			

Vera youobj introduced TO-MEOBL

This follows because for Appl to be 1^{st} person ([PART—AUTH]), as in the (a) examples, provides more specification, i.e., a richer logophoric center, than for it to be 2^{nd} person (just [PART]) as in the (b) examples.

We now turn to BCS, which it will be recalled obeys a Me-First system. Hence the clitic combinations *mu me* 'him_{*DAT*} me_{*ACC*}' in (6b) and *ti me* 'you_{*DAT*} me_{*ACC*}' in (7b) are unacceptable. The neutral resolution should retain accusative clitic *me* 'me' and introduce tonic dative forms *njemu* 'him' and *tebi* 'you', rather than the other way around. The results for repairing (6b) are thus just as in Bg, with its Strong sytem:

- (27) a. Toplo **mu** preporučuješ mene. warmly him_{DAT} recommend_{2SG} ME_{ACC} 'It is ME who you warmly recommend to him.'
 - b. Toplo **me** preporučuješ njemu. warmly me_{ACC} recommend_{2SG} HIM_{DAT} 'You warmly recommend me to him.'

While these data add nothing new to what has already been established, additional if perhaps somewhat less forceful arguments can be made by exploiting the relationship between 1^{st} and 2^{nd} person in a Me-First

system. Specifically, one wonders how BCS (7b), repeated as (28), can be repaired. One possibility would be to retain the dative 2^{nd} person clitic *ti* and use a full form for the accusative 1^{st} person, as in (29a), and the other would be to retain the accusative 1^{st} person clitic *me* and use a full form for the dative 2^{nd} person, as in (29b). While judgments are subtle, it seems that the latter alternative is the unmarked option:¹⁹

- (28) ??(*)Toplo **ti me** preporučuje. ***2.DAT » 1.ACC** warmly you_{DAT} me_{ACC} recommend_{3SG} 'He warmly recommends me to you.'
- (29) a. Toplo **ti** mene preporučuje. warmly you_{DAT} ME_{ACC} recommend_{3SG} 'It is ME who s/he warmly recommends to you.'
 - b. Toplo **me** tebi preporučuje. warmly me_{ACC} YOU_{DAT} recommend_{3SG} 'S/he warmly recommends you to me.'

Although the BCS speakers taking part in FASL26 (Ljiljana Progovac, Sandra Stjepanović, and Aida Talić, inter alia) confirmed these judgments, Jelena Runić (p.c.) herself expressed some doubt about the differences here. All consultants nonetheless sensed a contrast when 3rd person is involved.²⁰ Further study of the variants and their appropriate contexts is clearly warranted, both in BCS and across languages.

In that regard, it remains to be seen whether other systems, both within Slavic and beyond, are amenable to this way of mediating the choice between competing repair strategies. And of course, all these examples also differ in case. One might, therefore, contend that, given the choice of an objective/accusative clitic or an oblique/dative one, it is always the accusative clitic that wins. This seems wrong, given the conclusion one is led to on the basis of the reordering repair strategy,

¹⁹ Interestingly, the contrast is stronger in (27), where the choice is between two features or nothing on Appl, than in (29), where it is between two features or one. ²⁰ Thanks to Miloje Despić (p.c.) for helpful discussion. He adds that the best repair for illicit *mu me* combinations is with the full pronoun at the beginning, as in (i):

⁽i) Njemu **me** toplo preporučuje. HIM_{DAT} me_{ACC} warmly recommend_{3SG} 'She/he warmly recommends me to him.'

namely, that the PCC has nothing to do with case. It is not easy to demonstrate the irrelevance of case on the basis of Slavic data (since DAT » ACC); nor do I know what the case-theoretic account would look like. One possible Slavic argument can however be made using the resolution of infelicitous $1^{st} \gg 2^{nd}$ in Strong PCC languages, such as Bg (24) with **mi te* 'me you': here we saw that retaining oblique (dative) *mi*, as in (26a), is pragmatically unmarked. A more persuasive argument for the present approach could in principle also be constructed with the right language. The most compelling situation would be one in which some PCC violation involved an accusative clitic before a dative one and the language in question employed the tonic pronoun repair strategy: the system described in this paper would then end up replacing the accusative clitic and retaining the dative one.

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Binding by Objects in Polish Double Object Constructions: Acceptability and Correlation with Object Order*

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This paper presents selected results of two experiments testing acceptability of reflexive binding (Exp1) and possessive reflexive binding (Exp2) between two objects, IO_{DAT} and DO_{ACC} , in Polish double object constructions (DOCs), as in e.g. (1a) and (1b), a context also referred to throughout the paper as *object coreference structure*.

(1) a. Babcia pokazała Janowi₁ siebie₁/jego₁ (samego) na grandmother showed J._{DAT} self/his_{ACC} alone on zdjęciu z dzieciństwa.¹
 pictures from childhood

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 $^{^1}$ The following abbreviations are used throughout the paper: ACC – accusative, DAT – dative, F – feminine, FOC – focus, GEN – genitive, INSTR – instrumental, LOC – locative, M – masculine, N – neuter, NOM – nominative, 3SG – 3rd person singular.

b. Babcia pokazała Janowi₁ swoje₁/jego₁ zdjęcie. grandmother showed J._{DAT} self/his_{ACC} pictures

The two experiments are set up to review selected literature claims on: (a) binding by objects in Polish, (b) complementarity of pronouns and anaphors, and (c) canonical object order in Polish. Based on the results, we provide an analysis of the data in terms of an Index Theory of Binding, IT (Nikolaeva 2014, Hestvik 1992, a.o.), where the pronominal or reflexive (the index) moves covertly to either v or T and is bound only in these positions by NPs that c-command it from their case positions. The outline of IT is presented in section 4.

The paper is organized as follows. Section 1 briefly describes the literature claims tested in our study. Section 2 discusses the design, materials, the hypotheses, as well as the aims of our experiments. Section 3 presents the results of the experiments; Section 4 proposes a theoretical analysis of the data. Section 5 concludes the discussion.

1 Claims in the Literature

In the literature on Polish pronominal and anaphor binding, it is claimed that only pronouns can be locally co-indexed with objects in double object constructions, whereas reflexives, either pronominal (2a) or possessive (2b), can only be bound by subjects.²

(2) a. Piotr₁ pokazał chłopca₂ sobie_{1/*2}/jemu_{*1/2} (samemu) w lustrze. P._{NOM} showed boy_{ACC} self_{DAT} /him_{DAT} (alone_{DAT}) in mirror (Witkoś 2007: 458)
b. Marta₁ opowiedziała Markowi₂ o swojej_{1/*2}/jego_{*1/2} młodości. M._{NOM} told M._{DAT} about self^{*}s_{LOC}/his youth (Bondaruk and Szymanek 2007)

 $^{^2}$ One exception to this conclusion is the reciprocal use of reflexives, (i), which can be locally bound by objects (Willim 1989; Witkoś 2007; Bondaruk and Szymanek 2007). For reasons of space, we cannot discuss reciprocals in this paper.

⁽i) Piotr₁ pokazał dziewczyny₂ sobie_{1/*2} (nawzajem) w lustrze.

P._{NOM} showed girls_{ACC} self_{DAT} (reciprocally) in mirror

A similar observation is made in Reinders-Machowska (1991: 138,146) who concludes that these contrasts point to the complementarity of pronominals and reflexives in the local binding domain. We aim to test these claims.

Moreover, our investigation, based on Featherston's (2002) similar study on German, aims to test predictions with regard to binding by objects based on a hierarchy of grammatical functions. It has been argued for German that the opacity hierarchy of grammatical functions, namely: Subject < Direct Object < Indirect Object < Instrumental < Adverbial < Genitive, predicts grammaticality of various binding configurations (Grewendorf 1988, Hole 2014, a.o.). The binder is required to be higher on the hierarchy than the bindee, thus the hierarchy predicts e.g. that an indirect object can be bound by a direct one, but not otherwise. However, Featherston's (2002) experimental study on German shows that the opposite seems true. We test a parallel case for Polish.

The problem of the correlation of binding in object coreference structures and the hierarchy of grammatical functions is closely related to the problem of canonical object order. Recent studies suggest that even the notoriously scrambling Slavic languages show a basic word order (e.g. Bailyn 1995, 2014; Franks 1995 for Russian, Dornisch 1998; Witkoś 2007, 2008; Citko 2011 for Polish). However, in the case of Polish double object constructions, there is no agreement as to which of the object orders is in fact canonical. E.g. Dornisch (1998) argues for a DO_{ACC} - IO_{DAT} order, while Witkoś (2007, 2008) and Citko (2011) argue for IO_{DAT} - DO_{ACC} . We aim to test which of the orders is basic and believe that if it ever becomes possible to facilitate one object in the ditransitive construction to bind the other, this relationship should be easier to obtain in the basic order, as any additional rearrangements should increase the computational burden.

2 Experiments

2.1 Aims and Predictions

Exp1 concerned non-possessive reflexives, and Exp2 possessive reflexives. Both experiments tested for the two binary independent variables: (a) case (accusative vs. dative) and (b) bindee.type (anaphor vs. pronoun). Furthermore, Exp1 contained the variable (c) bindee.emph[asis] ($\pm samemu_{DAT}/samego_{ACC}$ 'self'), and Exp2 tested for

the influence of deeper embedding of the bindee into its DP, poss.embedd (±embedding of the possessive). In this paper, we are focusing only on the first two variables, namely case and bindee.type. This choice of variables was dictated by an intention to test claims in the literature on object coreference structures, discussed in more detail in Section 1. Controlling for bindee.type, we scrutinise the complementarity of the distribution of pronouns and anaphors in their local binding domain (Reinders-Machowska 1991); moreover, we test whether only pronouns can be locally bound by objects (Willim 1989, Reinders-Machowska 1991, Witkoś 2003, 2007, Bondaruk and Szymanek 2007). Should both claims be true, we expect clearly higher ratings for pronouns than for anaphors (= H[vpothesis]1). Controlling for the cases of binder and bindee, we check which of the object orders in Polish might count as canonical, DO_{ACC}>IO_{DAT} or IO_{DAT}>DO_{ACC}. Following Dornisch (1998), we initially assume DOACC>IODAT as basic object order in Polish. Therefore, we expect higher acceptability rates for binders in accusative case. Additionally, the influence of case on binding might correlate with the hierarchy of grammatical functions (Grewendorf 1988, Hole 2014, a.o. for German); this would also point to higher acceptability for accusatives binding datives than for datives binding accusatives (= H2).

(3) H1: Only pronouns, not anaphors, may be bound by other objects.H2: Accusatives may bind datives, but not the other way round.

2.2. Design

The participants were asked to rate the acceptability of 48 sentences per experiment, using a 7-point Likert scale, ranging from 1, fully unacceptable, to 7, fully acceptable. 24 sentences in each experiment constituted the experimental items, 24 the unrelated fillers, 12 grammatical and 12 ungrammatical, presented in random order. Each item was introduced by an adjunct clause constituting the context for the item. After a comma the experimental item occurred, followed by an intended interpretation, suggesting that it is an object that acts as a binder, rather than the subject. The experimental sentences were based on the three verbs *pokazać 'to show'*, *polecić 'to recommend'* and *narysować 'to draw'*. The materials were organized in a Latin Square design in 8 treatment groups, with lexical realizations of the 8 tested experimental conditions varying in a balanced way across participants. I.e., a participant from treatment

group1 would see the three realizations r1, p1, q1 in condition 1; a participant from treatment group2 would see r1, p1, q1 in condition 2; and so on. This is a common design in psycholinguistics, intended to reduce repetition of lexical material within a questionnaire. Treatment group was included in the analysis of variance as a between-subjects factor. Both Exp1 and Exp2 were organized in a factorial design with three binary independent variables. 81 native Polish students of higher education took part in Exp1, of which only the first 64 entered the evaluation for reasons of balance of the design (52 women and 12 men, mean age: 23.2 years). 124 took part in Exp2; again, the first 64 entered the evaluation (53 women, 11 men, mean age 22.9 years). Fig. 1, 2 below provide an overview of the distribution of the acceptability ratings.

3 Results

3.1 Experiment 1: Reflexive Binding



Fig. 1: Binding of reflexives vs. coreference with pronouns

Fig.1 shows a box-and-whiskers plot of the data according to case (dative binding accusative, dat>acc vs. accusative binding dative, acc>dat), bindee.type and bindee.emphasis. The data were evaluated in a 3-way repeated measures ANOVA with treatment (=questionnaire variant) as a between-subjects factor. The preconditions for a parametric test were met; sphericity holds trivially for binary factors, and normality of residuals and of participant-specific differences passed the Shapiro-Wilk test. We found significant effects for case (F(1,56)=86.65, p<0.001), bindee.type (F(1,56)=30.07, p<0.001) and bindee.emph (F(1,56)=45.79,

p<0.001): A dative binding an accusative was generally rated better than an accusative binding a dative; a pronominal bindee was rated better than an anaphor; and a bindee emphasized by sam was rated better than a bare bindee. At the same time, variation was considerable, and overall ratings rather low, with only the best constellation, a dative binding a pronominal accusative, attaining medium acceptability. Furthermore, we significant interactions between case and found bindee.type (F(1,56)=33.28, p<0.001), case and bindee.emph (F(1,56)=9.11, p<0.01), and bindee.type and bindee.emph (F(1,56)=19.04, p<0.001). This means that the dative binder preference is weaker with anaphoric accusative objects than with pronominal accusative objects, and weaker with bare bindees than with those emphasized by *sam*; and the positive effect of emphasizing was weaker with anaphoric objects than with pronominal ones. The treatment variable showed no significant effects or interactions, so the various lexical realizations had no unwanted side effects. Given the extremely low judgments for bound anaphors, we conclude that H1 may be accepted: Only pronouns, not anaphors may be co-referential with other objects. H2, however, must be rejected: The preference is clearly for the binder (or the controller of coreference) to be dative, not accusative.



3.2 Experiment 2: Possessive Reflexive Binding

Fig. 2: Binding of possessive reflexives vs. co-reference with possessive pronouns

Fig.2 shows a box-and-whiskers plot of the data according to case, bindee.type and bindee.embedding. The data were evaluated in a 3-way

repeated measures ANOVA with treatment (=questionnaire variant) as a between-subjects factor. Concerning the preconditions for a parametric test, sphericity holds and normality of residuals passed the Shapiro-Wilk test; however, the means of participants' judgments were not distributed normally, but skewed towards the left, i.e. the lower half of the scale. The ANOVA showed significant effects of case (F(1,56)=68.35,p<0.001) and bindee.type (F(1.56)=103.74, p<0.001), but no effect of bindee.embedding. As in Exp1, there was a significant interaction between case and bindee.type (F(1,56)=24.69, p<0.001), indicating that a dative binder (or, controller of co-reference) was rated better than an accusative one only for coreferential possessive pronouns, not for bound possessive reflexives. It is important to note that the judgments for pronouns in Exp2 came out higher on the scale than those in Exp1, i.e., ranging between medium and almost full acceptability. However, variation was again considerable. There was a mildly significant interaction between bindee.type and bindee.embedding (F(1,56)=4.30,p=0.043), indicating a selective improvement for reflexive possessives; but judgments for the latter were so low in general that this is inconclusive. The treatment variable showed no main effect, but a significant interaction (only) with case (F(7,56)=4.42, p<0.001); thus, some experimental items were more prone to the case effect than others. As in Exp1, we may conclude that H1 should be accepted: Only possessive pronouns, not possessive reflexives may be co-referential with their co-objects. H2 must (again) be rejected: dative binders (controllers of coreference) are preferred over accusative ones. We could not detect an improvement of binding by deeper embedding of the bindee.

4 Theoretical Analysis

4.1 Background – Index Theory (Hestvik 1992, Nikolaeva 2014)

Our analysis constitutes a part of a larger enterprise focusing on explaining why certain dative (and accusative) arguments can function as antecedents for reflexives in a grammar that otherwise shows strict nominative subject orientation in anaphoric binding. Thus, we have turned to a theoretical account (Nikolaeva 2014) which is as empirically adequate as possible and can explain why both a reflexive possessive and pronominal possessive are acceptable with identical co-indexation when a dative experiencer is the antecedent:

- (4) a. Marii₁ żal było swojej₁/jej₁ koleżanki. Maria_{DAT} sorrow_{3.SG.M} was_{3.SG.N} self's/her friend_{3.SG.F.GEN} 'Maria felt sorry for her female friend.'
 - b. $[_{TP} \text{ index-T } [_{vP} \text{ Maria}_{DAT}]_{v'} \text{ index-v was } [sorrow [index friend]_{GEN}]]]$

The system presented below is a development of Hestvik (1992), who postulates index (head) movement to T, but Nikolaeva (2014) also allows for adjunction to v. This is crucial to explain the facts in (4), as index raising to v places it in the c-domain of the dative experiencer in [spec,vP] and leads to its spell out as a reflexive possessive, while index raising to T places it outside the c-domain of the dative experiencer and leads to its spell out as a pronominal possessive, see (6iv-v). Significantly, nominative binders never allow for co-indexed pronominal possessives in their c-domain:

 (5) Maria₁ żałuje swojej₁/*jej₁ koleżanki. Maria_{NOM} feels.pity self's/*her friend 'Maria feels pity for her friend.'

We take the difference between (4) and (5) to mean that the LF head movement of the index to T is not sufficient to capture the characteristics of dative and nominative binders.³ It also shows that dative experiencers are not placed in [spec,TP]. Furthermore, we believe that ex. (4) and the examples considered in this contribution show that dative experiencers of psychological predicates and dative goals occupy different A-positions, with the former high enough in the structure to c-command v and the

³ A reviewer for this volume also points to Reuland (2011) as a feasible theoretical framework but we do not follow this approach, as it clearly makes use of ϕ -feature sharing involved in structural case valuation (T, nominative and v, accusative), while we are also interested in datives as antecedents, where such feature sharing does not hold. Additionally, we are preoccupied with possessive pronouns/reflexives and Reuland's system does not elaborate on their participation in Agree with T. Despić (2013, 2015), who develops Reuland's approach and applies it to Serbo-Croatian possessives, neither advances index-free theory of binding in this respect nor dwells on double object constructions.

index adjoined to it. Goal datives (as well as theme/patient accusative arguments) are placed in lower A-positions inside VP and thus cannot c-command the index adjoined either to v or T.

One of the assumptions of the Index Theory as proposed in Nikolaeva (2014) for Russian is the existence of *Pronominal Raising*, a notion also applicable to analogous constructions in Polish. Pronominal Raising is a covert movement of pronominals and reflexives, which leads to subject-oriented binding and explains Anti-Cataphora Effects (ACE).⁴ Raising is typically implemented by phrasal movement to the first available specifier, tucking-in under the [spec,VP]. Pronomial Raising is the first step of a more general movement called *Index Raising*. Anaphors and pronouns are merged into the structure as indices. An index has no phonological form and driven by a need to determine its phonological shape, it undergoes movement in search for its binder.

(6) Five principles of Index Theory (Nikolaeva 2014):

i. Movement: an index must undergo Index Raising unless it is at a Reflexivization site (or movement is no longer possible)

The ungrammaticality of (i) is taken to be due to Principle C violation, which indicates that the coindexed pronoun in (i) raises to a position from which it c-commands into the clause. In contrast to, e.g. English, *Cataphora* (or *Backward Anaphora*) in Russian or Polish is severely unacceptable unless the pronoun is embedded deep in the NP, see Witkoś (2008). Narrow focus on the pronoun can also improve the ratings of cataphora, see Wiland (2009: 98), (we are grateful to a reviewer for pointing this fact to us):

(ii) To [jego_i nowego wykładowcę Piotr pokazał studentowi_i. this [his new lecturer]_{ACC.FOC} P_{NOM} showed student_{DAT} 'It was his new lecturer that Piotr showed to the student.'

In English cataphora is possible with non-focused R-expressions, as in (iii) (Chomsky 1976, Williams 1997):

⁴ This is to account for the ungrammaticality of (i):

⁽i) *Maria pokazała [jej₁ pracę] [siostrze Ewy₁].

Maria_{NOM} showed [her work_{ACC}] [sister_{DAT} Ewa's]

⁽iii) His_i mother LOVES John_i.

⁽iv) *Hisi mother loves JOHNi.

ii. Reflexivization site: an index is sister to a node with label D/v/T and is c-commanded by a specifier

iii. Coargumental Reflexivization: if an index is at a reflexivization site and is coindexed with a specifier which is its coargument, the index has to be realized as reflexive iv. Reflexivization at spell-out: when the sentence is sent to spell-out, if an index is coindexed with the specifier of the projection to which it is adjoined, the index has to be

projection to which it is adjoined, the index has to be realised as reflexive.

v. **Pronominal is an elsewhere condition:** if an index has not been realised as reflexive, it is realised as pronominal.

The outcome of the assumptions above is that anaphoric binding involves covert (LF) configurations in which reflexives and reflexive possessives are at their Reflexivization sites: either v or T, while the antecedents c-command them from their case positions in [spec,TP] or [spec,vP]. Overt configurations may be misleading, so binding-wise, 'what you see is not what you get', specifically in double object constructions.

4.2 Application

4.2.1 Reflexive Binding. The results of Exp1 are illustrated in (7) - (8). The derivation of the non-scrambled structure in (7) is presented in (7').

- (7) a. *[?]Tomek pokazał Marii_{1-DAT} ją₁ (samą)-_{ACC} (w lustrze).⁵ b. *Tomek pokazał Marii_{1-DAT} siebie_{1-ACC} (w lustrze).
- (8) a. *Tomek pokazał Marię_{1-ACC} jej_{1-DAT} (w lustrze).
 b. *Tomek pokazał Marię_{1-ACC} sobie_{1-DAT} (w lustrze).
 'Tomek showed Maria her/herself (alone) (in mirror).'

⁵ The edge of the clause being prosodically prominent, the PP in brackets is added to protect the phonologically weak pronoun from focus interpretation. The tree diagram abstracts away from the PP.



In (7'), the index, a complement of V, moves via phrasal movement in search of its binder, tucking under the closest specifier, i.e. under [sec,VP]. The index and the argument in [spec,VP], the DP *Marii*, are co-arguments; they are also co-indexed. However, the index cannot be bound in this position, because position 1 is not a reflexivisation site.⁶ V is not a proper reflexivisation label; only D/v/T are. Therefore, in search for a reflexivisation site, the index raises, via v-head adjunction, to position 2. In this position it turns out that the argument in [spec,vP] is not co-indexed with the index. Therefore, the index can only be realised, very marginally, as a pronoun, by the elsewhere principle.⁷

⁶As duly observed by an anonymous reviewer for this volume, movement to Nikolaeva's position 1 is a weak aspect of her theory, as this position must have an A-position status without further motivation. This can be avoided if the possessive is an adjunct and c-commands outside its host NP, as in Despić (2011, 2013) and Bošković (2012). We do not discuss this option in detail here for lack of space.

⁷ A reviewer for this volume raises the issue of the rationale for index raising in a number of steps, of which the initial ones are phrasal. Nikolaeva (2014) claims that her theory falls back on the classic idea of clitic raising (Kayne 1991) and head movement (Matushansky 2006). The index tucks in under the c-commanding argument to observe some version of Locality/Relativized Minimality (RM). A further leg of movement is covert (LF) head movement, so RM is observed.

More complex cases involve reconstruction at LF when focalization or whmovement affect the index (reflexive):

Our results, illustrated in the examples in (7) and (8) clearly show an antiobject orientation of coargument pronouns in Polish. This means that object pronouns disprefer object binders that are their coarguments. The degraded status of the object pronoun arises due to conflicting demands on the index itself. For Nikolaeva (2014), the index must raise in order to be spelled out on the one hand (the domain of V is not a reflexivization site by definition), but on the other hand it needs to be accessible for interpretation in position 1 as a coargument of the c-commanding binder in [spec, VP].⁸ For Hestvik (1992), this issue is much more straightforward, as he assumes that Binding Principle B must hold of both the overt (S-structure) and covert (LF) representations. Thus all the positions of the index, including Position 1 are visible to Binding Principle B. Note also that although ungrammatical, pronouns are still more acceptable, as compared to anaphors. This is because, position 1 is not a reflexivisation site and there is no coindexed antecedent ccommanding position 2. Therefore, anaphors are ungrammatical here, whereas, by elsewhere principle in (6v), the index can marginally be realized as a pronoun.⁹

The diagram in (8') illustrates the derivation of (8), involving

- (i) [ile donosów na siebie₁] Jan₁ przeczytał wczoraj? how.many reports on self Jan_{NOM} read yesterday 'How many reports on himself did Jan read yesterday?'
- (ii) [how many x, x: reports on self₁] [TP Jan₁ index₁-T [vP Jan₁ index₁-v [vP read x, x: reports on self₁]]]

In ex. (ii) the bottom copy of the restrictor to the wh-operator serves as the launching position for IR to v and/or T. As the nominative subject is the only available antecedent the index is duly spelled out as a reflexive pronoun. Thus, a combination of the approach based on IT and a general minimalist theory of reconstruction (Chomsky 1995, Lebeaux 2009) yields correct results.

⁸ This need for the visibility of the bottom position in the chain results from the tension between the need to raise on the part of the index, see (6i-ii) and it being a coargument of an element (another object) which is not placed in [spec,vP]. We assume that the coargument clause in (6iii) provides for the preservation of overt c-command relations at the VP-level.

⁹ The index realised as a sole pronoun is acceptable only marginally but the addition of *sam* to it considerably improves it and serves as a repair strategy for reflexivisation in Polish coargument contexts. In his comprehensive discussion of anaphoric binding and coreference relations, Reuland (2011) takes the combination of the pronoun and an emphatic element to be one of leading crosslinguistic strategies in forming lexical reflexives. scrambling of one of the objects.



In the base generated configuration, the index is an IO_{DAT} c-commanding its binder. The DO_{ACC} object is scrambled via A-movement (Witkoś 2007) to the [spec,VP] position (contra Witkoś 2007, suggesting movement to [spec,VP]).¹⁰ The index in this structure raises and tucks-in under the scrambled binder, DP_{ACC} . Because A-scrambling does not allow for reconstruction, the index does not produce ACE/Principle C violation. Because Position 1 is not a reflexivisation site, the index raises to position 2 in search for a local binder. By elsewhere principle, the index could potentially be spelled out as a pronoun in Position 2. However, the index and its scrambled binder, the DP *Marię*, are coarguments. This means that on movement to Position 2, the coargument binder of the index, *Marię*, remains in [spec,VP], too low to be able to bind its coargument index. Hence, the ungrammaticality of (8b).

The derivation in (8') is essentially the same as in (7a). The crucial

¹⁰ We follow Chomsky (2001, 2008) and Citko (2014) and assume that the phase head (optionally) transfers (or copies) its features and the [+EPP] property to its complement head. As v is a phase head this set of options is available to it as well; so, v hands down the [+EPP] and ϕ -features to V, so that V now functions as the accusative case licensing head in mono- and di-transitive verbs in Polish in most contexts. Consequently, [spec,VP] functions like [spec,vP] in these cases and the raising of the accusative object to this position is justified as overt A-movement to the case position.

difference lies in the fact that pronouns in (8a) are rated lower. This, as we assume, is because scrambling produces a non-canonical word order, which is dispreferred, causes extra processing difficulty and thus blurs the contrast between anaphors and pronouns. ¹¹ Provided that IO_{DAT}>DO_{ACC} object order is basic, lower ratings for items as in (8a) can be due to scrambling rather than illicit pronoun binding.

4.2.2 Reflexive Possessive Binding. In (9) and (10) we illustrate our findings for reflexive possessive binding in object coreference structures. (9') shows the derivation of a non-scrambled context.

(9) a.	Tomek	pokazał	Marii _{1-DAT}	jej ₁	koleżankę.			
b.	*Tomek	pokazał	Marii _{1-DAT}	swoją1	koleżankę.			
(10)a.	[?] Tomek	pokazał	Marie _{1-ACC}	jej ₁	koleżance.			
b.	*Tomek	pokazał	Marie _{1-ACC}	swojej1	koleżance.			
	'Tomek showed Maria her/self's friend.'							
(9')								



¹¹ This assumption is based on the results of previous experimental works on the processing of scrambled contexts in Russian (Sekerina 1997, 2003). These studies showed that non-canonical word order incurs additional processing cost which is evident in longer reading times for scrambled as compared to non-derived sentences elicited in online self-paced reading experiments, as well as lower ratings for scrambled sentences gathered in an off-line questionnaire.

In (9'), the index tucks-in under the first available specifier, i.e [spec,VP], the DP *Marii*. The index and the argument in [spec,VP] are coindexed; however, because they are not coarguments, the index does not have to be bound in position 1 and it is allowed to move higher in search for a reflexivization site. In doing so, the index adjoins to v, i.e. it moves to Position 2, from which it is no longer c-commanded by its binder. Because of this lack of c-command, no Principle B violation arises; also, the index does not c-command into the clause, hence it causes no Principle C violation/no ACE.¹² Crucially, there is a profound difference between (9a) and (7a) with the bare pronoun above: Nikolaeva stresses the fact that the possessive and the DP objects are not coarguments, so position 1 is less relevant for the interpretation here, whereas Hestvik openly claims that although c-commanded by the object at S-structure, the possessive pronoun is free because it is placed in a different binding domain ([DP *jej koleżankę*]), cf. fn. 6.

(10') illustrates possessive reflexive binding in object coreference structures with a scrambled object.

¹² Nikolaeva (2014: 93-94) assumes that the index does not c-command from its head-adjoined position at v or T. She follows the definition of c-command in Hestvik (1992: 574): 'x c-commands y iff every node dominating x includes x and y, and x does not dominate y (where x includes y iff y is dominated by every segment of x, as proposed in May (1985).' Such a definition leaves the c-command domain of the adjunct undefined, as the node dominating the adjunct at the adjunction site does not include it. This may not be the best step for both X^o and XP adjunction, so alternatively, we can invoke the Word Interpretation notion from Chomsky (1995: 322): 'at LF, X^o is submitted to independent word interpretation processes WI, where WI ignores principles of the computational system within X^o.' As c-command between links of the movement chain is a principle of computation, we assume that a head adjoined to another head does not c-command either its own copy/trace or any other syntactic object at LF.



The first step in (10') is movement to position 1, namely the index tucksin under the scrambled ACC object. The index and the ACC argument are coindexed; however, because they are not coarguments, the index does not have to be bound in position 1, and it is allowed to move higher in search for a reflexivization site. The index does so via head-movement to v. The structure is, thus, fairly comparable to the non-scrambled structure, the difference in pronominal binding judgments, higher to the DAT>ACC object order, seems to be due to a preference for the basic word order.

5 Conclusions

The paper showed that possessive pronouns can be coindexed with and anteceded by the other object. Double object constructions with non-possessive coargument pronouns exhibit anti-object orientation. Moreover, the results of our experimental studies indicate that the DAT>ACC object order might be canonical, as it was rated significantly higher in both experiments.

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Inverse Scope in Doubly-quantified Sentences in Polish*

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It is often claimed that, unlike their English counterparts, doublyquantified sentences in free word order languages do not permit inverse scope readings. This is because, unlike English, free word order languages have scrambling and can display scopal relations overtly, making covert operations redundant. This paper puts to the test the putative negative correlation between the flexibility of word order and the flexibility of scope and experimentally examines the availability of the inverse scope in doubly-quantified SVO and OVS constructions in Polish.

1 Mechanisms Generating the Inverse Scope Reading

In many cases, a construction of α type (schematized in (1a)) wherein an existentially-quantified phrase A, such as (*one X*) precedes a universallyquantified phrase B, such as (*every Y*) can have two readings. In one, the existential quantifier scopes over the universal (1b). In the other, we get a reversed relation between quantifiers with the universal scoping over the existential (1c).

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(1) a.	$\alpha - ()$ one X (A) () every Y (B) ()	A - E
b.	One specific X interacts with all Ys.	$\exists > A$
c.	For every Y, there is one – potentially different X –	$A > \exists$
	interacting with that Y.	

In a configurational framework, scopal relations between quantifiers are determined by asymmetric c-command (Reinhart 1976), that is a quantifier takes scope over everything in its c-command domain. On the assumption that left-to-right order reflects c-command in α , explaining the first reading is straightforward, for the relation between quantifiers is compatible with their surface positions. We refer to the first reading as surface scope reading. In the second, scopal relation between quantifiers is the reverse of what is determined by their surface configuration. The change in structural representation compatible with this reading can be generated either by scope extension of B or by scope reduction of A. The mechanism by which scope of a quantifier gets extended is Quantifier Raising (QR) — an A'-movement operation which raises one quantifier over another at the post-spell-out level of LF (May 1977, 1985). The mechanism by which scope of a quantifier is reduced is reconstruction (Reinhart 1983, Frey 1993 etc.), which occurs in cases where one quantifier has crossed another one overtly and its trace gets interpreted. We refer to the second reading as inverse scope reading.

2 Quantification in Cross-linguistic Perspective

In the preceding section we said that (i) in many cases, a construction of α type is ambiguous and (ii) this ambiguity can be explained either by scope extension (QR) or scope reduction (reconstruction). The current section provides a cross-linguistic overview of quantification. It deals with the vagueness of (i) by looking into the interpretation of α type constructions in a number of languages. It also puts flesh on the bones of (ii) by looking into cross-linguistic application of both of the inverse scope mechanisms.

2.1 English

We begin with English. There is a general agreement that if α is a monotransitive construction where A is a subject and B is an object, as in (2a), α is ambiguous.

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(2) a.	One student read every novel.	A - E
b.	One specific student read all novels.	$\exists > A$
c.	For every novel, one – potentially different student –	$A > \exists$
	read it.	

(2a) has both the surface (2b) and the inverse scope reading (2c). The inverse scope reading, as per standard assumption, is derived in this type of sentences by QR. The existence of QR in English is supported by other effects displayed in this language where QR finds its application – demonstrated in (3) and (4). (3) is an example of, so called, Inverse Linking Construction (ILC; May 1977, 1985 etc). It contains two quantifiers in the order familiar from α . QR allows to extract the inner quantifier from the containing NP to generate the most plausible reading of this NP: one member per each committee (3b). What's new here is the binding relation between the universal and the pronoun "it". Such binding relation is of course possible if the universal c-commands the pronoun – a configuration which can be formed if we assume LF operation raising the quantifier.

- (3) ILC:
 - a. One member of every committee_i voted to abolish it_i.
 - b. For every committee there is one member who voted to abolish that committee.

QR also resolves VP ellipsis in Antecedent Contained Deletion cases (ACD; May 1985, Sag 1976, Williams 1977 etc.), such as (4). Here, the elided VP is contained in the VP that serves as its antecedent. Attempting to resolve the ellipsis with the quantifier in its base position would lead to a structural representation containing an infinitely regressive, and uninterpretable, VP (4c). Raising the quantifier creates a structure in which the antecedent for the elided VP no longer contains the elided VP itself (4d). This resolves the infinite regress problem.

- (4) ACD:
 - a. I will read every book that you will.
 - b. I will read every book that you will read.

- c. I will [VP read every book that you will [VP read every book that you will ...]]
- d. [every book that you will [vp read t]] I will [vp read t]

In this subsection we saw that monotranstive sentences of α type in English are ambiguous. This ambiguity is standardly tied to QR, whose existence in the language is reinforced by its application in ILC and ACD.

2.2 Free Word Order Languages

Things get more complex if we look beyond English. A complete coverage of cross-linguistic quantification is beyond the scope of this paper. We limit our discussion to what is most relevant for the study reported in the upcoming parts – the stance on quantification in free word order languages.

Quantification in free word order languages is under debate. One part of this debate is of descriptive nature. For instance, there is disagreement over the available readings in doubly-quantified monotransitive sentences in Russian. Scope is frozen in both SVO and OVS orders according to Ionin 2003, whereas Antonyuk 2015 claims that both these constructions are ambiguous.¹ Parallel descriptive disagreement is found when we look at Serbo-Croatian with Progovac 1994 and Godjevac 2004 representing scope rigidity and flexibility positions respectively. More on that note can also be found in German (Frey 1993, Wurmbrand 2008, Bobaljik & Wurmbrand 2012, Pafel 2005) and Japanese (Hoji 1985, Goro 2007).

The second part of this debate is theoretical and concerns the availability of scope changing mechanisms. In (Table 1) below, I illustrate the breadth of theoretical positions regarding scope possibilities in free word order languages, the diversity of which is partially a result of the descriptive dispute mentioned above. The overview presented here demonstrates that all four logical combinations of scope possibilities with regard to extension (QR) and reduction (reconstruction) in relation to surface order of quantifiers have been entertained in the literature.

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¹ Recent experimental studies on scope suggest that the inverse scope might be available in Russian after all (refer to Ionin & Luchkina 2015).
	 scope extension 	+ scope extension		
– scope reduction	Russian (Ionin 2003); Serbo- Croatian (Progovac 1994); Bulgarian (Ikuta 2015); Hungarian (Kiss 1991)	Russian (Antonyuk-Yudina 2006, Antonyuk 2015); Serbo- Croatian (Godjevac 2003)		
+ scope reduction	Russian (Titov 2012); German (Frey 1993); Japanese (Hoji 1985, Kuroda 1970); Korean (Kim 1989)	German (Wurmbrand 2008, Bobaljik & Wurmbrand 2012); Japanese (Goro 2007)		

Table 1

Two considerations allow us to evaluate the positions in (Table 1). The first one targets the "- scope extension" positions and relies on the argument for QR based on ILC and ACD. If one postulates that free word order languages do not use QR in sentences with two quantifiers, does this extend to other constructions where QR is taken to apply in English? Are ILC and ACD in free word order languages interpretationally different or the same as their English counterparts? If they are different, then we have support for the "- QR" positions. But what if their interpretation is the same as in English? If this is the case, then "- QR" positions are faced with the puzzle of why QR, being available in principle in a certain language, is not available in transitive sentences with two quantifiers.

The second consideration targets specifically the scope rigidity position (" – scope extension", " – scope reduction"). More specifically, it targets the foundation on which the scope rigidity position is based, that is the assumption postulating the possibility of scope transparency in a language with free word order. The logic here goes as follows. It has been proposed that there is an economy condition which favours isomorphism between LF and PF (Pesetsky 1989 Earliness Principle, Beck 1996, Bobaljik & Wurmbrand 2012 ScoT Condition). The freedom of word order allows to satisfy this condition and makes covert operations redundant. Applying it to scope, the freedom of word order provides a means to display scopal relations overtly, therefore covert operations, such as QR, are not needed. This results in an inverse correlation between the freedom of word order and the availability of covert operations. We can

think of such correlation in two ways: a weaker version – applicable to constructions, and a stronger version – applicable to languages. Under the weaker form, if in a given construction change of word order for scope is possible, the inverse scope is impossible. That is, in a construction α with word order A – B, inverse scope is impossible if there is a construction β of the form of B - A where scope can be displayed overtly. The stronger version assumes that in a given language all constructions are such that they allow word order variations reflecting scope. That is, every construction α (A – B) has an alternative in the form of β (B – A) where scope is realised overtly. Now, the scope rigidity position adopts the stronger version. However, for this version to work, we need to assume that scope is either the only or that it is the most dominant factor determining word order. If neither holds, then we can construct a scenario where the scope transparency requirement might not be met. If scope is in competition with another factor and that factor is dominant, then either (i) certain scope readings go missing or (ii) some or all of these readings do not go missing. If (ii), then scope extension and / or scope reduction must be at play, despite the free word order the language displays.

In this subsection, I illustrated a debate over quantification in free word order languages. I pointed out two considerations which could potentially cast doubt on the validity of the positions which disallow QR. The first calls to investigate whether ILC and ACD are available in the language claimed to disallow QR. The second invites us to look into the factors determining word order and their interaction with scope. For now, I abstract away from the implementation of this analysis and perform it in the upcoming section on Polish.

3 Polish

The situation in Polish is typical. Although quantification in this language is understudied, instances where scope has served as a diagnostic reveal an implicit dispute. This dispute is evident in judgements regarding the availability of the inverse scope in monotransitive sentences found in Citko 2011, Szczegielniak 2004 and Witkoś 2009. According to Citko 2011, scope is generally frozen in a free word order language such as Polish. In neutral contexts scope facts are argued to align with what has been claimed for Russian by Ionin 2003. In contrast to Citko 2011, both .

Szczegielniak 2004 and Witkoś 2009 state that the SVO order is ambiguous.

The theoretical treatment of scope in Polish mirrors the situation in other free word order languages illustrated above. The following range of scope possibilities can be found in the literature:

	 scope extension 	+ scope extension
– scope reduction	Citko 2011	Not reported
+ scope reduction	Wiland 2009	Szczegielniak 2004

Table 2

We now move to evaluating these positions.

First off, we look at ILC and ACD – constructions taken to provide additional evidence for the existence of QR in English. As (5) and (6) below show, assuming that there is no QR in Polish is problematic, because these constructions display behaviour parallel to their English counterparts, suggesting that QR operates in Polish as well.

(5) ILC:

a. Jeden członek każdej komisji_i głosował, żeby ją_i
One member_{NOM} every committee_{GEN} voted to it_{ACC} rozwiązać.
abolish
'One member of every committee_i voted to abolish it_i.'

(6) ACD:

- a. Ja będę czytać każdą książkę co ty będziesz. INOM will read every book_{ACC} that youNOM will 'I will read every book that you will.'
- b. I will read every book that you will read.

Next, we attend to the second consideration, that is the availability of scope overtness, on which scope rigidity position rests, and ask whether in Polish every α construction has a β alternative where scope can be displayed overtly. As already pointed out in the preceding section, for this question to be answered positively, scope needs to be either (i) the only or (ii) the most dominant factor determining word order. In Polish, (i) is not satisfied as word order is highly influenced by the configuration of Information Structure². Specifically, given information has been shown to be positioned before new (Siewierska 1993, Wiland 2009 among others). As for (ii), at this point, I don't have much to say except referring to the analyses of the interaction of scope and IS in other free word order languages (see Titov 2012 on Russian, Wurmbrand 2008, Bobaljik & Wurmbrand 2012 on German). None favours scope over IS in terms of word order representation. It is plausible to assume then that the same holds for Polish. With this assumption in hand, we can construct a case where scope transparency might not be satisfied and its structural requirements would need to be satisfied covertly. It goes as follows.

IS requires given elements to be placed before new. Scope requires elements taking wide scope to go before elements taking narrow scope. When IS and scope interact, scope will be transparent if its word order requirements align with the requirements of IS, that is when an element A is given and takes wide scope and an element B is new and takes narrow scope. In this case, there is one word order which will satisfy the requirements of both factors, that is A - B. However, scope transparency might not be satisfied if the requirements of scope and IS are in conflict, that is when an element A takes narrow scope and is given and an element B takes wide scope and is new. Under this scenario, IS requires construction α with word order A - B whereas scope requires construction β with word order B - A. There is no one word order which would satisfy both factors. It is plausible to assume that in such a case, where scope requires β , but IS requires α , α might be scopally ambiguous.

² Other factors influencing word order in Polish are constituent animacy, definiteness and pronominality.

	Word order	
A (wide, given) B (narrow, new)	α : A - B (Scope \checkmark ; IS \checkmark)	
A (narrow, given) B (wide, new)	 α: A - B (Scope *; IS ✓) β: B - A (Scope ✓; IS*) 	← + scope extension, + scope reduction?

Table 3

To sum up, the discussion in the preceding context suggests that only the positions which allow QR are viable in Polish. This is so for two reasons. First, ILC and ACD – constructions taken to support the existence of QR in English display parallel behaviour in Polish as well. Second, under the assumption that scope is not the most dominant factor determining word order, we entertain that there are conditions which cannot satisfy the isomorphic principle. In such cases, word order is regulated by a non-scopal factor which places an element A structurally higher than an element B in the overt syntax, which is incompatible with what is required by scope. Thus, the structural requirements of scope, not met in the overt syntax, can be predicted to be displayed covertly. The experiment that is described in the next section takes this prediction into account and probes the availability of non-surface scope in Polish under conditions where the word order reflecting givenness conflicts with the word order reflecting scope.

4 Experiment

The experiment reported below investigates the availability of the inverse scope in two monotransitive constructions of α type in Polish: SVO and OVS³ in conditions where scope overtness expectation – a factor

³ Only the inverse scope is tested in the experiment. Since the availability of the surface scope is not subject to disagreement in the literature and in view of the results of an informal pilot study in which the accessibility rate of this reading was near ceiling, the condition with surface scope is not part of the experiment.

putatively connected to scope freezing effects in free word order languages is blocked. Assuming that QR is necessary to derive inverse scope in canonical SVO, and QR and / or reconstruction is necessary for inverse scope in non-canonical OVS, the empirical results from the experiment will shed light on the theoretical dispute over quantification outlined in Section 3.

4.1 Design and Stimuli

The paradigm used in the experiment was a Truth Value Judgement Task. The participants were presented with sentences paired with images and were asked to judge whether the sentences correctly described the situations depicted in the images.

The design was built on two overarching objectives. The first was to elicit judgements which reliably reflect the computation of the tested reading. In view of a potential confound arising from the entailment pattern found in $\forall -\exists$ order where the inverse reading entails the surface one (Reinhart 2006), $\exists - \forall$ order was used in the critical conditions. The second was to ensure that the tested reading is accessed when it is licensed by the grammar. The problem is that scope judgements are subtle and inverse scope has been proven difficult to obtain even in English – a language uncontroversially considered to be scopally fluid. Various experimental studies have revealed that inverse scope is dispreferred (Kurtzman& MacDonald 1993, Anderson 2004, Scontras et al. 2014 among others). This dispreference has been linked to the processing difficulty associated with the structural complexity of derivations with QR. This factor, of course, cannot be controlled for experimentally. However, there are other factors which have been shown to influence the availability of the inverse scope and which may be controlled for experimentally. Among them are factors which increase the accessibility of the inverse scope. These include biasing context (i.e. Anderson 2004, Experiment 2) and priming of a particular interpretation (Raffray & Pickering 2010, Chemla et al. 2015). On the other hand, there is topicality – a factor which reduces the inverse scope availability. The logic here goes as follows. Topics are interpreted with wide scope. Since preverbal NPs are preferably interpreted as topics, preverbal NPs take wide scope (i.e. Catlin & Micham 1975).

Thus, in view of the parser's preference for the surface scope construal, the availability of the inverse scope was tested in facilitating

conditions incorporating the factors shown to influence the availability of the inverse scope in English: biasing context, control for the topicspecificity factor and priming the narrow scope of the existential.

The above objectives were executed in a design featuring test tokens comprising a context sentence (S1) followed by a target sentence (S2). Target sentences $S_{\exists}VO_{\forall}$ were paired with context sentences $O_{\forall}VS_{\exists}$, which set up the distributive reading of the indefinite subject by surface scope configuration (as in (7a)). Conversely, target sentences $O_{\exists}VS_{\forall}$ were paired with context sentences $S_{\forall}VO_{\exists}$, which set up the distributive interpretation of the indefinite object by surface scope configuration (7b). The nominal element of the indefinite quantifier phrases was kept the same in the context and in the target sentence, but the nominal elements of the universal quantifier phrases differed. Thus, the presentation of the test items followed the pattern: **S1**: NP1 $_{\forall}$ - Verb - NP2 $_{\exists}$ **S2**: NP2 $_{\exists}$ -Verb - NP3 $_{\forall}$. Both sentences were presented with accompanying pictures depicting distributive scenarios matching the surface and inverse scope respectively in the first and the second sentence (as illustrated in Figure 1 and Figure 2).

(7) a. Test token for SVO: S1: $O_{\forall NP1} V S_{\exists NP2} S2$: $S_{\exists NP2} V O_{\forall NP3}$

S1:

Każdego pelikana karmi jeden Indianin. Every pelican_{ACC} feeds one Indian_{NOM} 'Every pelican is being fed by one Indian.'

S2:

Oprócz tego, jeden Indianin karmi każdego kotka. Moreover one Indian_{NOM} feeds every cat_{ACC} 'Moreover, one Indian is feeding every cat.'



Figure 1

b. Test token for OVS: S1: $S_{\forall NP1} V O_{\exists NP2} S2: O_{\exists NP2} V S_{\forall NP3}$

S1: Każdy Indianin karmi jednego pelikana. Every Indian_{NOM} feeds one pelican_{ACC} 'Every Indian is feeding one pelican.' S2: Oprócz tego, jednego pelikana karmi każdy rolnik. Moreover one pelican_{ACC} feeds every cat_{NOM} 'Moreover, one pelican is being fed by every farmer.'



Figure 2

As can be seen, S1 provides context setting up plural reference of the indefinite in S2. By inducing the plural interpretation, thus inhibiting the specific interpretation of the indefinite, the context sentence serves to control for the topic-specificity factor. Additionally, S1 whose surface scope representation matches the inverse scope representation of S2 should induce a priming effect. Moreover, and crucially for a free word order language, the format of the tokens blocks the expectation of scope overtness. The word order in S2 can be attributed to IS. In S2, NP2 is given (by virtue of being previously mentioned in S1) and NP3 is new.

The control sentences followed the same format as the target tokens, but had the order of the quantifiers reversed. Both sentences in the control tokens were presented with nondistributive pictures matching the surface and inverse scope respectively in the context and the test sentence. They tested whether the participants can access the reading compatible with the non-distributive scenario.

(8) a. Control token for SVO: S1: O_{3NP1} V S_{VNP2} S2: S_{VNP2} V O_{3NP3}
b. Control token for OVS: S1: O_{3NP1} V S_{VNP2} S2: S_{VNP2} V O_{3NP3}

4.2 Participants

18 native Polish speakers (10 male and 8 female) between the age of 22 to 58 took part in the study (mean age: 34.7; standard deviation 9.5). All were residing in Poland.

4.3 Procedure

The stimuli were presented on a computer via PsyScope software. The sentences featured neutral intonation (with stress on the rightmost element), were prerecorded by a female native speaker and presented auditorily. Instructed that S1 is always true in the context of its accompanying picture, the task of the participants was to determine whether S2 (the target item) was true in the context of its accompanying picture. The participants selected the answer by pressing either p button (prawda – true) or n (nieprawda – false). The True response to the critical item (S2) indicated the availability of the inverse scope in that item. Each experiment featured 8 target tokens divided evenly between SVO and OVS orders and 8 control sentences. These sentences were pseudorandomized with 16 fillers of similar cognitive load.

4.4 Predictions

Given that the inverse scope construal is dispreferred by the parser, the participants were not expected to access this reading in the test items 100% of the time. That is, the participants could still give the 'false' response to the test sentences even though the inverse scope was licensed by the grammar as they could judge the critical items based on the truth value of the most accessible surface scope interpretation. However, it was predicted that if the inverse scope reading is available, at least some of the participants will be able to access it.

4.5 Results

The results given in Figure 3 reflect the raw percentages of 'true' responses in each condition. The rate of 'true' responses in control items was obtained 89% of the time: an average of 89% for the SVO order (64 out of 72) and 90% for the OVS order (65 out of 72 items). As for the test items, the average acceptance rate was 68% (98 out of 144 test items): 61% for the SVO order (44 out of 72 items) and 75% for the OVS order (54 out of 72 items).



Inverse wide scope of the universal Inverse wide scope of the existential

Of the 18 participants, all appeared to have accessed the inverse scope in experimental items to some extent. All participants accessed the inverse scope of the subject in OVS with 8 accessing it 100% of the time, 4 - 75% of the time, 4 - 50% of the time and 2 - 25% of the time. 15 out of 18 participants accessed inverse scope of the object in SVO with 6 accessing it 100% of the time, 4 - 75% of the time, 3 - 50% of the time and 2 - 25% of the time and 2 - 25% of the time. Overall, raw results for accessing inverse scope in both OVS and SVO are as follows: 4 participants accessed it 100% of the time, 4 - 87.5% of the time, 2 - 75%, 2 - 62.5%, 2 - 50%, 1 - 37.5%, 2 - 25%, 1 - 12.5%.

4.6 Discussion

The results of the experiment provide strong empirical support for the availability of the inverse scope reading both in SVO and OVS constructions in Polish. The acceptance rate of the inverse scope obtained in the study was 68% overall (with 61% for the SVO order and 75% for the OVS order). Demonstrating a strong statistical effect which cannot be attributed to the inaccuracy or noise in the performance, these results are comparable or in some cases surpass the findings obtained in experiments investigating scope interpretation in English – a language uncontroversially regarded to be scopally fluid. Let's take a study by Scontras et al. (2014) as a point of comparison in which the acceptance rate of inverse wide scope of universal in $S_{\exists}VO_{\forall}$ reached 56% in sentences with the indefinite article 'a', but dropped to mere 28% in sentences with the existential 'one' in the subject position. Or, perhaps a more parallel

study with facilitating context conducted by Anderson (2004) where the rate of the inverse scope interpretation preference was 53%. And other results, such as the following: 23% in a sentence-continuation compatibility judgement task conducted by Kurtzman & MacDonald (1993), 33.6% in a game task with TVJT in Goro (2007).

We thus conclude that scope is not frozen in Polish. In both OVS and SVO constructions the interpretation associated with the inverse scope is available. These observations translate into rejecting the theoretical stance which posits that Polish does not allow scope extension or scope reduction. In other words, it cannot be the case that scope is read merely from the surface configuration of quantifiers as claimed by the scope rigidity stance. The availability of the inverse scope not only in OVS but also in SVO implies that the stance claiming that Polish only allows scope reduction cannot be on the right track. Scope reduction associated with reconstruction can explain the inverse scope reading in movement-derived OVS, but it cannot explain the ambiguity in base-generated SVO construction. Given the inverse scope in both SVO and OVS, we are left with the theoretical possibility that scope of quantifiers is derived by covert quantifier movement and possibly by reconstruction in OVS. As the aim of the study was to establish whether inverse scope is available in principle in either of these constructions, this study cannot provide any explanatory clues with regards to what mechanism is responsible for this reading in OVS. This experiment failed to detect a statistically significant difference between OVS and SVO (p=0.1072108). However, such low pvalue, close to the critical p-value of 0.05 calls for measuring it in a larger scale experiment. If the difference is real, it is conceivable that different scope deriving mechanisms may be operating in each of these constructions given that all other processing related factors implemented in the experiment were equal. It is possible that reconstruction induces lesser processing costs than quantifier raising, therefore the reading derived by this mechanism is accessed more easily.

5 Summary and Conclusions

The aim of this paper was to investigate the alleged reverse correlation between the freedom of word order and the freedom of scope by experimentally testing the availability of the inverse scope reading in SVO and OVS α type constructions in Polish.

We began our discussion by pointing out that a monotransitive α construction with an existentially quantified subject (A) and a universally quantified object (B) is ambiguous in English and that its inverse scope is derived via covert QR. Moving beyond English, we revealed a debate over the interpretation and theoretical account of α type constructions in free word order languages. We targeted two theoretical positions that disallow QR. One of them additionally disallows reconstruction and, postulating scope rigidity, links the ban on covert operations to the availability of scope overtness via scrambling. It claims that covert operations which change the configuration between quantifiers in an α construction with word order A – B are ruled out by the existence of a β construction with word order B - A, where the configuration between the quantifiers is overt. On the ground of one free word order language – Polish, we cast doubt on the validity of these positions. First, we revealed evidence suggestive of the existence of QR in this language: ILC and ACD. Then, we challenged the scope rigidity position by making plausible the existence of conditions where scope overtness expectation is not met. We showed that, β alternative might not be available to serve scope if α serves Information Structure. We thus expected to see covert operations, that is the inverse scope in these conditions.

This expectation was confirmed in the experiment carried out in section 4. Both SVO and OVS α type constructions allow inverse scope in Polish in the conditions where word order is regulated by Information Structure. We therefore conclude that in Polish (a free word order language) scope is not rigid. The stronger version of the inverse correlation between the freedom of word order and the freedom of scope is not borne out, according to the results of the experiment. Free word order language does not entail absolute scope rigidity. We obtain inverse scope in conditions where scope overtness is blocked. It remains to be seen whether scope is displayed covertly *only* in these conditions. In order to determine this, the availability of the inverse scope needs to be tested in conditions where word order is not regulated by a non-scopal factor, i.e. in conditions where both QPs are new.

The availability of the inverse scope in both SVO and OVS constructions is compatible with the positions which allow scope extension. One of them additionally allows reconstruction. At this point we are not able to discriminate between them as we don't know what mechanism derives the inverse scope in OVS. Future work will aim to determine whether it is QR and/or reconstruction.

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An Experimental Study of the Distributional Restriction on Russian *Čto*-Clause Complements of Nouns^{*}

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Clausal complements are generally taken to be free from formal licensing conditions such as the Case Filter. In this paper, I discuss the distributional restriction of *čto*-clause complements of N to restructuring V-N collocations earlier proposed in Knyazev 2016, where it was explained by a formal licensing requirement for *čto*-clausess. I present the results of an experimental study that used a factorial definition of the restriction adapted from studies of island effects (see Sprouse et al. 2013). The results provide evidence for the restriction and indirectly support the licensing requirement proposed earlier.

1 Restriction on *Čto*-Clause Complements of Nouns

1.1 Background on Cto-Clause Complements

Russian *čto*-clauses can be optionally embedded in a DP-shell realized as the singular neuter form of the demonstrative *to* 'that' (with the respective case morphology), a construction henceforth referred to as *to,čto*-clauses (see, e.g., Hartman 2012, Knyazev 2016). *To,čto*-clauses generally appear either as (preverbal) subjects or as complements of P or

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predicates that assign oblique case, as in (1). Many predicates allow *to,čto*-clauses to freely alternate with "bare" *čto*-clauses, as shown in (1a); other predicates, however, strongly favor *to,čto*-clauses (especially with less common verbs), as shown in (1b).

- (1) a. Ivan nadeetsja (na to), čto [vloženija okupjatsja]. Ivan hopes in it_{ACC} that investments pay off 'Ivan hopes that the money will pay off.'
 - b. Učenye sxodjatsja ^{?*}(na tom), [čto est' global'noe poteplenie]. scientists converge on it_{LOC} that is global warming 'Scientists are in consensus that global warming exists.'

Whereas many of such distributional differences are highly idiosyncratic and depend on poorly understood lexical and stylistic factors, there also appear to be more systematic restrictions that govern the distribution of *čto*-clause complements.

1.2 Introducing the Collocational Restriction

One such restriction comes from the distribution of clausal complements of nouns such as *nadežda* 'hope', *uverennost'* 'conviction', *somnenie* 'doubt', *dokazatel'stvo* 'proof', *verojatnost'* 'likelihood' and potentially other nouns that share the property of taking true semantic arguments (see Krapova and Cinque 2016 for the relevant discussion and references).¹ The restriction consists in the following fact. When these nouns appear in collocations like *vselit' nadeždu* 'instill hope', *vyrazit' somnenie* 'express doubt', *privesti dokazatel'stvo* 'produce proof', *est' verojanost'* '(there) is likelihood' and others, their complement can be realized either by a *čto-* or a *to,čto-*clause, as shown in (2a)–(2d), although the *čto-*clause might sound slightly less natural.²

¹ The restriction does not seem to appear with complements of nouns like *utverždenie* 'claim' and *mysl*' 'idea', which have different semantic properties and which are often treated as appositive modifiers, see Stowell 1981, Grimshaw 1990, Moulton 2009. Complements of these nouns are not discussed in this paper.

² Number marking on the noun does not seem to have a clear effect on the acceptability of $\check{c}to$ -clauses in collocations and was not considered in the study.

- (2) a. Ona vyrazil somnenija (v tom), [čto ona zdes']. she expressed doubts in it_{LOC} that she here 'She expressed doubt that they will win.'
 - b. On **privel dokazatel'stva** (togo), [čto èto fal'šivka]. he produced proofs it_{GEN} that this fraud 'He produced proof that this is fraud.'

By contrast, other verb-noun combinations such as *razdeljat' nadeždu* 'share hope', *usilit' somnenija* 'strenghthen doubt', *ignorirovat' dokazatel'stva* 'ignore proof', *obsuždat' verojatnost'* 'discuss likelihood' and others seem to strongly favor *to,čto*-clauses, as shown in (3a)–(3d).³ I will refer to this preference for *to,čto*-clause complements as the **collocational restriction** on *čto*-clauses.

- (3) a. Èto **usililo somnenija** ^{??}(v tom), [čto ona zdes']. this strengthened doubts in it_{LOC} that they here 'This strengthened doubts that she is here.'
 - b. On **ignoriruet dokazatel'stva** ^{??}(togo), [čto èto fal'šivka]. he ignores proofs it_{GEN} that this fraud 'He ignores proof that this is fraud.'

The difference between the two types of collocations seems to lie in the nature of the semantic relation between the verb and the noun, although it is somewhat difficult to characterize it precisely due to a large intraclass variability and the graded of nature of the judgments.

In general, verbs in collocations that allow *čto*-clauses have a more impoverished meaning and/or are more tightly, often idiomatically connected to the noun. They typically express possession, coming in possession or causation of possession of a mental state, as in *u X-a est'/ostaetsja nadežda* 'X has/keeps having hope', *pitat'/lelejat' nadeždu* 'cherish hope', *u X-a voznikla/pojavilas' nadežda* 'X started having hope', *vselit' v X-a/dat' X-u nadeždu* 'instill hope in X'. In other cases, the collocation seems to have a unified meaning that is close to the base predicate corresponding to the noun. For example, *est'/suščestvuet verojatnost'* '(there) is/exists likelihood' (cf. 'likely'),

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³ Examples in (3) with *čto*-clauses are not completely unacceptable and sometimes can occur naturally, a point to which I return in section 3.1.

privesti/presdstavit' dokazatel'stva 'bring/present proof' (cf. dokazyvat' 'prove') and vyrazit' nadeždu/uverennost 'express hope/conviction' (cf. nadejat'sja 'hope'/uveren 'certain'). Sometimes the verb adds extra content, as in tešit' sebja nadeždoj 'find comfort in hope' and u X-a krepnet uverennost' 'X's conviction is growing', however, the collocation might still be taken to express the possession of a mental state with some further semantic or pragmatic distinctions.

2.3 Parallels with Infinitival Complements of Nouns

Although this semantic characterization of the contrast between verbnoun combinations in (2) and (3) is imprecise, it is corroborated by its similarity to a contrast observed in verb-noun collocations that take *infinitival* complements, discussed in Franks and Hornstein (F&H) 1992, Franks 1995 and Lyutikova 2010 (see also Pereltsvaig 2013). F&H observe that infinitival complements of nouns share certain syntactic properties of verbal complements (such as the ability to license nominative case agreement on secondary predicates or element like *sam* and *odin* and the ability to license wh-movement) when combined with a particular set of verbs. This is the case with such combinations as *vyrazit' želanie* 'express desire', *prinjat' rešenie* 'take decision', *polučit' prikaz* 'receive order' and *voznikla ideja* '(there) emerged idea', but not with *peresilit' želanie* 'overcome desire', *ponimat' želanie* 'understand desire' and *ob''jasnit' rešenie* 'explain decision'.

Drawing parallels from the analysis of the *make the claim* construction (see, e.g., Davies and Dubinsky 2003), F&H argue that in these combinations the verbs and the noun can reanalyze to form a complex predicate, which accounts for their "exceptional" syntactic properties.⁴ While this reanalysis (also called restructuring) is governed by poorly understood lexical factors, they suggest, citing Wayles Browne (p.c.), that for the restructuring to be possible "the verb must be the minimal, unmarked lexical function of the noun, idiomatically combining with it to form a set collocation" (1992:42). Lyutikova (2010) further develops this idea, by identifying F&H's "restructuring" verbs with

⁴ See Landau (2008) for some criticisms of F&H.

lexical functions Oper, Func and Labor (in Mel'čuk's (1974) Meaning-Text Theory) of the noun).⁵

Given the discussion above, there is a strong semantic parallelism between the verb-noun combinations that license $\check{c}to$ -clauses and those that license case transmission/wh-movement in infinitival complements, suggesting that we are dealing with the same phenomenon. The parallelism is supported by the following fact. As noted by Lyutikova, confirming an earlier observation by F&H, phonologically overt material in the projection of the noun such as demonstratives, possessives and (potentially) quantificational elements seem to disrupt restructuring for the purposes of case transmission and wh-movement, whereas an adjectival dependent of the noun is harmless. We see a similar effect on the selection for $\check{c}to$ -clauses, as shown in (4)–(5).

- (4) a. On vyrazil **svoi** somnenija ^{??}(v tom), [čto ona zdes']. he expressed his_{REFL} doubts in it_{LOC} that she here 'He expressed his doubts that she is here.'
 - b. On vyrazil **bol'šie** somnenija (v tom), [čto ona zdes']. he expressed big doubts in it_{LOC} that she here 'He expressed strong doubts that she is here.'
- (5) a. Est' **neskol'ko** dokazatel'stv ^{??}(togo), [čto èto fal'šivka]. is several proofs_{GEN} that_{GEN} that this fraud 'There are several proofs that this is fraud.'
 - b. Est' **veskie** dokazatel'stva (togo), [čto èto fal'šivka]. is solid proofs it_{GEN} that this fraud 'There are solid proofs that this is fraud.'

Given the discussion above, we can formulate the collocational restriction on *čto*-clauses as in (6).

(6) Clausal complement of nouns can be realized as *čto*-clauses only if the noun belongs to a noun-verb collocation that can undergo restructuring to form a complex predicate.

⁵ Lyutikova's (2010) provides an analysis in terms of (non)projection of a DP-layer by the noun, identifying F&H's restructuring cases with those where a non-projected DP (or "small" nominal) is possible.

2 Account of the Restriction

2.1. Case Requirement of Clauses and the Null P Proposal

The collocational restriction in (6) does not follow from the standard approach to the distribution of clausal complements (see, e.g., Pesetsky and Torrego 2004), according to which they are not subject to the Case Filter and are in principle free to appear with noun predicates. Knyazev (2016) challenges the standard account by proposing that argumental *čto*-clauses are subject to the Case Filter by virtue of being embedded in a null DP-shell (which are treated as being realized by the demonstrative *to* in *to,čto*-clause). In order to account for how *čto*-clauses can appear as complements of non-case-licensors such as PP-verbs, N and A (one of the facts that motivates the standard account), Knyazev argues that in such positions *čto*-clauses are exceptionally licensed by an insertion of a null P, which assigns morphologically unrealized 'null Case' to the complement, as formulated in (7).

(7) *Čto*-clause complements are licensed either by (i) structural Case; or (ii) by insertion of an abstract preposition (null P).

As a phonetically empty element, null P has to get some default interpretation in order to be visible to the computational system. Knyazev (2016) proposes an account inspired by Pustejovsky's (1995) analysis of constructions like *John began a book*, where the "understood verb" is recovered from the *qualia structure* of the complement noun, which specifies stereotypical actions associated with that noun (i.e. reading and writing).⁶ In a similar vein, null P gets interpreted as a twoplace relation HOLD between a propositional content and an attitude holder, which obtains whenever an attitude holder entertains some belief or claim (which can be viewed as stereotypical relations associated with propositional contents). For HOLD to be correctly interpreted, its internal ("content") role has to be identified with the Theme role of the verb while its external ("holder") role has to identified with the Agent/Experiencer role of the matrix predicate. This identification is

⁶ Pustejovsky's (1995) account is in terms of complement coercion and does not postulate a null V. For a syntactic interpretation of this account see van Riemsdijk 2002 (see also Pylkkänen and McElree 2006 for some discussion).

implemented via incorporation of null P into the higher predicate (cf. a similar proposal in Neeleman 1997 for the interpretation of PP-complements such as *believe in Bill's honesty*). This is schematically represented in (8a). The result of this process is interpreted as conjunction of the relation HOLD and the denotation of the higher predicate, as shown in (8b). The proposal leads to the licensing condition on null P, given in (9).

(8) a. Ivan $\begin{bmatrix} v & P_{HOLD} & nadeetsja \end{bmatrix}$, $\begin{bmatrix} pP \ t & [DP \ cto...] \end{bmatrix}$. hopes that b. *nadejat'sja'* 'hope' + null P: $\lambda p. \lambda x. \lambda e.$ hope(e) & Exp(e,x) & Theme(e,p) & HOLD(x, p)

(9) Null P is licensed by predicates that have an argument interpreted as the holder of the propositional content (realized by the *čto*-clause).

2.2. Motivation for the Null P proposal

Evidence for the null P proposal comes from the sentience restriction on *čto*-clauses (Knyazev 2016, 2017a, 2017b). According to this restriction, *čto*-clauses but not *to,čto*-clauses are degraded with non-agentive (epistemic) uses of certain speech verbs such as *namekat* ' 'hint', *govorit*' 'say' and others, as illustrated in (10a); cf. the agentive use in (10b).

(10)	a.	Èto	namekaet	*(na	to),	[čto	bar	dlja	turistov].
		this	hints	on	it _{ACC}	that	bar	for	tourists
'This suggests that the bar is for tourists.'									
	1	0.1	1 /	(()	E Y 4	1	11.	

b. Gid namekaet (na to), [čto bar dlja turistov]. guide hints on it_{ACC} that bar for tourists 'The guide hints that the bar is for tourists.'

Crucially, this restriction is confined to cases where the complement appears in a PP position, cf. (11), and is not observed with verbs like *dokazyvat'* 'prove' and *podtverždat'* 'confirm', as shown in (12).

(11) {*Čto / na čto} èto namekaet? what_{ACC} on what_{ACC} this hints

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(12) Èto dokazyvaet / podtverždaet { ego teoriju /, čto this proves confirms his theory_{ACC} that bar for tourists}. bar dlja turistov 'This proves/confirms {his theory/that the bar is for tourists}.'

The sentience restriction directly follows from the null P proposal. Given the lack of structural-case-assignment in (10), the licensing requirement in (7) will trigger insertion of null P. Null P, however, will violate the condition in (9) as the verb is non-agentive and lacks a sentient argument that can be interpreted as the holder of the propositional content.

2.3 Account of the Collocational Restriction

The Null P proposal provides a way to account for the collocational restriction in (6). As I suggested above, noun-verb collocations that allow *čto*-clauses involve formation via restructuring of a complex predicate that closely resembles an already existing attitude predicate. Following Davies and Dubinsky's (2003) analysis of the *make the claim* (cf. *discuss/retract the claim*) construction, we can formalize this suggestion by assuming that this restructuring involves the process of abstract noun incorporation, which is licensed under the following conditions: (i) the head noun is a nominalization of an attitude predicate; (ii); the noun is an argument of V; (iii) one of the arguments of V is construed in the noun-verb collocation as the holder of the propositional attitude corresponding to the noun. For example, in the case of *vyrazit' somnenie* 'express doubts' condition (iii) will be satisfied because the subject of the verb is construed as the holder of the doubt and similarly for other cases.⁷

It is easy to see now how the null P proposal in conjunction with the abstract incorporation analysis can account for the collocational restriction. Assuming that nouns are not case-assigners, *čto*-clause complements of nouns will trigger insertion of null P, which requires licensing conditions of its own. These conditions will be satisfied in

⁷ For cases like *est' verojatnost'* 'is likelihood' we have to assume that the holder argument can be realized as an implicit argument. A more challenging case is provided by collocations like *byt'/javljat'sja/služit' dokazatel'stvom* 'be/serve as proof', where the holder argument appears to be the inanimate. Perhaps these cases could be explained along the lines of *teleological capability*, which might underlie animacy effects (Folli and Harley 2008).

restructuring cases as in (2). Since abstract incorporation will create a complex predicate one of whose arguments is an attitude holder (due to condition (iii)), null P will be able to incorporate into this predicate and get correctly interpreted as a modifier of its denotation, as shown in (13).

(13) Ivan $\begin{bmatrix} v & P_{HOLD} & v & v \\ v & v & z \\ v & v & z \\ v$

By contrast, non-restructuring cases as in (3) will not involve complex predicate formation and thus will fail to provide the right configuration for the licensing of null P. This account assumes (a) that nominalizations, though inheriting semantic arguments from the base verb, do not have 'true' (theta-marked) syntactic arguments (in the sense of Grimshaw 1990); and (sb) that identification of theta-roles involved in Pincorporation requires true theta-marked arguments.

As for the 'intervention effect' of the overt material in the DP projection of the nominal as in (4a)–(5a), it could follow from the assumption that abstract incorporation is at least sometimes blocked by such material (cf. a similar assumption in F&H).⁸

3 Experimental Study

3.1. Possible Concerns with the Account

The account of the collocational restriction presented above may raise certain objections. First, one can find some naturally-occurring examples of *čto*-clauses in non-restructuring contexts as in (14), which leads to wonder whether the collocational restriction is real.⁹

⁸ One should be careful in formulating this assumption. For example, Davies and Dubinsky (2003) assume that possessive reflexives do not block abstract incorporation in cases like *write his story*, whereas F&H assume that possessive reflexives do block restructuring in cases like *make his claim*. The effect of possessive reflexives in Russian infinitival complements, as discussed by F&H and Lyutikova (2010), is rather weak, according to my judgment, and has been questioned by Landau (2008). The experimental study discussed below also showed an inconsistent effect of the overt material in the DP on the licensing of *čto*-clauses.

⁹ The example is from the Russian National Corpus (RNC) (http://www.ruscorpora.ru).

(14) My polnost'ju opravdyvaem nadež**du**. ego čto we completely justify his hope that gnusnost' projdet. nastiness ends 'We fully justify his hope that nastiness will end.' [Fazil Iskander. Sandro iz Čegema]

Second, even if the restriction is real, one may still object to the account of this restriction proposed above. In what follows I will mostly address the first concern by presenting the results of an experimental study testing the validity of the restriction and discuss the second concern only very briefly in the end of section 3.

Before discussing the experiment, we should note that individual examples like (14) do not necessarily falsify the proposed account. First of all, syntacticians are mostly interested in relative judgments of acceptability between two contrasting conditions rather than in absolute judgments. Thus, *čto*-clause complements of nouns in non-restructuring contexts can merely be taken to be worse than *to*,*čto*-clauses rather than ungrammatical in some absolute sense. Second, occurrence in the corpus does not directly map to (relative) acceptability. While high frequency entails high acceptability, low frequency can be associated with *either* low or high acceptability (Arppe and Järvikivi 2007).¹⁰

To assess the frequency of V-N collocations, an exploratory corpus study of V-N collocations with five nouns *nadežda* 'hope', *uverennost'* 'conviction', *somnenie* 'doubt', *dokazatel'stvo* 'proof', and *verojatnost'* 'likelihood' was conducted.¹¹ The study showed that restructuring collocations are by far more frequent than non-restructuring for both *čto*- and *to,čto*-clauses, replicating the results of Lyutikova's (2010) corpus study of N-V collocations with infinitival complements.¹² The five most common collocations for the first three nouns are shown in Tab. 1. Given

¹⁰ Arppe & Järvikivi (2007) assume this is only true for acceptability rating tasks, which they advocate for rare phenomena, but not necessarily for *forced choice* tasks. ¹¹ The study was conducted on the subcorpus of RNC texts dating after 1950. The

queries searched for verbs in indicative mood followed by the noun and a $\check{c}to-/to,\check{c}to-$ clause separated by up to two words.

¹² Providing an accurate estimate of the frequency of non-restructuring collocations turns out to be non-trivial due to a large number of intermediate cases. I leave this interesting task for future work.

the relative rarity of non-restructuring collocations in general, it is difficult to assess their effect on the choice of the complement in a corpus study. Therefore, a controlled experiment was conducted.

3.2. Factorial Design

Given the discussion above, how can we establish the unacceptability of čto-clause complements in non-restructuring constructions? It turns out that simply comparing *čto-* and *to, čto-* clauses is not enough because in principle *čto*-clause complements of nouns might *independently* have lower acceptability ratings than to, *čto*-clause complements, i.e. across both restructuring and non-restructuring contexts. This is plausible because čto-clauses sometimes sound less natural than to, čto-clauses even in restructuring contexts like (2) for reasons yet to be understood (but see some suggestions in the end of section 3). Taking this into account, we need to use a *factorial* definition of the collocational restriction (see Sprouse et al. 2013, a.o, for the same logic applied to experimental studies of island violations).¹³ That is, we need to compare the *difference* between the two non-restructuring conditions with the difference between the two restructuring conditions in a 2×2 factorial design with factors CONTEXT TYPE and CLAUSE TYPE, as schematized in (15).

(15) a. On vyrazil somnenija v tom, čto RESTR | TOČTO he expressed doubts in it_{LOC} that

¹³ The factorial definition of islands (Sprouse et al. 2013) breaks them down into two factors: (a) the presence of long vs. short wh-movement; and (b) the presence vs. absence of an island structure. Island effects are then defined as a decrease in acceptability over and above these two factors manifested in the significant interaction between them. This definition stems from the so-called reductionist theories of islands that attempt to reduce island effects to the independent processing cost associated with these two factors and thus eliminate the need to encode explicit constraints in the mental grammar (Kluender & Kutas 1993, Hofmeister & Sag 2010). Note that whereas these theories are premised on the independent processing difficulty of both factors (Phillips 2013), formal grammatical accounts such as espoused by Jon Sprouse and colleagues, are in principle compatible with there being no independent costs incurred by these factors. In fact, as observed by Phillips (2013), there is only consistent evidence for a processing cost associated with wh-movement but not with island structures per se.

b.	On vyrazil	somnenija,	čto			RESTR ČTO
	he expressed	doubts	tha	t		
c.	Èto usililo	somnenija	v	tom,	čto	N-RESTR TOČTO
	this strengthene	d doubts	in	it_{LOC}	that	
d.	Èto usililo	somnenija,	čto			N-RESTR ČTO
	this strengthene	d doubts	tha	t		

If the collocational restriction is real, the former difference (15c-15d) should be larger than the latter difference (15a-15b), that is, *čto*-clauses should have a stronger effect on lowering acceptability (compared to *to*,*čto*-clauses) in non-restructuring contexts than in restructuring ones. In statistical terms, we should observe a significant interaction between factors CONTEXT TYPE and CLAUSE TYPE. The effect size of the collocational restriction can be measured by obtaining the difference between differences (*DD*-score), i.e. (15c-15d) - (15a-15b).

3.3 Materials and Procedure

The selection of materials for the study was not straightforward due to the existence of different kinds of manipulation between restructuring and non-restructuring contexts, high variability within the constructions themselves and certain pressures to use a small number of items (the participants were not compensated financially or in any other way). In addition, as this was the first study of the collocational restriction, it was not clear what kinds of manipulations across the contexts should be prioritized. The strategy was to sacrifice consistency of manipulation between context types in favor of a reasonable degree of variability.

The materials were 12 item sets of four sentences as in (15), see Appendix and Knyazev 2017a for the full list. There were four sets with *dokazatel'stvo* 'proof' (sets 1–4) and two sets for *verojatnost*' 'likelihood' (sets 5–6), *somnenie* 'doubt' (sets 7–8), *uverennost*' 'conviction' (sets 9–10) and *nadežda* 'hope' (sets 11–12). Jointly there were: a) five sets with the manipulation of the nominal projection alone, including: i) three with a possessive reflexive (sets 1, 8, 9); ii) one with a possessive pronoun (set 2); iii) one with a quantificational element (set 3); b) six sets with the manipulation of the verb, including: i) four with the manipulation of the possessive (sets 7, 10–12); ii) two without the manipulation of the possessive (sets 5–6); 3) one set with manipulation of the verb order (set 6). These 48 experimental sentences were distributed among four lists in a Latin square design and were interspersed with 18 fillers in a pseudorandom order. The fillers consisted of three sets of sentences with similar structures (six highly acceptable, six highly unacceptable and six moderately acceptable), see Knyazev 2017a for the list of fillers. The task was to judge the acceptability of a given sentence on 1–5 scale.¹⁴ The experiment was presented as a survey hosted on Google Forms, the link to which was distributed via social media. The experiment was completed by 282 participants (mean age 28.2, sd=11.1, 220 female).

3.4 Results

Prior to the analysis, 18 participants whose mean judgment of the acceptable fillers was below 3 or the mean judgment of the unacceptable fillers was above 3 were removed. The data from the remaining 264 participants were z-score transformed by participant and entered into a two-way repeated measures ANOVA.¹⁵ The analysis revealed a significant main effect of CONTEXT TYPE (F₁ (1, 263) = 169.87, p < p0.0001; F₂ (1, 11) = 17.36, p = 0.002) and a significant main effect of CLAUSE TYPE (F1 (1, 263) = 656.15, p < 0.0001, F2 (1, 11) = 178.8, p < 0.0001). Crucially, there was a significant interaction between CONTEXT TYPE and CLAUSE TYPE: $F_1(1, 263) = 129.66$, p < 0.0001; $F_2(1, 11) =$ 14.68, p < 0.01. The acceptability of *to,čto*-clauses was similar in restructuring (M = 0.85, SD = 0.43) and non-restructuring contexts (M = 0.81, SD = 0.47); however, *čto*-clauses were significantly less acceptable in non-restructuring contexts (M = -0.22, SD = 0.75) than in restructuring ones (M = 0.25, SD = 0.7). The interaction plot with the DD-score (0.43) is shown in Fig. 1.

Pairwise comparisons were also performed to isolate the effect of CLAUSE TYPE (comparing the restructuring, *to,čto*-clause (15a) and the restructuring, *čto*-clause (15b) conditions) as well as the effect of CONTEXT TYPE (comparing the restructuring, *to,čto*-clause (15a) and the non-restructuring, *čto*-clause (15c) conditions), see Sprouse et al. 2013.

¹⁴ The participants were instructed to use their native speaker intuition without recourse to any prescriptive rules they might have learned in formal schooling.

¹⁵ The analysis was performed in the statistical language R (https://www.rproject.org) using the *ezAnova* function from the *ez* package, which automatically checks the assumptions of the test.

<i>Čto</i> -clauses		To, čto-clauses				
nadežda 'hope'						
<i>byt</i> ' N _{NOM} 'be _{EXIST} hope'	255 (29)	byt' N _{NOM} 'be _{EXIST} hope'	42 (22)			
<i>vyražat</i> 'N _{ACC} 'express hope'	156 (17)	<i>vyražat'</i> N_{ACC} 'express hope'	25 (13)			
pojavljat 'sja N _{NOM}	42 (5)	davat' N _{ACC} 'give hope'	18 (9)			
'appear hope'						
ostavat 'sja N _{NOM}	41 (5)	vseljat' N _{ACC} 'instill hope'	12 (6)			
'remain hope'						
terjat' NACC 'lose hope'	32 (4)	ostavat 'sja N _{NOM}	11 (6)			
		'remain hope'				
Unique collocations / Total	99 / 885	Unique collocations / Total	48 / 192			
и	verennost' '	conviction'				
<i>byt</i> ' N _{NOM} 'be _{EXIST} conviction'	147 (24)	<i>vyražat</i> ' N _{ACC}	40 (18)			
		'express conviction'				
<i>vyražat</i> ' N _{ACC}	104 (17)	<i>byt</i> ' N _{NOM}	29 (13)			
'express conviction'		'be _{EXIST} conviction'				
<i>prebyvat' v</i> N _{LOC}	40 (6)	<i>krepnut</i> ' N _{NOM}	9 (4)			
'be in conviction'		'strenghten conviction'				
pojavljat 'sja N _{NOM}	23 (4)	<i>vnušat</i> ' N _{ACC}	8 (4)			
'appear conviction'		'instill conviction'				
<i>vseljat</i> ' N _{ACC}	19 (3)	<i>vseljat</i> ' N _{ACC}	7 (3)			
'instill conviction'		'instill conviction'				
Unique collocations / Total	125 / 617	Unique collocations / Total	83 / 217			
somnenie 'doubt'						
<i>byt</i> ' N_{NOM} 'be _{EXIST} doubt	114 (44)	<i>byt</i> ' N _{NOM} 'be _{EXIST} doubt	75 (31)			
ostavat 'sja N _{NOM}	49 (19)	ostavljat ' N _{ACC}	56 (23)			
'remain doubt'		'leaves doubt'				
<i>voznikat</i> ' N _{NOM}	25 (10)	ostavat'sja N _{NOM}	25 (10)			
'appear doubt'		'remain doubt'				
ostavljat ' N _{ACC}	20 (8)	<i>voznikat</i> ' N _{NOM}	20 (8)			
'leaves doubt'		'appear doubt'				
<i>vyražat</i> ' N _{ACC}	115 (6)	<i>vyražať</i> N _{ACC}	19 (8)			
'express doubt'		'express doubt'				
Unique collocations / Total	25/260	Unique collocations / Total	$2\overline{4}/240$			

Tab. 1: Five most frequent N-V collocations with three nouns in a subcorpus of RNC (counts with percentages)

Pairwise comparisons revealed a significant effect of CLAUSE TYPE (F_1 (1, 263) = 258.26, p < 0.0001; F_2 (1, 11) = 58.46, p < 0.0001); the effect

of CONTEXT TYPE was not significant (F_1 (1, 263) = 3.94, p = 0.05; F_2 (1, 11) = 0.44, p = 0.52).

3.5. Discussion

The observed interaction between the factors CLAUSE TYPE and CONTEXT TYPE supports the hypothesis that the collocational restriction (under the factorial definition in (15)) is real. Interpreting the magnitude of this effect (0.43), though, is not straightforward given the lack of relevant standards in syntactic theory (see Sprouse et al. 2016). It is smaller than the effect sizes reported for island violations in English wh-questions (0.56–1.15) and is comparable to the effect sizes reported for island violations in relative clauses (0.40-0.52).¹⁶ Note also that it is smaller than the effect of the *čto*-clause (15a-15b = 0.85-0.25 = 0.60).

Given the high variability of manipulation between context types, it is important to examine the individual items. In Fig. 2 are shown by-item interaction plots for the 12 experimental items as well as the DD-scores calculated by averaging the four conditions.¹⁷ We can see that three item sets (1, 2 and 6) showed no or negligible effect of the restriction, while one set (9) showed a comparably smaller effect (0.31) than others (0.41– 1.28). Interestingly, three of these "misbehaving" sets (1, 2, 9) only involved manipulation of the nominal projection, whereas one (6) only involved manipulation of the word order. Crucially, all five sets (4, 8, 10–12) that involved manipulation of the verb (whether with or without manipulation of the nominal projection) showed the interaction effect. In addition, the two other sets (3 and 8) that only involved manipulation of the nominal projection also showed the effect.

These results confirm the effect of the non-restructuring context on the acceptability of a *čto*-clause. The effect is reliable when the nonrestructuring context is signaled by the verb. However, the effect of the presence of overt material in the DP-projection of the nominal (by assumption, blocking restructuring) is inconsistent and requires further investigation.

¹⁶ Kush et al. (2017) assume the DD-score of 0.25 as a minimum threshold to establish an island effect for a given participant.

¹⁷ The DD-scores are calculated in a non-standard way (i.e. not by averaging individual DD-scores) owing to the experimental design whereby each individual saw each item only in one condition.



Fig. 1: General interaction plot for the experiment

The latter result is not entirely unexpected under the abstract incorporation analysis (see section 2.3) given that there is inconclusive evidence for the effect of overt nominal projection on incorporation in general (see footnote 8). The observed interaction effect follows from the account proposed in section 2 and provides general support for the licensing requirement in *čto*-clauses in (7) and the condition on null P in (9).¹⁸

The experiment also revealed an independent (lowering) effect of the *čto*-clause in both restructuring and non-restructuring contexts. This effect cannot be explained as a grammatical violation of principles (7) and/or (9) and calls for a processing explanation. One tentative explanation is that processing null P independently increases difficulty for the speaker, which might account for the lower naturalness of *čto*clauses at least in some PP/oblique positions (see section 3.1). Note, however, that this difficulty should totally disappear with frequent predicates like *nadejat'sja* 'hope' in (1a), where *čto*-clauses sound perfectly natural. Given that restructuring collocations are also more frequent (see Tab. 1), this raises the possibility of an alternative

¹⁸ A question that remains under the proposed account is why violations of the collocational restriction are sometimes moderately acceptable. One possibility is that *čto*-clause complements of nouns that are true arguments can still in certain cases be exceptionally parsed as appositive modifiers (see footnote 1) and thus obviate the licensing requirement in (9). I leave this question for future research.



explanation of the observed interaction effect (i.e. processing difficulty is somehow alleviated by repeated exposure).¹⁹

Fig. 2: By-item interaction plots

4 Conclusion

In this paper, I discussed the restriction of *čto*-clause complements of nouns to restructuring N-V collocations (previously proposed in Knyazev 2016). I presented the results of an experimental study that used a 2×2 factorial definition of the restriction in terms of the complement type and the context type. The results showed a significant interaction indicating that the choice of a *čto*-clause (as opposed to a *to,čto*-clause) has a reliably stronger lowering effect on acceptability in the non-restructuring

¹⁹ An alternative is to postulate *deletion* of overt P/oblique case instead of *insertion* of null P. The observed effects could then follow from some kind of weak/violable principle of recoverability of deletion (cf. Pesetsky 1998) along similar lines.

contexts. These results provide support for the formal licensing requirement on *čto*-clauses proposed earlier although further studies are needed to eliminate alternative explanations.

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Appendix: Experimental Item Sets with Raw Mean Ratings

1a–b. Èkspert privel dokazatel'stva (togo), čto kartina poddel'naja. 3.02 (4.96) 1c–d. Èkspert privel svoi dokazatel'stva (togo), čto kartina poddel'naja. 3.05 (4.60) 2a–b. Sudu nužny dokazatel'stva (togo), čto oni rodstvenniki. 3.43 (4.94)

- 2c-d. Sudu nužny ee dokazatel'stva (togo), čto oni rodstvenniki. 2.49 (3.83)
- 3a-b. Genštab predstavil dokazateľstva (togo), čto samolet peresek granicu.3.27 (4.85)
- 3c–d. Genštab predstavil neskol'ko dokazatel'stv (togo), čto samolet peresek granicu. 2.37 (4.93)
- 4a-b. Pojavilis' dokazatel'stva (togo), čto èta vakcina očen' èffektivna. 3.53 (4.85)
- 4c–d. Bol'šinstvo ljudej ignorirujut dokazatel'stva (togo), čto èta vakcina očen' èffektivna. 2.74 (4.82)
- 5a–b. Est' bol'šaja verojatnost' (togo), čto trener v ètom godu zakončit kar'eru. 4.03 (4.85)
- 5c-d. Oni obsuždali verojatnosť (togo), čto trener v sledujušxem godu zakončit kar'eru. 1.85 (4.84)
- 6a–b. Velika verojatnosť (togo), čto novyj zakon vyzovet protest naselenija. 4.34 (4.94)
- 6c–d. Verojatnosť (togo), čto novyj zakon vyzovet protest naselenija, očen' velika. 4.17 (4.97)
- 7a-b. U nego pojavilis' somnenija (v tom), čto vložennye den'gi okupjatsja. 4.46 (4.82)
- 7c–d. Ėto usililo ego somnenija (v tom), čto vložennye den'gi okupjatsja. 2.77 (4.74)
- 8a–b. On vyskazal somnenie (v tom), čto institut polučit finansirovanie. 3.18 (4.29)
- 8c–d. On vyskazal svoe somnenie (v tom), čto institut polučit finansirovanie. 2.40 (4.46)
- 9a-b. Politik vyrazil uverennosť (v tom), čto problema budet rešena. 3.22 (4.79)
- 9c-d Politik vyrazil svoju uverennosť (v tom), čto problema budet rešena. 2.98 (4.97)
- 10a–b. U nego pojavilas' uverennost' (v tom), čto situacija izmenitsja k lučšemu. 4.06 (4.97)
- 10c–d. Ja ne razdeljaju ego uverennosť (v tom), čto situacija izmenitsja k lučšemu. 3.26 (4.93)
- 11a-b. Oni pitajut nadeždu (na to), čto storony pridut k soglašeniju. 3.61 (4.18)
- 11c–d. Èto podpityvaet ix nadeždu (na to), čto storony pridut k soglašeniju. 2.95 (4.74)

12a-b. Éti slova vselili v nee nadeždu (na to), čto on skoro vyzdoroveet. 4.35

(4.88) 12c–d. Ėti slova usilili ee nadeždu (na to), čto on skoro vyzdoroveet. 3.22 (4.60)
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Inferential Language in Russian Children with Autism: Mental State Verbs and Their Degrees of Certainty

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1 Introduction

Mental state verbs primarily refer to beliefs and desires of self and others being substantial to Theory of Mind (ToM). Even though some of these verbs are witnessed in the productive speech of 2-year-olds, typically developing children commonly begin to differentiate between the truth and false value of their complements only after the age of 4 years (Bartsch & Wellman 1995; de Villers, 2007). Impaired ability to build inferences based on other people's mental states is considered one of the hallmark features of autism spectrum disorder (Baron-Cohen et al., 1985). However, very little is known about this ability in autistic children once we apply a paradigm other than a classic false-belief task. The present study explored whether high-functioning children with autism can process complex sentences with different mental state verbs and correctly form inferences about the truth/false/uncertainty value of their complement clauses in a sentence-picture-matching task. This particular approach allows for a paradigm where each participant is not asked to predict the protagonist's behavior based on his/her mental state, but to judge whether this mental state entails truth about reality.

1.1 What Are Mental States and How Do We Attribute Them?

The question of how we read the minds of others without any direct access has a long history. Each of us may admit that X can look like Y, knowing that it is still X and, at the same time, pretend that X is P

(Dennett, 1987). All of these ways are possible representations of a single object in one's mind. Interpersonally, people may interpret things differently due to divergent concepts, experiences and sensations. Our everyday conversations are filled with mental state terms expressing propositional attitudes that often exhibit great complexity, because they refer to phenomena we cannot feel, see or touch. We can infer their meanings and presence in others only by looking at certain behaviors in a relevant context.

In 1980s researchers made first attempts to gain a better understanding of how young children become capable of reading mental states of others and predicting their actions based on these mental states (Bartsch & Wellman, 1989; Perner et al., 1987; Perner & Wimmer, 1986; Wimmer & Perner, 1983). The first mention of the *theory of mind* (ToM) belongs to Premack and Woodruff (1978), and it was initially tested on chimpanzees to see if they can deceive their keeper. The authors attempted to find whether an ability to impute mental states (i.e., desires and beliefs) of self and others using them to understand and predict various intentions and behaviors is special to humans. A decade after, Leslie (1987) presented a model of cognitive mechanism behind the pretend play in young children. According to his "decoupling theory", maturation of shared pretend play between a mother and a child is an important prerequisite for the early formation of social interactions and comprehension of mental states.

By that time four major tests were developed and have been widely used to the present day. These tests include: *Maxi* task (Wimmer & Perner, 1983), *Smarties* task (Perner et al., 1987), *Sally-Anne* false-belief test (Baron-Cohen et al., 1985), and *Second order* false-belief test (Perner & Wimmer, 1986). The principle element laid in the core of all the above-mentioned tasks tests a participant's ability to predict the actions of a character who becomes a holder of false belief. In the case of *Sally-Anne* false-belief test, a child sees two different dolls, Sally and Anne, and a piece of marble which Sally hides inside her basket. When Sally leaves the scene, Anne relocates Sally's piece of marble into a box. When Sally comes back, a participant is asked to predict where Sally will be looking for her marble. In such a way, Sally becomes a holder of false belief because she hasn't seen what happened to her marble while she was away. The remaining tests are composed by applying this same principle of false belief to various scenarios. Critically, to pass the ToM tests successfully, a child needs to acquire mental state verbs (e.g. *know, think, pretend, remember, believe*).

Even though typically developing children begin to produce mental state verbs from the 3rd year of their life, this usage is of rudimentary and self-referential nature (Bretherton & Beeghly 1982; Shatz et al., 1983). The results of the earliest theory-of-mind studies indicated that 3-year-old children could not grasp the concept of false belief (Perner et al., 1987). The ability to read other people's mental states by means of dissociation from one's own state is almost fully developed in children between 3 and 5 years of age (Leslie & Frith, 1988; Moore et al., 1990; Perner et al., 1989). Coincidentally, around the same age children are reported to acquire propositional complement clauses (Villiers & Roeper, 2016).

1.2 Can ToM Deficit Be Attributed Specifically to Autism?

Autism spectrum disorder (ASD) is a very complex multimodal diagnosis involving the triad of impairments (Wing, 1988). Impaired socialization, communication and imagination are considered defining and universal aspects of ASD to the present day. These conditions equally affect language acquisition and its further development. Language profiles across the spectrum range from mute and severely echolalic children to extremely fluent high-functioning children at the other end of the spectrum commonly diagnosed with pragmatic language *impairment*. The high-functioning part of the spectrum also shows delay in receptive and expressive language, unlike infants diagnosed with Asperger's syndrome (Weismer et al., 2010). Further research in this area proved that observed echolalia is intentional and not automatic; that morphosyntactic development is delayed, but not deviant; that language impairment greatly manifests itself at semantic and pragmatic levels only (Ambridge et al., 2015; Dennis et al., 2001; Tager-Flusberg, 1981a, 1981b). In other words, autistic children have considerable difficulties making inferences from feelings and thoughts of others, consequently understanding only literal aspects of language. The absence of pretence in children with autism is striking (Baron-Cohen, 1987; Happé 1994; Wing et al., 1977). Not less striking is the evidence for preserved development of pretence in children with other forms of mental retardation, such as Down's syndrome (Hill & McCune-Nicolich, 1981).

The question of whether autistic children have ToM was partially answered by Baron-Cohen et al. (1985). The researchers tested 20 children diagnosed with ASD (mean age of 11;11 years) and 14 children with Down's syndrome (mean age of 10;11years). The obtained results were striking, with 80% of autistic children failing the task and 86% of children with Down's syndrome successfully passing it. Happé (1995) conducted a meta-analysis of 27 studies from 1985 to 1993 that included data from 70 participants with autism, 34 mentally handicapped participants and 70 typically developing controls. Happé reported that at the verbal mental age of 4 years, typically developing children reached 50% probability of successfully passing false-belief tests, but it took more than twice as long (mean age of 9 years) for ASD children to reach similar probability level.

Bartsch and Wellman (1989) eliminated prediction from a usual false-belief paradigm by giving 3- and 4-year-old typically developing children the whole story and asking them to interpret characters' actions based on their false beliefs (e.g. "Here's Andrew. Andrew is going to the drugstore. The drugstore does not sell balloons. But Andrew is going to the drugstore to buy a balloon. Why do you think Andrew is doing that?"). Consequently, 53% of 3-year-olds initially mentioned false belief in their spontaneous unprompted explanations. Bartsch and Wellman (1989:959) concluded that "3-year-olds can explain actions via false belief although fail to correctly predict actions based on false beliefs".

Grant et al. (2004) similarly observed that actual difficulties associated with the concept of false belief were found in autistic children mainly when they were asked to predict the protagonist's behavior, but not when they had to explain it. This finding is remarkably important because it suggests that it might be not the reading of mental states that is problematic for these children, but the prediction framework of falsebelief tests. To gain a deeper understanding of ToM deficit commonly observed in children with autism, it appears necessary to decompose the whole framework of false-belief tasks into smaller units, such as mental state verbs.

1.3 Mental State Verbs as the Smaller Units of a Bigger Theory

All the communicative situations and social codes shared by people universally are inferred from words we use every day to express our propositional attitudes in various social contexts. In this regard, it is important to understand that mental states are complement taking. This means that such verb as '*think*' is always tied up to context. Furthermore, if we say '*she thinks that the weather is sunny today*', we cannot determine the truth value of the complement clause because the verb '*think*' represents an inner isolated state not presupposing anything. Even if the forecast tells us that the entire month is going to be rainy and dreadful, she can still '*think*' anything. In that sense, we can conclude that "mental states are not reflections of the way the world is, but are representations of it. That is to say, they can stand in true or false relation to reality" (Bowler, 2007: 30). Consequently, to pass false-belief tests, a child needs to understand the concept of misrepresentation conveyed by the meaning of factive and non-factive verbs.

Historically, the term *factive predicate* was introduced by Kiparsky and Kiparsky (1970) and applied to a group of verbs such as '*know*', '*regret*', '*forget*' that entail the truth of their complements. Non-factive verbs, such as '*think*', '*hope*', '*believe*', do not presuppose any truth value of their complement sentences. The distinction between factivity and non-factivity is not only restricted to *that*-clauses, but can also occur with infinitival clauses after adjectives, such as '*sorry*', '*happy*', '*proud*', '*lucky*', that also presuppose the truth value of their complements. Linguists classify predicate as factive if it not only entails, but also presupposes the truth of its complement even when manipulated (Karttunen, 1971). Let us consider example (1) below:

- (1) a. Alex knows that it's raining outside. Alex doesn't know that it's raining outside. Does Alex know that it's raining outside? If Alex knows that it's raining outside he will take an umbrella.
 - b. Alex thinks that it's raining outside.
 Alex doesn't think that it's raining outside.
 Does Alex think that it's raining outside?
 If Alex thinks that it's raining outside he will take an umbrella.

In (1a), all sentences presuppose that 'it is raining outside'. In (1b), the non-factive verb '*think*' does not convey the truth of its complements in any of the sentences. Each mental verb or an adjective (e.g., *think*,

believe, is happy) primarily refers only to agent and his/her relation to reality.

Several language acquisition studies found that preschoolers can differentiate between the degrees of certainty of most frequently used mental state verbs from 4 years of age (Bartsch & Wellman 1995; de Villers, 2007). However, Abbeduto and Rosenberg (1985) went further and compared two groups of 3- and 4-year-old children with a 7-year-old group and adults on a story-telling paradigm and a verb-choice task. They asked their participants to provide presuppositions and definitions of mental state verbs in isolation. The authors included five verbs, namely '*think*', '*know*', '*forget*', '*remember*', and '*believe*'.

Their results demonstrated that performance positively correlated with age. Factive verbs were easier across all ages as opposed to the nonfactive verbs 'think' and 'believe'. The results also indicated that after the age of 4 years, children were aware that 'think' doesn't presuppose the truth of its sentential complements. Interestingly, the non-factive quality of the verb 'believe' was correctly understood only by the adults, all the other groups acted as if it was factive. The group of 7-year-olds treated the verb 'believe' as a non- factive one only when it was contrasted with the verb 'know'. Abbeduto and Rosenberg (1985:640) concluded that "multiple measures of linguistic knowledge" are crucial in learning to differentiate factives from non-factives. False belief-tasks are more difficult only because the beliefs tested are the false ones. According to the observed developmental trajectory, infants initially acquire desires followed by beliefs and only then, after 4 years of age, children start to understand the concept of false belief (Wellman & Lui, 2004).

2 Goals of the Present Study

Even though a general number of studies on ToM and mental state verbs in productive and receptive language of autistic children is impressive, there are very few experiments that were designed to specifically look at their ability to differentiate between factivity and non-factivity of these verbs. Firstly, these studies included a small number of verbs, namely 'know', 'think' and 'guess' (Tager-Flusberg et al.,1995; Ziatas et al.,1998). Secondly, the major goal of these studies was to reveal a link between lexical knowledge of speaker's certainty denoted by these mental state verbs and development of ToM. Tager-Flusberg et al. (1995) concluded that in children with ASD comprehension of false belief and semantic knowledge of mental state verbs develop in parallel. Contrastingly, Ziatas et al. (1998: 762) concluded that ToM outpaces "belief term development". Both claims contradict previously discussed findings by Happé (1995) who argued that ToM development significantly depends on a greater verbal ability in children with autism.

Dennis et al. (2001) specifically introduced presupposition and implication of truth value conveyed by mental state verbs in their study with autistic children. Mental state verbs used in the presupposition task were organized into factive and non-factive groups (e.g., *think* vs. *know*). In the implication part of the study, the authors used implicative and nonimplicative verbs (e.g., managed vs. wanted) that expressed truth or false value of their complements. All children had to listen to 12 sentences with factive verbs (e.g., know, realize, is sorry, is happy) and 3 with nonfactive ones (e.g., *thought*), and afterwards they were asked to judge on the truth or false value of their sentential complements (e.g., "If Karen knows that the door is shut, is it shut?"). Similarly, the implication task comprised 12 sentences with implicative verbs (e.g., remember, manage, forgot, is careful) and 3 with non-implicative ones (e.g., want). Children responded with 'yes', 'no' or 'maybe' to different sentences with matrix verb being either affirmative (e.g., thought) or negative, both semantically (e.g., forget) and grammatically (e.g., didn't know). The results indicated that children with ASD are able to make some but not all the inferences correctly. However, they were much less successful in pragmatic inferences that involved implication but not presupposition.

The present study poses the important question of whether children with ASD can think about thoughts and beliefs of others and judge on truth or false value of these beliefs. This study differs from previously discussed literature due to a larger set of mental state verbs and presence of justification part allowing to exclude any random responses. In compliance with previous studies (Dennis et al., 2001), I predict that high-functioning children with autism and Asperger's syndrome will succeed in making some but not all the inferences correctly, demonstrating significantly lower level of performance in terms of accuracy and justification of their choices in comparison with typically developing children. I also predict that factive verbs will cause less errors than non-factive verbs, as seen from previously discussed developmental trajectory observed in typically developing children (Abbeduto & Rosenberg, 1985; Bartsch & Wellman 1989; de Villers, 2007) and in children with autism (Li et al., 2013).

3 Method

3.1 Participants

Thirty-five children ranging from 9 to 15 years of age took part in the current study. The sample included 15 children with high-functioning autism and Asperger's syndrome and 20 typically developing children in the control group. All the participants were recruited from three public schools with inclusive education project in Moscow (Russia). All the participants diagnosed with ASD received a prior diagnosis of autism or Asperger's syndrome based on current guidelines from *International Classification of Diseases* (10th ed; ICD-10; World Health Organization, 1992). It is important to clarify that all of them have attended preschools and currently have tutors who are constantly working with them after classes. Presently, all of these children are successfully mainstreamed, and their educational level is at par with their typically developing classmates.

Group	TD	ASD
Ν	20	15
female/male	11 female/9 male	1 female/14 male
M (age in years)	9;9 (<i>SD</i> =0.3)	11 (<i>SD</i> =1.8)
range	9;0 to 10;8	9;3 to 14;7
	RSPM*	
M (IQ score)	109 (<i>SD</i> =11.7)	109.8 (SD=7.3)
	MAIN**	
M (VIQ in %)	64.8 (SD=7.02)	64.6 (SD=9.4)

*RSPM- Raven's Standard Progressive Matrices

**MAIN - Multilingual Assessment Instrument for Narratives

Table 1. Group characteristics (number of participants in each group (*N*), gender, mean age in years, mean IQ score, mean verbal IQ score in %).

All the participants were matched on fluid IQ and verbal ability. The

children's intellectual ability was assessed through administration of Raven's Standard Progressive Matrices (Raven, 2000). Their verbal ability was assessed with *Multilingual Assessment Instrument for Narratives* (MAIN, Gagarina et al., 2012). All parents have signed the informed consent. Complete demographic characteristics for both groups are presented in Table 1.

3.2 Materials and Design

The materials comprised 32 original black-and-white illustrations depicting various characters who have either accomplished certain actions or are only thinking, dreaming, willing or hoping for certain events to happen. This approach allowed for conveying factive and non-factive qualities of mental state verbs in the main clause.

Each picture was presented with two similar written sentences in Russian. The only difference was the mental state verb itself: factive in one condition (e.g., *know, remember, is happy*) and non-factive (e.g., *think, hope, believe*) in the other. Each picture illustrated either a truth/ false or uncertainty value of an event described in a complement clause of every sentence. The 32 sentences matched to pictures were organized in 16 pairs centered around various mental state verbs. Each sentence was a complex one with a main clause and a complement clause. The verb in the main clause was either semantically negative (e.g., *was sorry*), grammatically negative (e.g., *did not know*), or semantically affirmative (e.g., *remember*). Each sentential pair shared similar complements, as can be seen in Figure 1.

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Figure 1: Examples of non-factive and factive conditions.

The list of mental state verbs comprised 25 original verbs, 7 of which were used twice but always in different sentential pairs. If a particular verb was already used in the affirmative form, the second time it appeared only in a different sentential pair in the negative form. This list included various types of predicates: cognitive (e.g., *know; think; believe*), perceptual (e.g., *see; seem*), emotional (e.g., *is sorry; is pleased*), and implicative (e.g., *remember; forget*). The main inclusion criteria for a particular verb was its factivity or non-factivity that implies the quality to presuppose the truth/uncertainty value of its complements.

The 32 pictures were split into two blocks in order to avoid repetition of the same sentential pair in both conditions. Within each block, the sentences with different mental state verbs were randomized in such a way that one picture was presented in the first block of 16, and another picture from the same pair was presented in the second one. All the pictures were pseudo randomized so as to exclude any prompting or logically predictable order of the two conditions. The condition (i.e., factive/non-factive) was an independent variable. It was manipulated as within-participants in such a way, that one picture (i.e., factive/nonfactive) was always presented with two sentences (i.e., a sentence with *factive verb* and a sentence with *non-factive verb*) from one pair (see Figure 2).

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NON-FACTIVE CONDITION



Figure 2: Example of a single stimulus in non-factive condition.

3.3 Procedure

Every child was tested individually in a separate quiet classroom. All pictures and sentences were printed on cardboard cards. A single stimulus consisted of 3 cards (i.e., one picture, sentence a, and sentence b). The participant's task was to match the picture with one of the two sentences, a or b. Each time a participant saw only one card with a picture. While looking at the picture she/he was always asked to describe it. This clarified whether a participant correctly understood what was illustrated on each card. Once the correct answer was obtained, a child was shown two similar sentences written on two different cards. At this point, she/he was asked to read both sentences and pick only one, which she/he thought matched the picture best. Once the choice was made, each participant was asked a justification question (i.e., "Why do you think that this sentence is the relevant one?"/ "Почему ты выбрал именно это предложение?"). During the experiment, participants' spoken responses were audio recorded for the further analysis. The entire testing procedure lasted approximately 15-25 minutes.

3.4 Coding

The measures of interest were the accuracy in selecting a sentence that matched the picture and justification of participants' responses as a result of their inferential ability. Mean accuracy and justification scores were calculated as a factor of the condition (i.e., factive vs. non-factive). The answers were coded as "1" for a correct match of the sentence to the picture and "0" for an error. The same method was used for the justification part; when the explanation was relevant to the actual meaning of the verb and condition illustrated in each picture, the response was coded as "1". In case the justification was inadequate or absent, the response was coded as "0".

4 Results

The mean scores for the correct responses for both accuracy and justification are presented in Table 2. The target ASD group had 90% of correct responses in the sentence-picture-matching task, but was less able to justify their choices, averaging only 79%. Typically developing children scored equally (98%) for both making choices and justifying them.

TD	ASD		
ACCURACY			
31.5 (<i>SD</i> =0.8)	28.8 (<i>SD</i> =3.7)		
98%	90%		
0.4 (<i>SD</i> =0.7)	1.6 (<i>SD</i> =1.9)		
0.1 (SD=0.3)	1.5 (<i>SD</i> =2)		
JUSTIFICATION			
31.4 (<i>SD</i> =0.9)	25.3 (<i>SD</i> =8.7)		
98%	7 9%		
0.45 (SD=0.8)	3.4 (<i>SD</i> =4.2)		
0.1 (SD=0.3)	3.2 (<i>SD</i> =4.6)		
	TD 31.5 (SD=0.8) 98% 0.4 (SD=0.7) 0.1 (SD=0.3) 31.4 (SD=0.9) 98% 0.45 (SD=0.8) 0.1 (SD=0.3)		

Table 2. Group means and SDs of correct responses and errors for accuracy and justification of responses.

The statistical analysis of accuracy and justification scores was conducted with a *Generalized Linear Mixed Model* (GLMM), a mixed-effects version of logistic regression models (*lme4* in R) for binary data

with non-normal binomial distribution (Quene & van den Bergh, 2008). Age, group type (i.e., TD vs. ASD) and condition (i.e., factive vs. nonfactive) were included in the model as fixed factors, whereas participants and items (i.e., verbs) represented random factors. This model allowed to analyse which factors affected the overall accuracy and justification, whilst looking for differences between the groups.

The results revealed a significant difference between the groups' performance in both accuracy (Pr(>|z|)=.00123, p<.01) and justification (Pr(>|z|)=.000166, p<.001) scores. Typically developing children had more correct responses and were able to adequately justify their choices most of the time. The ASD group had greater difficulty in making inferences from mental state verbs, with the lowest performance in the justification part of the experiment. This significance was caused by the vast variability within the autistic group expressed in large *SD*s, with 5 out of the 15 participants in the ASD group demonstrating ceiling performance in both accuracy and justification scoring. However, the overall tendency revealed multiple gaps in general knowledge about the meaning of mental state verbs among children with ASD.

The condition and age variation didn't affect the overall performance in either accuracy or justification. The participants made approximately equal number of errors in their inferences from both factive and nonfactive verbs.

Finally, in the course of the experiment, 5 children in the ASD group demonstrated strong sensitivity towards facial expressions of characters illustrated in the pictures. These participants often named a particular mental/emotional state of a character using it to justify their choices (e.g., *"Look at her face! She is sad because she has broken her mom's vase"*). Coincidentally, these particular children demonstrated the highest level of performance in the target ASD group.

5 Discussion

The present results support the major assumption that children with ASD are able to make some but not all the inferences from mental state verbs correctly. These findings also reveal substantial difficulties in the autistic group concerned with their ability to give explanations for their own verb choices with 79% of correct responses in the justification part. Surprisingly, their performance was not affected by the condition.

Children with ASD made approximately equal number of errors in both factive and non-factive conditions. This outcome seems especially interesting because it contradicts the results of previously discussed studies in which non-factive verbs appeared to be of greater complexity in comparison with factive verbs for children with and without autism (Abbeduto & Rosenberg, 1985; Bartsch & Wellman 1989; de Villers, 2007; Li et al., 2013).

The control group demonstrated ceiling performance (98%) in accuracy of their verb choices and ability to give relevant explanations. As expected, typically developing children demonstrated correspondence between both accuracy and justification scores in such a way that they failed to give proper explanations only for the incorrect verb choices. Contrastingly, the ASD group often could not give adequate explanations for their correct verb choices demonstrating a lack of semantic knowledge.

It is worth mentioning that 7 out of 32 pictures represented scenarios in which various characters were the holders of false belief. Naturally, all 7 conditions were non-factive (see Figure 1, non-factive condition). Since the average scores for accuracy and justification in all of the 7 false-belief pairs were even higher than for the remaining non-falsebelief 9 items in the target ASD group, it can be concluded that children with autism made errors predominantly due to poor semantic knowledge of mental state verbs.

Even though all the participants were controlled for verbal and intellectual abilities, the manifested significance in groups' differences was obtained only due to large variability in the target group. As mentioned earlier, 5 out of 15 children in the ASD group demonstrated ceiling performance (100%) in both accuracy of their choices and ability to properly justify them. These 5 children constantly paid attention to facial expressions of characters illustrated in the pictures and always referred to characters' emotional states in the justification part. This particular observation points at two different types of strategies employed by the target group. For some children, facial expressions served as an additional cue while others applied only their semantic knowledge of mental state verbs in a given context.

This variability in the target group can be caused by differences in developmental trajectories partially driven by environmental factors, interaction with family members at home, and intensity of educational process. The overall results prove that children diagnosed with ASD can build some inferences and learn to differentiate between various degrees of certainty implied by some mental state verbs. Typically developing children acquire and effortlessly produce non-factive verbs after 4 years of age. This coincides with acquired concept of false belief, as it was previously discussed. Children with ASD are delayed on the same developmental trajectory and need considerably more years to grasp the concept of false belief; therefore, by the age of 9 years they might have difficulties only with specific verbs, regardless of whether these verbs are factive or non-factive.

6 Conclusion

The present study explored whether high-functioning children with ASD can differentiate between various degrees of certainty in the meaning of factive and non-factive mental state verbs and build inferences about the truth/false/uncertainty value of their sentential complements. The primary assumption that autistic children will be able to make some but not all the inferences correctly found evidence and was supported by the results of this study. The second prediction was centred around factive and non-factive conditions of the experiment with the latter expected to cause more errors in the target group. However, the condition didn't anyhow affect the overall performance in both groups. Finally, as mentioned earlier, the justification part of the study revealed that the errors in the ASD group mainly occurred due to a lack of semantic knowledge of certain mental state verbs rather than due to theory-of-mind issues.

In further research, the emphasis should be made on attempts to outline developmental trajectory associated with acquisition of mental state verbs in children with autism and Asperger's syndrome. This can only be achieved by shifting our focus from false belief tasks to longitudinal studies looking at early production and comprehension of mental state verbs in spontaneous speech of these children. The question of whether ToM development facilitates semantic knowledge of mental state verbs or vice versa is still a matter of discussion. What we need to know is which particular environmental factors in everyday lives of autistic children can be critical for acquisition of mental state verbs and inferential ability.

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Cross-application of word order and prosody in the expression of contrastive focus in Russian

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This study examines the differential effects of prosodic augmentation of contrastive foci in Russian in canonically-ordered SVO sentences and noncanonically ordered OVS sentences during auditory sentence comprehension. Results of a lexical probe recognition task completed by linguistically-naïve native speakers of Russian are reported. Consistent with prior work by Slioussar (2011), this study finds that native Russian speakers take significantly longer to identify a lexical probe matching a pre-verbal focused object or a post-verbal focused subject. The cross-application of the non-canonical constituent order and prosodic augmentation of the focused noun facilitates subsequent recognition of a matching lexical probe only when the focused noun aligns with the nuclear pitch accented phrase-final position, which serves as a natural prominence landing site in Russian. The limited nature of the observed facilitative effect supports that dislocation of the main phrasal prominence is akin to word order dislocation in that it incurs added computational costs during auditory sentence comprehension.

1 Introduction

Focus placement in a sentence can be inferred based on a number of cues. including acoustic-prosodic expression of the focused constituent and its position relative to other constituents in a In head-initial sentence. languages, by default. the most constituent in a clause (typically, the object) is embedded interpreted as focused and also receives the

nuclear pitch accent (Chomsky and Halle 1968). When a different constituent is in focus, a marked structure with a shifted location of the focused word or a shifted location of the nuclear pitch accent is used. As a result, the inference of focus based on the surface constituent order is largely analogical to the post-grammatical inference of focus on the basis of the nuclear stress placement.

Word order variability is generally limited to morphologically rich languages where it may be used to express focal or topical status of discourse entities and signal their information status and relative perceived prominence (e.g., Donati and Nespor 2003). Whereas prosodic augmentation, via pitch accenting, is also commonly associated with focus and leads to a more accurate recall of the information relayed by the accented word (Fraundorf, Watson, and Benjamin 2010), in a number of free word order languages, augmenting prosodic expression of an ex-situ focused constituent is not felicitous (e.g., Italian, see Swerts, Krahmer, Avesani 2002). Psycholinguistic literature reports that processing and production of non-canonical orders is context-restricted and resourceintensive, which is why it is often associated with greater reading times and disfluencies in sentence repetition tasks (Kaiser and Trueswell 2004; Sekerina 2003). Arguably, computational costs associated with constituent reordering may be what precludes speakers from expressing focus by prosodic means once a change in constituent order has applied.

Less consensus is available regarding the cognitive costs associated with prosodic marking of focus. While Skopeteas and Fanselow (2010) consider acoustic-prosodic means to be more economical than constituent ordering from the cognitive standpoint, Reinhart (2006) and Neeleman and Titov (2009), argue that observing canonical stress placement in a given language, just like observing canonical constituent order, is strongly preferred. What it means is that listeners are implicitly aware of the preferred location of the main phrasal prominence as specified by the Nuclear Stress Rule (NSR), and that dislocating/shifting the nuclear pitch accent to a non-NSR specified location to cue focus presents a violation of the canonical prosodic structure, thereby incurring added computational costs (Calhoun 2010). An interesting empirical puzzle, then, is presented by languages in which contrastively focused constituents feature augmented acoustic-prosodic expression independently of their position in a sentence or clause. In the absence of prior experimental work it is unclear whether positioning a focused constituent ex-situ and augmenting its

prosodic expression observed in Georgian, Greek, Finnish, Hindi, and Russian, (Baltazani 2003; Luchkina and Cole 2016; Patil, Kentner, Gollard, Kügler, Féry, Vasishth 2008; Skopeteas, Féry and Asatiani 2009; Vainio and Järvikivi 2006) results in a yet greater processing load for the listener or, on the contrary, mitigates the word order effect while reinforcing the special pragmatic status of the focused constituent. In this study, this issue is explored for Russian, a highly free word order language.

This study asks, first, how a change in word order affects acousticprosodic expression of a nominal (focused) constituent in Russian. To this end, dynamic changes in the magnitude of acoustic parameters known to jointly contribute to the acoustic-prosodic expression of focus in spontaneous and read speech are investigated. Second, this study asks whether augmented prosodic expression of the focused noun (subject or object) in the non-canonical OVS order is deployed by listeners during auditory comprehension of read discourse and facilitates the subsequent recognition of that noun. Experimental results reveal that listeners have robust expectations about the default order of sentence constituents as well as the default placement of the main phrasal prominence. Discourse conditioned violations of these expectations, admissible in free word order languages like Russian, incur added processing costs, as evident from greater latencies associated with subsequent recognition of the focused word.

2 Expression of Contrastive Focus in Russian

2.1 Acoustic-prosodic Expression

In Russian, the Nuclear Stress Rule aligns the main phrasal prominence, known as the nuclear pitch accent, with the rightmost prosodic phrase boundary. Under the canonical SVO constituent order, the default placement of the nuclear pitch accent coincides with the most embedded sentence constituent, which is the sentence object. Russian exhibits prosodic effects of referent information status in patterns of pitch-accenting. Typically, this involves accenting of novel or contrastively focused information and deaccenting of given information (Jasinskaja 2013; Neeleman and Titov 2009). Just like in English, location of the nuclear pitch accent is variable and aligns with the focused constituent in the clause.

Acoustic-prosodic augmentation in relation to relative perceived information prominence is particularly robust as a cue to contrastive foci in Russian (Bryzgunova 1980; Svetozarova 1998). The notion of focus adopted in this work is informed by the discussion offered in Krifka (2007). Krifka follows Rooth (1985, 1992) in saying that "Focus indicates the presence of alternatives that are relevant for the interpretation of linguistic expression" (p.18). Furthermore, the set of alternatives necessary for the interpretation of contrastive focus (closed focus, in Krifka's terms), which is of particular relevance for this study, is limited (see (1) and (2) below). Wagner, Breen, Flemming, Shattuck-Hufnagel, and Gibson (2010) and Fraundorf et al. (2010) convincingly argue that contrastive foci weigh the most on the information prominence scale, cross-linguistically, as is often evident from recognizable accenting patterns and faster subsequent recall characteristic of contrastively focused information. In Russian, contrastive focus intonation contour described by Svetozarova (1998) includes a rise in the fundamental frequency aligned with the stressed syllable, followed by a sharp fall. This contour is observed regardless of the position of the focused word (Botinis, Nikolaenkova and Themistocleous 2005; Svetozarova 1998), potentially variable due to flexible linear order of sentence constituents, to which we turn next.

2.2 Constituent Ordering and Interaction with Acoustic-prosodic Expression

Russian is known as a highly free word order language. The six possible word orders are SVO (canonical), OVS, SOV, OSV, VSO, and VOS. This study adopts a view of discourse-motivated word order variability, whereby an interpretative license (Titov 2017) is required for non-canonical orders to be produced. Consistent with this view, the ordering of constituents in a sentence serves a pragmatic function (Kallestinova 2007; Slioussar 2010, 2011): while all word order permutations are propositionally equivalent, when used in discourse, they differ in pragmatic meaning. Not surprisingly, information status of words in discourse bears an association with designated clausal positions (Brun 2001; King 1995). While the default (pragmatically neutral) pattern is for new information foci to occur clause-finally, contrastive foci may surface in various positions or remain in-situ. Consider the following example, in which the sentence in (1a) can be

continued with the canonically ordered sentence in (1b) or the noncanonical OVS order in (1c):

- (1) a. In the evenings, the girls listen to the news, and only on the weekends to music or audiobooks. But this Wednesday something went amiss.
 - b. Smotri! Devochki slushayut MUZYKU segodnya vecherom look girls_{NOM} listen to_{3PL} music_{ACC} tonight
 - c. Smotri! Segondya vecherom MUZYKU slushayut devochki look tonight musuc_{ACC} listen to_{3PL} girls_{NOM} 'Look! Tonight, the girls are listening to music.'

In (1b), the focused object noun "muzyku" is adjacent to a prosodic phrase boundary and nuclear pitch-accented. In the non-canonical OVS continuation shown in (1c), "muzyku" appears preverbally, where it is structurally prominent, and where its contrastive interpretation may be further reinforced by means of prosodic accenting. In the latter case, (1c) presents an instance of constituent dislocation concurrent with the dislocation of the main phrasal prominence also known as stress shift (Calhoun 2010). In a similar vein, example (2) demonstrates a context consistent with the contrastive reading of the subject noun "devochki":

- (2) a. In the evenings, girls listen to audiobooks, boys to music, and their parents to the news. But tonight something went amiss.
 - b. Smotri! Segodnya vecherom DEVOCHKI slushayut muzyku look tonight girls_{NOM} listen to_{3PL} music_{ACC}
 - c. Smotri! Myzyku slushayut DEVOCHKI segondya vecherom look musuc_{ACC} listen to_{3PL} girls_{NOM} tonight 'Look! Tonight, the girls are listening to music.'

Extant literature on Russian does not discriminate between in- and ex-situ contrastive foci. Botinis et al. (2005), Bryzgunova (1980), and Titov (2012) argue that intonation properties associated with contrastive focus are independent of the clausal position of the focused constituent.

To summarize, in Russian, the focal status of a sentence constituent presents an interpretative license for its dislocation (Jasinskaya 2013; Slioussar 2011; Titov 2017). A compelling extra-linguistic motivation for

such licensing relations, arguably, is optimization of discourse content for the parser and better retention of focused information.

2.2.1 Considerations of Cognitive Economy. Albeit its convenient functionality, altering constituent order in Russian is strictly optional and accounts for a relatively small proportion of mostly spoken utterances (Zybatow 1997). A well-known explanation for such limited application of word order variability concerns a relatively greater computational load associated with production and perception of non-canonical orders. A number of psycholinguistic studies focusing on the processing aspects of word order have reported greater reading and processing times associated with non-canonical orders, cross-linguistically (see, among others, Clahsen and Fetherston 1999 and Kaiser and Trueswell 2004). Slioussar (2011) reported a significant increase in silent reading times for non-SVO sentences in Russian, possibly, due to more complex derivation of the non-canonical orders.

The OVS constituent order displayed in (1c) and (2c) is considered the most common non-canonical word order in Russian (Sirotinina 1965), possibly because it is compatible with more than one information structural configuration, including the following:

- (a) Topicalized object noun and discourse-new subject noun
- (b) Contrastively focused object noun and discourse-given subject noun (see example (1c))
- (c) Topicalized object noun and contrastively focused subject noun (see example (2c))

This study is concerned with the information structural configurations schematized in (b) and (c) and illustrated in (1c) and (2c) above. Examples (1c) and (2c) feature constituent dislocation, apparent from the pre-verbal position of the object noun and the post-verbal position of the subject noun. Critically, in (2c), the nuclear pitch accent aligns with the sentencefinal subject and is therefore in the natural prominence landing site. The output in (1c), however, features two distinct types of dislocation, namely, constituent dislocation, apparent from the sentence-initial position of the focused object and dislocation of the main phrasal prominence, which is sentence-initial as well. Dislocation of the nuclear pitch accent is in violation with the Nuclear Stress Rule for Russian and may incur added computational costs (Neeleman and Reinhart 1998; Reinhart 2006). The word order-prosody configurations illustrated in (1c) and (2c) demonstrate that Russian presents an interesting case for testing cognitive economy in contexts where the focal status of a sentence constituent is cross-referenced by word order and acoustic-prosodic means.

The Listener's Perspective. To date, it remains largely unclear if 2.2.2 listeners deploy word order, prosody or both as cues to contrastive focus in discourse. It is possible that augmented prosodic expression of foci occurring in non-canonically ordered sentences stems from (greater) articulatory effort due to non-canonical linearization of sentence constituents; additionally, in situations when the ex-situ constituent appears sentence-initially or sentence-finally, its acoustic-prosodic expression may further be conditioned by the immediate proximity to a prosodic boundary (Cutler, Dahan, Van Donselaar 1997). If these assumptions are accurate, per considerations of cognitive economy, unambiguous constituent order should be used as a primary cue to focal status of a sentence constituent. On a different account, acoustic-prosodic expression and constituent linearization may be viewed as part and parcel of a unitary mechanism encoding the focal status of a sentence constituent in Russian. Under this account, acoustic-prosodic augmentation of the focused constituent may be regarded as a means of canceling out competing interpretations associated with non-canonical constituent orders (see 2.2.1).

3 The Present Study

This study explores how prosody and word order function independently and in combination during auditory sentence comprehension in Russian. The first goal of the experimental investigation reported below is to investigate the effect of a change in word order on the acoustic-prosodic expression of the focused constituent. The second goal is to explore the cross-application of prosodic augmentation and a change in word order in the expression of contrastive focus and establish the consequences of such cross-application for the listener. Specifically, this study asks whether interpretation of contrastive focus based on the clausal position of a sentence constituent is further facilitated by concurrent augmentation of its acoustic-prosodic expression. To answer this question, the time lag reflective of the subsequent recognition of the focused noun is measured for a group of linguistically naïve listeners. For the purposes of the present investigation, word order and prosodic properties of canonical SVO and non-canonical OVS sentences in Russian were manipulated. Read production data analyses reported in section 3.1 were carried out to examine acoustic-prosodic characteristics of contrastively focused nouns positioned in-situ, as well as occurring in the non-canonically ordered OVS sentences. The Probe Recognition task reported in Section 3.2 gauges the effect of acoustic-prosodic augmentation coincidental with a change in word order on the subsequent recognition of a lexical probe matching the focused noun. Section 4 discusses experimental results and their implications for the understanding of how word order and acoustic-prosodic cues interact in the expression of contrastive focus in Russian. Section 5 presents conclusions.

3.1 Production Data

3.1.1 Materials and Method. Sixteen canonically ordered SVO sentences, each featuring an animate subject and an inanimate object, were re-written as object-initial and subject-final OVS sentences. All object nouns were unambiguously marked for Accusative case. Explicit case marking disambiguated syntactic roles of the nouns in the non-canonical OVS order. In each SVO-OVS sentence pair (see (1) and (2) above), a target noun was identified, for a total of 16 subject and 16 object nouns. Two recordings of each experimental sentence were produced by a native Russian speaker, female, age 24. Recording (a) featured neutral intonation; in recording (b), the model speaker was instructed to prosodically augment the target noun. Acoustic-prosodic parameters f0 range, mean intensity and vowel duration were taken from the stressed syllable of each subject and object noun in the test sentences using Praat (Boersma and Weenink 2018). Each parameter entered a separate analysis of variance with predictor variables Prosodic Expression (2 levels: target noun features neutral vs. augmented prosody), Word Order (2 levels: target noun occurs in-situ vs. ex- situ), and Grammatical Function/Animacv (2 levels: target noun is an animate subject vs. an inanimate object). Production data analyses reported in section 3.1.2 present confirmatory evidence that nouns featuring augmented prosody show evidence of robust augmentation of all acoustic-prosodic measures. Independently of the controlled prosodic manipulation, and in line with prior research (Branigan and Feleki 1999; Bornkessel-Schlesewsky and Schlesewsky 2009; Luchkina and Cole 2016), two additional sources of prosodic variability, (a) word order and (b) animacy and grammatical function of the target noun, are accounted for.

3.1.2 Results of Acoustic-prosodic Analyses. Keeping the factor *Word Order* constant, prosodically augmented nouns in the model speaker's read production had greater f0 range (t=4.96, p<0.001), mean intensity (t=3.17, p<0.005), and duration (t=3.07, p<0.005). Keeping the factor *Prosodic Expression* constant, pre-verbal subject and post-verbal object nouns demonstrated evidence of partial augmentation evident from greater f0 range (t=2.8, p=0.005) and duration (t=3.1, p<.005). Acoustic-prosodic variability in the production data was also affected by the grammatical function–animacy asymmetry between subject and object nouns. Specifically, animate subjects were systematically more prosodically prominent than inanimate objects, as evident from augmented f0 range (t=2.5, p<.05) and mean intensity (t=2.2, p<.05).

3.2 The Probe Recognition Task (PRT)

3.2.1 Method and participants. PRT stimuli were SVO and OVS sentences described in Section 2.2 and illustrated by examples (1) and (2) reprinted as (3) and (4) below¹.

- (3)a. In the evenings, the girls listen to the news, and only on the weekends- to music or audiobooks. But this Wednesday something went amiss.
 - b. Smotri! | Devochki slushayut MUZYKU| segodnya vecherom look girls_{NOM} listen to_{3PL} music_{ACC} tonight
 - c. Smotri! | Segondya vecherom | MUZYKU slushayut devochki look tonight musuc_{ACC} listen to_{3PL} girls_{NOM} 'Look! Tonight, the girls are listening to music.'
- (4) a. In the evenings, girls listen to audiobooks, boys to music, and their parents to the news. But tonight something went amiss.

¹In (3) and (4), vertical bars mark prosodic breaks; contrastively focused constituents appear in UPPER CASE letters. In both examples, the verb "smotri!" and the adverbial modifier "segodnya vecherom" are structurally optional, as signaled by prosodic breaks, and are primarily necessitated by the experimental design (see section 3.2.1 for details).

- b. Smotri! | Segodnya vecherom | DEVOCHKIslushayut muzyku look tonight girls_{NOM} listen to_{3PL} music_{ACC}
- c. Smotri! | Myzyku slushayut DEVOCHKI | segondya vecherom look musuc_{ACC} listen to_{3PL} girls_{NOM} tonight

'Look! Tonight, the girls are listening to music.'

Thirty-two stimuli sentences (16 SVO and 16 OVS) featuring neutral prosody were used as controls. Prosodic expression of the target noun was augmented in the remaining half of the stimuli. Each stimulus sentence was embedded into a carrier phrase such that the target nouns in the preverbal and the post-verbal positions were followed with an equal amount of auditory material, in syllables, occurring between the offset of the stimulus and the moment when the probe was presented on the screen. Added lexical material was always separated from the main clause with a prosodic phrase boundary, which ensured that the post-verbal noun was the optimal candidate for nuclear pitch accent assignment at all times. Each stimulus sentence was also preceded with a two sentence vignette read by the same speaker. Vignettes introduced the first mention of the nouns to be used in the following SVO/OVS continuation and thereby mitigated the effects of lexical frequency, word length, and cloze probability of the target noun on task performance. Critically, vignettes were constructed such as to render the contrastive reading of the target noun in each experimental sentence plausible.

Twenty-eight native Russian speakers heard experimental sentences through headphones. Each sentence was followed by a lexical probe presented on a computer monitor. Participants were instructed to press YES if the probe had occurred in the test sentence, and to press NO otherwise. Probe recognition latencies, in milliseconds, reflect the time interval between the auditory stimulus offset and the YES/NO button press. Lexical probes were 1-3 syllable long lexical nouns; for test items, they always matched the target noun. The task also included 32 fillers. Filler item contexts did not introduce the target noun. Non-matching probes, semantically related to the target noun, were used in filler trials to encourage participants to pay attention. Test and filler items were divided between four lists and pseudo-randomized. Each list, additionally, contained 2 sound test trials and 6 practice trials during which participants were trained to respond as fast as they could and saw their response times, in milliseconds, after each trial. Testing took place in a soundproof booth. Stimuli were presented using E-prime2 software.

Seven participants completed each test list. Responses from two participants were discarded due to systematically greater probe recognition latencies. Data from 10 males and 16 females (mean age=29.6, SD=7.29) satisfied the inclusion criteria for subsequent analyses. Participants were international students at a US university at the time of participation; they reported being born and raised in Russia, in a Russian-speaking household. The mean age of arrival to the US was 25.3 years (SD=5.99). All respondents reported Russian to be their native language as well as their preferred language for daily communication.

3.2.2 Predicted Effects of Word Order and Acoustic-prosodic Augmentation on Probe Recognition Latencies.

Grammatical Function/Animacy effect: Keeping all else constant, probe recognition latencies are predicted to vary as a function of the target noun grammatical function and animacy. Due to animate subjects being perceived as inherently more prominent than inanimate objects (Branigan and Feleki 1999; Bornkessel-Schlesewsky and Schlesewsky 2009), probe recognition latencies are predicted to be smaller when the probe matches a subject noun, always animate in the PRT stimuli, and greater- when the probe matches an object noun, always inanimate in the PRT stimuli.

The word order effect: Keeping all else constant and consistent with the considerations of cognitive economy laid out in section 2.2.1, probe recognition latencies are predicted to be smaller when the probe matches a target noun presented in a canonically ordered SVO sentence.

The prosody effect: Keeping all else constant, probe recognition should be facilitated when the probe matches a prosodically augmented target noun. Such facilitative effect will be confirmed if prosodic augmentation of the probe matching noun is associated with smaller probe recognition latencies. Furthermore, if dislocation of the main phrasal prominence is akin to constituent dislocation in that it incurs additional processing costs (Neeleman and Reinhart 1998, Reinhart 2006), prosodic augmentation of the target noun in contexts necessitating a stress shift operation should result in greater probe recognition latencies.

3.2.3 Results of the Probe Recognition Task.



Fig. 1: Mean probe recognition latencies (ms) for SVO and OVS **P**robe **R**ecognition Task stimuli. Upper panel: PRT conditions featuring neutral prosody; Bottom panel: PRT conditions featuring augmented prosody. Upper case letter in the word order abbreviation marks location of the prosodically augmented noun. Asterisks mark location of contrastively focused noun.

The mean accuracy rate of 98.5% indicates that participants paid attention. Probe recognition latencies (means and standard deviations from 26 participants are summarized in Figure 1) were modeled using a mixed effects linear regression. The regression model included fixed effects *Grammatical Function/Animacy, Word Order*, and *Prosodic Expression*. The model also included an interaction between *Word Order* and *Prosodic Expression*. Participant and *Test Item* were introduced as random effects. PRT trials which resulted in probe recognition latencies greater than 3000 ms (<2% of all trials) and filler trials were not analyzed.

Consistent with the predicted effect of *Grammatical Function/Animacy*, smaller probe recognition latencies (**R**esponse Times, ms) were obtained when probes matched target nouns which were grammatical subjects, as opposed to objects (mean subject RTs=900.1 ms, mean object RTs=980.5 ms, z=4.25, p<.001). The regression analysis revealed a significant main effect of *Word Order* (z=3.02, p<.005), indicating that smaller latencies were obtained when the probe matching noun was presented in a canonically ordered SVO sentence (mean SVO)

RTs=893.7 ms, mean OVS RTs=956.1 ms). There was no main effect of *Prosodic Expression*, however, the interaction between *Word Order* and *Prosodic Expression* was significant (see Fig. 1). Smaller probe recognition latencies were obtained when probes matched prosodically augmented object nouns in the svO* sentences (mean RTs=767.1ms, z=-5.11, p<.001), and prosodically augmented subject nouns in the ovS* sentences (mean RTs=842.4ms, z= -3.47, p=.001). Significantly greater probe recognition latencies were obtained when probes matched prosodically augmented object nouns in the *Ovs order (mean RT=1004.4ms, z=4.24, p<.001).

To summarize, observed patterns of variation in probe recognition latencies support differential underlying prominence of subject and object target nouns due to combined effects of grammatical function and animacy asymmetry, consistent with earlier work on Russian (Luchkina and Cole 2016). Results also point to the effects of constituent ordering and location of the main phrasal prominence on the rate of subsequent recognition of the target noun. We now turn to discussing these results in more detail.

4 Discussion

This study evaluates combined effects of constituent reordering and prosodic augmentation in the expression of contrastive focus in Russian. An experimental investigation involving production and perception data solicited from linguistically naïve native speakers of Russian was carried out to determine whether augmented acoustic-prosodic expression of a contrastively focused noun used in combination with non-canonical constituent order affects its subsequent recognition during auditory sentence comprehension. Materials used in this study included canonical SVO and non-canonical OVS sentences read by a female native speaker of Russian. In addition to the word order manipulation, acoustic-prosodic expression of the subject or the object noun in the test sentences was purposefully augmented.

Analyses of the acoustic-prosodic measures extracted from the model speaker's read production data revealed, in addition to comprehensively augmented acoustic-prosodic expression of the target nouns which were purposefully uttered as prominent, partial augmentation of animate subjects, regardless of their focal status. Observed effects of grammatical subjecthood and animacy are in line with relatively greater perceived prominence of animate nouns (Bornkessel-Schlesewsky and Schlesewsky 2009) and grammatical subjects in discourse (Branigan and Feleki 1999). Not surprisingly, during the PRT, grammatical function and animacy of the probe matching noun affected the rate of its subsequent recognition, which was faster when the probe matching noun was an animate subject.

In a similar vein, partial acoustic-prosodic augmentation of the preverbal object and post-verbal subject nouns in the non-canonical OVS order was observed regardless of their focal status. While similar findings have been previously reported for various free word order languages, including Hindi (Luchkina et al. 2015; Patil et al. 2008), Finnish (Vainio and Järvikivi 2006) and Russian (Luchkina and Cole 2016), acousticprosodic effects in question have not been fully understood. Recall that in the experimental sentences used in this study, pre-verbal object nouns and post-verbal subject nouns were always adjacent to a prosodic phrase boundary. It is therefore plausible that prosodic domain boundary strengthening could contribute to the observed augmentation of these nouns in the model speaker's read production data. On a different account, observed acoustic-prosodic effects could be reflective of relatively greater perceived prominence of the non-canonically positioned nouns in the experimental materials. While determining the nature of observed acoustic-prosodic augmentation in relation to the OVS constituent order in the study materials is interesting, it is beyond the scope of the present investigation.

Addressing the central research question of this study, effects of word order and augmented prosodic expression on the subsequent recognition of contrastively focused nouns were evaluated in an online probe recognition task completed by linguistically naive native Russian speakers. Participants listened to short vignettes in which one of the nouns in the following SVO/OVS continuation was contrastively focused. Lexical probes presented on the screen at the offset of the auditory stimulus always matched the focused noun. Probe recognition latencies provide a window into the complexity associated with focus interpretation on the basis of context (under default constituent order and neutral prosody), a combination of context cues and word order, or a combination of context, word order, and acoustic-prosodic expression of the focused word.

Analyses of the PRT data revealed that listeners were sensitive to word order and acoustic-prosodic manipulations in the PRT stimuli. Keeping

acoustic-prosodic characteristics of the probe matching (focused) noun constant and in line with the overall preference for the canonical SVO order in Russian, probe recognition latencies were smaller when the probe matching noun occurred in a sentence with SVO constituent order. Probe recognition latencies were greater when the probe matching noun was presented in the non-canonical OVS order. The word order effect was particularly pronounced in the experimental conditions featuring neutral prosody (see the upper panel of Figure 1) and is consistent with the findings reported in earlier work on processing non-canonical orders in Russian by Slioussar (2001). Slioussar's study examined processing of read context-appropriate sentences with canonical and non-canonical orders and found that significantly greater reading times were associated with non-canonical OSV, INDIRECTOSVODIRECT, and INDIRECTODIRECTOVS orders. Sekerina (2003) proposed that faced with a non-canonical order, the parser activates the ex-situ constituent twice: in its base position, as well as in its surface position; this, in turn, leads to greater processing times.

Turning now to the combined effects of word order and acousticprosodic manipulation in the PRT stimuli, analysis of probe recognition latencies revealed differential effects of acoustic-prosodic augmentation of the probe matching noun on probe recognition latencies. When the probe matched a prosodically augmented target noun adjacent to the rightmost phrasal boundary, which presents a natural prominence landing site in Russian, significantly smaller probe recognition latencies were observed in the canonical SVO and the non-canonical OVS order. These results provide important novel evidence that preservation of the underlying prosodic structure at the phrasal level is similar in effect to the preservation of the canonical constituent order in Russian in that it optimizes sentence processing and subsequent recognition of the focused constituent. Consistent with this conclusion are the findings that probes matching prosodically augmented post-verbal objects were associated with the smallest recognition latencies in the PRT, as well as that probes matching prosodically-augmented post-verbal subjects were associated with the smallest recognition latencies in the conditions featuring the noncanonical OVS order. To summarize, listeners selectively benefitted from the cross-application of constituent order and prosodic augmentation in the expression of contrastive focus in Russian. Preservation of the canonical constituent order in combination with honoring the Nuclear Stress Rule sped up subsequent recognition of the target noun suggesting that listeners have robust expectations about the ordering of sentence constituents as well as location of the main phrasal prominence. Consequently, under the non-canonical OVS order, the facilitative effect of prosodic augmentation obtains only when the focused noun aligns with a natural prominence landing site, thereby obviating a subsequent violation of the NSR. These results support the view that NSR violations are computationally costly (Reinhart 2006).

Recall that in Russian, fronting a contrastively focused constituent, i.e., moving it away from the natural prominence landing site, is also possible. While such movement operation successfully disambiguated the focus structure of the sentence, it necessitates a change in the constituent order as well as a shift in the location of the main phrasal prominence necessary to prevent the fronted constituent from being misinterpreted as a sentence topic. PRT results reveal that prosodic augmentation of the sentence-initial object in the OVS order is indeed costly and results in greater probe recognition latencies; this result supports that the breach of economy associated with focus fronting in Russian is two-fold. An interesting question for future research concerns speakers' motivation for choosing one focus marking strategy over the other.

5 Conclusion

In free word order languages, the focal status of a word in discourse may be manifest by prosodic means and via linearization of major phrasal constituents. This study examined the use of these two strategies, as well as their cross-application, in the expression of contrastive focus in Russian. Results of an online probe recognition task demonstrate that listeners attend to word order and actively deploy concurrent acousticprosodic variability observed in relation to the focal status of a word in discourse. Furthermore, listeners have robust expectations about the default order of sentence constituents, as well as the default placement of the main phrasal prominence. Breaching these expectations, while not uncommon for Russian, results in added computational load associated not only with non-canonical constituent ordering, as has been previously reported, but also with violation of the default location of the main phrasal prominence, as specified by the Nuclear Stress Rule.

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Non-Standard Allomorphs and Variation in Gender Assignment in Russian Expressive Morphology^{*}

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Introduction

In this paper, I present new data from Russian expressive morphology that challenge late insertion theories, i.e. theories that see morphemes as abstract entities that obtain phonological realizations at the last step of the derivation. I would argue against Late Vocabulary Insertion as it is stated in Distributed Morphology papers (e.g. Embick 2010, McGinnis to appear). The goal of this paper is to amass the data challenging the Distributed Morphology (further abbreviated as DM), however I do not propose an alternative structural analysis of the derivation process.

In DM, phonological form can play no role in determining syntactic properties in the process of the derivation. Neither can phonological features interact with semantic ones when determining the choice of a morpheme. However, there is evidence that phonological form must sometimes be considered before the presupposed Vocabulary Insertion step takes place. In this paper, I analyze two types of variation in Russian expressive forms: pseudo-allomorphs (suffixes that have both different meanings and phonologically conditioned distribution) and variable gender assignment.

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1 Pseudo-Allomorphs in Modern Russian

Russian has more than a dozen expressive suffixes with different meanings and behavior. In this section, I focus on four of them, previously considered to be allomorphs: *-ok*, *-ek*, *-ik*, and *-tčik*. These suffixes are classified as non-expressive diminutive suffixes in (Vinogradov 1947/1972); all other diminutive suffixes are classified as expressive. Although these suffixes were considered allomorphs in previous studies (Polivanova 1967, Gouskova et al. 2015), they have never been tested for allomorphy. The assumption that they are allomorphs was based on their classification (as non-expressive vs all other diminutive suffixes) and their distribution in Standard Russian (i.e. dictionaries and edited texts), which is close to complementary and can be largely predicted from phonological factors.

Before I start with the actual study, I should explain why I exclude the -*ek* suffix from the consideration in following sections. The -*ek* suffix is problematic as it is phonologically indistinguishable from a stressless -*ik* and in writing it can always be the case that an observed -*ek* is in fact a misspelled -*ik*. It also may work the other way round, which makes the study of -*ik/-ak* more complicated. Previous studies have different accounts for the -*ek* suffix: Anna Polivanova in (Polivanova, 1967) classifies it as a stressless variant of -*ok*, Gouskova et al. (2015) assume that there is a single -*ik/-ek* suffix, which is different from the bare -*ik* suffix and attaches to stem-final -*k* mostly as a second diminutive suffix. Finally, Kapatinsky classifies -*ek/-ik* as variants of the same suffix as "-*ek* and -*ik* are in nearly complimentary distribution in the established lexicon and thus can be considered allomorphs of a single morpheme" (2010, p. 365). For these reasons, I exclude the suffix -*ek* from the study of meaning.¹

1.1 Phonological Factors Responsible for the Distribution of the -ok, -ik, and -tčik Suffixes

In Standard Russian (according to the prescriptive grammar), the distribution of the three suffixes can be predicted from the stem final

¹ Although, this is a complex issue, we have made an attempt to study *-ek* experimentally in (Magomedova & Slioussar, 2017)

segment, the stress pattern of the base noun, and several other factors that have less significant impact. The phonological preferences of the suffixes are listed in Table 1. The *-ok* suffix is always stressed regardless of where stress falls in the base noun.

suffix	stem-final consonant preference	base stress position	other	example
-ok	any	initial	initial cluster, no hiatus, no final cluster	rog → rožok 'horn' les→ lesok 'forest' syr → syrok
-ik	preferably fricative, not velar	final		vopros→voprosik 'question'
-tčik	preferably sonorant, not velar		no final cluster	vagon→ vagontčik 'car'

 Table 1. Phonological properties of nouns selected by each suffix and the changes they cause

1.2 The Meaning Nuances of the -ok, -ik, and -tčik Suffixes

The difference in meaning of the three suffixes was mentioned by Vinogradov (1947/1972), who refers to Aksakov but provides no source publication. Vinogradov (p. 116) suggests that the *-ok* suffix, which is the oldest, expresses diminutive meaning alone, while the *-ik* and *-tčik* suffixes have an affectionate nuance. Vinogradov gives no indication of the pejorative nuance of *-ok*.

In this section, I argue that each of the three suffixes *-ok*, *-ik*, and *-tčik* has a distinct meaning. For example, even nouns that have well established diminutive forms with *-ok* sometimes also form diminutives with *-ik* for semantic reasons (e.g. *sapožok* 'little boot' – *sapožik* 'little boot (affectionate)', *syrok* 'cheese_{DIM}' – *syrik* 'cheese_{DIM} (affectionate)', *supčik* 'soup_{DIM}' – *supik* 'soup_{DIM} (affectionate)'). These nouns are very frequent. This fact is important because it contradicts previous theories that use diacritics to indicate which suffix is used for a particular base noun. For example, according to (Gouskova et al. 2015) if a diacritic is assigned to

every noun based on the lexicon, well established and frequent forms should not show variation.

1.3 Experiment

I conducted a forced choice test with three protocols: affectionate context, pejorative context and no context. Participants had to choose one of the three diminutive forms for each word: with the *-ok*, *-ik*, or *-tčik* suffix. 81 native speakers of Russian took part in this experiment, 27 for each

protocol. I did not collect information about their age and gender in this experiment.

I took as stimuli 10 nonce nouns that were identical for all protocols. All were monosyllabic, four nouns had stem-final velars (prefer -ok), four had stem-final fricatives (prefer -ik) and two nouns had stem-final [n] (prefer $-t\check{c}ik$). There were four nouns with stem-final clusters and four with stem-initial clusters. Sample sentences for affectionate and pejorative contexts and possible answers are listed below in (1).

(1) a. Affectionate context

Smotri,	ja	kupila	novyj	(ferk)!	Klassne	en'kij	takoj,
Look,	Ι	bought	new	(ferk)!	Cool _{DIN}	1	such,
akkuratnen	'kij –	kak raz	v	sumočk	cu	pomeš	čaetsja.
neat _{DIM}	_	just	in	handba	g _{DIM}	fits.	
'Look, I've	bought	a new (f	erk)! Su	ich a coo	oly one,	neaty –j	ust fits in
my handba	ggy'						
Possible an	swers: fo	erčik, fei	čok, fer	kčik.			
b.	Pejorat	ive conte	ext				
Odolži	mne	tvoj	fris	na	nedel'k	u,	a?
Lend	me	your	fris	for	week,		eh?
A to	nadoelo)	uže	vozit'sj	a	SO	svoim
Just	annoye	d	already	deal		with	own
starym	doxljat	skim	(fris)				
old	dead _{PEJ}		(fris)				
'Lend me your fris for a week, eh? I'm so fed up with my old dead							
(fris)'							
Possible answers: frisikom, friskom, frisčikom							

1.3.1 Results: Overview. Figure 1 shows the general distribution of suffixes within the three protocols, divided by stem-final segment place/manner. The width of the bars shows how many nouns with a given stem-final segment were in the experiment (four velars, four fricatives and two [n]). The *-ik* suffix (dark grey) is generally more productive than the *-ok* suffix (see also Magomedova & Slioussar 2017), *-tčik* is not very productive in this experiment due to the choice of stimuli: only two of ten words have stem-final sonorant consonants.



Figure 1. General distribution

1.3.2. Results: Inferential Statistics. I used R (R Core Team 2012) and *lme4* (Bates, Maechler & Bolker 2012) to perform a linear mixed effects analysis of the relationship between suffix choice and context. Each regression evaluated the likelihood of occurrence of one of the suffixes (coded as 1) vs. the two others (coded as 0). The context was coded as a factor with three values: affectionate, pejorative and neutral, and was treated as a fixed effect. Random slopes by participant and by item were also included in the models, except for the context model for *-ik* that only has intercepts and otherwise would not converge. For models that showed significance I have also performed pairwise comparisons using *lsmeans* (Lenth & Hervã 2015) and *multcomp* (Hothorn et al. 2008) packages. The results for *-ok* and *-ik* are presented below, the *-tčik* context model showed no significance. The detailed report of the regressions can be found in Tables 2 and 3 below.

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	Estimate	Std. Error	z value	Pr(> z)
intercept	-2.8335	0.6416	-4.416	1e-05***
neutral	1.0933	0.5251	2.082	0.03735*
context				
pejorative	1.5329	0.4679	3.276	0.00105**
context				

Table 2. Context for -ok. Fixed effects

	Estimate	Std. Error	z value	Pr(> z)
affectionate	-1.0933	0.5251	-2.082	0.09085.
- neutral				
affectionate	-1.5329	0.4679	-3.276	0.00295 **
- pejorative				
neutral -	-0.4396	0.3632	-1.210	0.44069
pejorative				

Table 3. Context for -ok. Pairwise comparisons

As one can see from the Tables 2 and 3, the distribution of *-ok* in affectionate and pejorative contexts was significantly different. I found phonological factors to be also significant, which confirms the results of (Gouskova et al. 2015).

I have been discussing the results with native speakers (not participants of the experiment), both linguists and not, and many speakers noted that although *-ok* has a clear pejorative tone with new loanwords (e.g. *fričok* vs *fričik* 'little freak') this does not make already lexicalized forms with *-ok* sound pejorative (e.g. *sapožok* 'little boot').

1.4 Discussion

There are different approaches to allomorphy, some less strict than the other. Generally, allomorphs are defined as a set of affixes that have the same function. according to Anna Endersen: "Allomorphy is traditionally defined as a structural relation of two or more variants of a single morpheme that satisfy two criteria: 1) identical meaning (or function) and 2) complementary distribution, so that their phonological, grammatical, or lexical environments never overlap (Matthews 1974: 107; Haspelmath 2002: 27; Booij 2005: 172; Bauer 1988: 13; Bauer 2001: 14)." (Endersen

2014) Anna Endersen proposed to consider allomorphy as a gradual property of a set of affixes: there might be prototypical allomorphy (according to the commonly used definition), standard allomorphy, nonstandard allomorphy and non-allomorphy. A basic condition for each kind of allomorphy is that the meanings of all the affixes in a set must share the central sense, which is called 'semantic prototype'. The semantic prototype should be embodied, i.e. have a spatial meaning. All diminutive suffixes share the semantic prototype "SMALL". However, it is hard to tell which of them are (non)-allomorphs without proper statistical modelling on a large amount of data. I leave this for the future work. The data presented above show that the -ok, -ik and -tčik suffixes, previously considered to be strict allomorphs, have differences in meaning along with phonological preferences, and hence cannot be allomorphs in the strict sense, because they are not synonymous. This poses a challenge for Distributed Morphology, similar to the one that rival suffixes -ness and ity in English do (Baeskov 2012; Arndt-Lappe 2014): if semantic features are not already specified in syntax and the competition is restricted to phonology, how is it possible for semantic factors to influence but not define the choice of a suffix?

This kind of issue might be resolved with derivation crashes and filtering approach. However, in this work, I assume competence and performance to be two levels of description of the same system, following (Neelman & Koot 2010). If one assumes that there is only one competence-performance system, then there is also one derivation, not a pair of them: an ideal one in the competence system that consults the real one in the performance. Then all computations that are not stored in the lexicon happen in real time. In this case, derivation crash is a real time crash and there must be a way to explain how variants arise to substitute for a crashing derivation. As filtering approach does not have such an explanation, I cannot use it to explain the variation in the data.

2 Gender Assignment to Russian Expressive Forms

In this section, I study expressive nouns that are formed with suffixes that pattern the resulting form into a different declension class than the one of the base noun. For example, a noun 'dom' has diminutives 'domik', 'domiška' and 'domiško' (the latter two only differ in written forms, but the difference still affects the gender agreement). 'dom' and 'domik' both

belong to the declension class I, while 'domiška' has a declension class II and 'domiško' is supposed to belong to the declension class IV. I focus on cases when the base noun has a different declension class than its expressive form does. This difference allows to study how declension class influences the gender assignment and what factors are importwnt in case of conflict of the lexical gender of the base noun and the suggested gender based on the declension class.

I assume a four-declensions classification system, as in Table 4:

Ι	zakon
II	škola
III	kosť
IV	vino

Table 4. Russian declension classes according to (Corbett 1982, p. 216)

It is often assumed (Corbett 1982; Hippisley 1996; Rice 2005 among others) that Russian evaluative suffixes are not able to contribute to a choice of the syntactic gender of resulting nouns. Papers that account for the gender change mostly mention the possibility of it without analyzing (Savchuk 2011; Sitchinava 2011) or assume that a suffix changes the lexical gender of a noun in 100% of cases (Wiltschko & Steriopolo 2007). In the latter study authors propose that some of the expressive suffixes are syntactic heads and always assign a certain gender to nouns they form, while other are not heads and never assign gender. However, even in dictionaries (e.g. Zaliznjak 1977) one can see that expressive forms have variation in gender, for example the noun *zveruga* with an expressive suffix *-uga* may be masculine, same as its base noun *zver'*, or feminine, assigned by the suffix. This means that certain suffixes may or may not assign a gender to the expressive nouns they form.

Matushansky (2015) discusses the problem of gender and declension class and concludes that the declension class is syntactic, and the gender of the resulting noun may be constructed and not stored. However, she hasn't provided yet the details of this analysis, e.g. when the declension class is assigned and where it is stored.

I have studied diminutive and augmentative forms using both websearch and experiment. Web-search showed variation in gender assignment with every suffix that would pattern the resulting expressive noun to a different declension class than its base noun.

2.1 Web Data

In this section I provide examples of gender variation in expressive forms. Note, that sometimes the assigned morphological gender contradicts both the base noun gender and the semantic gender (e.g. as in examples (6), (7a), (7b) below).

In case when feminine nouns that end in a secondary palatalized consonant (III declension class) attach a consonant-final "masculine" suffix (declension class I) there is no variation: C-final suffixes always assign masculine gender to inanimate C'-final feminine nouns. (2) $Butyl'_{FEM} + t\check{c}ik$ 'bottle'

2)	Dulyi FEM $+$ icik	oottie				
	Sdelaju	za	simvoličeskij	butyl'čik		
	[Will do]	for	symbolic _{MASC}	bottleDIM		
	Simvoličeskogo	0	piva			
	symbolicgen		beer			
	'I'll do it for a	little bot	tle of little beer.'			

The same situation is observed with feminine nouns that end in -a and do not denote human beings (1st declension class nouns). If these nouns attach a consonant-final suffix (declension class I) there is no variation, the resulting noun is always masculine.

(3) Bulka_{FEM} + ik 'bun' Vkusnyj bulčik yummy_{MASC} bun_{DIM} 'a yummy bun'

However, the a-final nouns that denote human beings show variation in gender assignment:

(4)	<i>Mama_{FEM}</i> + <i>tčik</i> 'mom'
()	

a.	Mamčik	prišël,		obradovalas'	doč	ka,	
	Mom _{DIM}	came _M	asc, —	cheered	dau	ghter,	
	otkryvaja	na	zvonoł	Κ.			
	opening	to	ring				
	'Mommy can	ne - che	ered a d	laughter and c	opened	the door,	as

somebody rang the doorbell'

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b.	Mamčik	prišla	na vzvode.
	Mom _{DIM}	сате _{ЕЕМ}	angry
	'Mommy cam	e angry.'	

Feminine nouns that end in -a and attach suffixes ending in -o or -e show variation in gender assignment (see example (5)). However, these cases are rather rare, probably due to the fact that all the suffixes ending in -o/ehave variants ending in -a.

(5)	Ryba	_{FEM} + išče	'fish'						
	a.	А	čto	èto	za	rybišče takoe			
		(And)	what	this	(prep)	fish _{AUG} such _{NEUT}			
		interes	noe?		u I)				
		intresti	ng _{NEUT}						
		'And w	'And what this interesting fish is?'						
		А	gde	voditsja	a	takaja			
		(And)	where	lives		such _{FEM}			
		rybišče	?						
		fishaug	?						
		'And w	'And where lives such a fish?'						

Masculine gender seems to be more "robust" in the sense that it is always possible to keep masculine when declension class is changed by the attached suffix. However, it is also possible to change the gender, so there is variation. Examples of gender change are listed below.

A change from masculine to neuter according to the declension class of the suffix is demonstrated in (6). All three genders are present here masculine morphological gender of the base noun, neuter gender of the agreeing possessive pronoun and, probably, semantic, feminine gender of the relative pronoun.

(6)	Kotm	$Kot_{MASC} + iško$ 'cat'							
	Vot	moë	Kotiško)))	Ja	eë	tak	ljublju		
	Here	my _{NEUT}	cat _{DIM})))	Ι	her	SO	love		
	'Here	'Here is my kitty))) I love her so much)))'							

(**-**)

Examples in (7) demonstrate possible gender change when masculine nouns ending in C or C' attach a suffix ending in -a.

(7)	a. <i>Volk_{MASC}</i> + <i>jara</i> 'wolf'							
	Stëpik	kak	dikaja	volčara	ı	bujnyj		i
	Styopik ² like wild _{FEM} wolf _{AUG} violent neobuzdannyj unrestrained _{MASC} 'Styopik is like a wild wolf – violent and unrestra						t _{MASC} and ained.'	
	b. <i>Pidžak</i> A Ah 'The boy	mal'čik boy is nice,	onka 'jac c milyj, nice just his	cket' tol'ko just jacket is	pidžačo jacket tacky.'	onka M	kvëlaja tacky _{FE}	L. M
(с. <i>Kon'</i> ма	sc + jar	<i>a</i> 'male]	horse'				
	Ogromna	ja	konjara	a^3	razmer	om	S	Tilja
	Huge _{FEM}	-	horseAu	JG	sizeINST	R	as	Til
	Lindema	nna						

Lindemann

'A huge horse, as big as Til Lindemann.'

2.2 Experiment

As one can see from the examples, gender assignment may depend on the declension class of the noun, on its meaning (is it a human or not?), on the availability of variants with "right" declension class (same as of the base noun) and may be on other factors, e.g. on the suffix itself.

To test possible factors that may contribute to gender assignment I conducted an online survey.

24 native speakers of Russian, 17 female, 7 male, from 26 to 56 years old, were asked to complete a simple text with adjectives that would fit best the style of the text (folktale). There were two texts, mostly identical, with a story about two characters: an unknown animal and a male cat. In

² A boy's name

³ This a characteristic of Adrian Heights (he is being compared to Lindemann), therefore 'horse' here denotes a man

Text 1 nouns for the animal were given in augmentative forms and nouns for the cat in diminutive. In Text 2 the animal is diminutive and the cat is augmentative.

This design has two important advantages: participants are not influenced by the given default form of adjectives (masculine) and the creative task drives their attention away from agreement.

There were 14 nouns with 6 expressive (diminutive and augmentative) suffixes that patterned resulting nouns to a declension class different from that of the base noun (e.g. ten' \rightarrow tenëk, pës \rightarrow psina). I excluded from the experiment neuter nouns, because they almost never attach non-neuter suffixes.

Since the stimuli were presented on the screen, there was no ambiguity caused by vowel reduction (final [a] and final [o]/[e] going to schwa). The list of stimuli is provided below in Table 5.

transcription	base gloss	suffix	type	Base gender
zveruga	animal	-uga	AUG	М
mordišče	animal face	-išče	AUG	F
domiško	house	-iško	DIM	М
kotjen'ka	male cat	-en 'ka	DIM	М
psina	male dog	-ina	AUG	М
monstrišče	monster	-išče	AUG	М
butylëk	bottle	-ok	DIM	F
zveruška	animal	-uška	DIM	М
mordiško	animal face	-iško	DIM	F
domina	house	-ina	AUG	М
kotišče	male cat	-išče	AUG	М
sobačok	male dog	-ok	DIM	F
monstriška	monster	-iška	DIM	М
sundučišče	box	-išče	AUG	М

Table 5. Stimuli

Already after finishing this experiment I realized that there are several issues with the stimuli (I list them below), therefore I consider this study as a pilot and another, more carefully planned, experiment will follow.

For the word koten'ka the assigned gender may very much depend on whether a speaker has a cat at home and what is the sex of the cat. The noun *psina* may be lexicalized and non-decomposable for some speakers, so it is not clear whether the feminine gender is due to the suffix or it is just the gender of this particular noun. Same applies to the noun *butylëk*.

2.2.3 Descriptive Results. I excluded from resulting data several hits where participants supplied a verb/adverb/another noun instead of an adjective, so I was not able to see the gender of an output form. That left me with 117 masculine base nouns and 46 feminine base nouns. As there are no C-final augmentative suffixes in Russian, I only took one diminutive C-final suffix *-ok*, which gave me 22 C-final diminutives in total in the experiment. There were in total 60 a-final diminutives and augmentatives with suffixes *-uška*, *-uga*, *-ina* and 81 total o/e-final diminutives and augmentatives (*-iško*, *-išče*). All groups of words had animate and inanimate nouns

The lexical gender was changed in 60% of cases. (see Figure 2).



Figure 2. Lexical gender change by gender of the base noun

As one can see on Figure 3, masculine suffix -ok always changes the gender of a base noun to masculine. A-final suffixes (*-uška*, *-uga*, *-ina*) change the gender in 75% of cases and o/e-final suffixes (*-iško*, *-išče*) – in 40% of cases.



Figure 3. Change of lexical gender by final segment type of the attaching suffix

2.2.4 Inferential Statistical Results. To estimate the significance of different factors that may have impact on the gender assignment, I used the generalized linear mixed model fit by maximum likelihood (Laplace Approximation), with random intercepts and random slopes by participant and by item. In case when a model did not converge, I excluded the random slopes from the calculations. This subsection is organized as follows: first I state a conclusion about significance and then provide the details of the relevant statistical test.

The o/e-final suffixes change the gender significantly less often than C-final and a-final ones, as Table 6 shows.

	Estimate	Std. Error	z value	Pr(> z)
intercept	0.9053	0.8099	1.118	0.2637
OE final	-3.8022	1.5921	-2.388	0.0169 *

 Table 6. Regression output for the dependence of gender reassignment on the final segment of a suffix

 As expected, declension class had significant impact on the choice of a suffix but did not determine it completely:

- 1. C-final suffixes, declension class I 100% of nouns were assigned masculine gender. Regression models do not converge, may be because there is absolute correlation with no variation.
- 2. Suffixes that end in *-o* or *-e*, declension class IV, significantly affect the assigned gender as one can see in Table 7.

	Estimate	Std. Error	z value	Pr(> z)
intercept	2.030	0.996	2.038	0.0415 *
OE final	4.129	1.880	2.196	0.0281 *

 Table 7. Regression output for the dependence of assigned gender on the final segment -o or -o of a suffix

3. Suffixes that end in *-a*, declension class II, significantly affect the assigned gender as one can see in Table 8.

	Estimate	Std. Error	z value	Pr(> z)
intercept	0.9910	0.5817	1.704	0.088444.
A final	-5.1305	1.4171	-3.620	0.000294 ***

 Table 8. Regression output for the dependence of assigned gender on the final segment -a of a suffix

Lexical masculine gender was changed significantly less often than feminine as one can see in Table 9:

	Estimate	Std. Error	z value	Pr(> z)
intercept	7.220847	0.001593	4532	<2e-16 ***
masculine	-14.80211	0.001593	-9293	<2e-16 ***
base				

 Table 9. Regression output for the dependence of assigned gender on the base noun gender

2.3 Discussion

The reason why variation in gender assignment challenges the LVI principle is in the variation itself. The question here is: if the declension

class is syntactic, how is it possible for it to be specified the way it can influence, but not determine a syntactic feature of gender? If the declension class is not syntactic, how it is possible for it to influence, but not determine any syntactic feature, including the one of gender.

According to (Kramer, 2015 (pp. 237-241)) the declension class head Th is inserted at the PF stage as a sister node to the head n that bears the gender feature. Then at the Vocabulary Insertion a theme vowel is inserted into the Th head. This structure allows gender to influence declension class as they are local to each other, but not the other way round, as the Th head is inserted post-syntactically. This cannot be the case either, as the data shows that declension class influences the choice of gender.

It is also possible that some expressive suffixes have their own gender, however in this case they would assign gender to the resulting expressive form in 100% of cases. If we assume Late Vocabulary Insertion, then to account for variation instead of set of expressive suffixes, there should be a set of sets of homophonic suffixes that are only different in gender they assign (e.g. *-ina_{MASC}*, *-ina_{FEM}*). It is not clear, what would be the motivation for these suffixes to exist, other than to account for the variation.

3 Conclusion

In this paper, I analyzed data from Russian that present a challenge for the Late Vocabulary Insertion principle. I showed that suffixes with different sets of features may compete (section 1), and that assuming late insertion leads to creation of otherwise unnecessary morphemes and misses an obvious generalization (section 2). In this paper, the variation in the data cannot be explained with diacritics stored on the root or stem as same roots (stems) show variation. To the best of my knowledge, competition of the suffixes with different features (section 1) cannot be explained in current late insertion theories as well as competition of the existing features (declension class, base gender) to assign gender to the expressive forms.

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To PPs in Their Proper Place*

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1 The Possessive PP Complex and Its Properties

The focus of this paper are examples like (1), where a possessive relation is established between the animate *affectee*, i.e., the NP complement of the linearly first P, and the complement of the linearly second P, where the latter can be stative (locational), as in (1b), or dynamic, with a source interpretation, as in (1a), or with a goal interpretation, as in (1c, d). We will argue that this interpretation arises pragmatically as a result of two interacting factors: the standard interpretation of a constituent consisting

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of two locative PPs as their intersection and the independently motivated view of possession as (a subtype of) a locative relation.

- (1) a. Vor vytaščil košelëk **u neë iz sumki**. thief pulled.out wallet at her out.of bag 'The thief pulled the/a wallet out of her bag.'
 - b. U menja doma živët lošad'. at me home.loc lives horse 'I have a horse living at my house.'
 - c. Položi spički **ko mne v rjukzak**. put.imp matches towards me in backpack.acc 'Put the matches in my backpack.'
 - d. Ona prinesla knigu **Timuru na rabotu**. she brought book Timur.dat on work.acc 'She brought the/a book to Timur's office.'

To avoid the linearity issue in a language with a relatively free word-order, we will be referring to the "possessor PP/NP" as u-PP. PPs that can qualify as u-PPs are headed by the prepositions u 'at' and k 'towards', which lexically encode physical proximity. We hypothesize that the apparent dative NP in (1d) is in fact a PP headed by a null preposition belonging to the same semantic class (see den Dikken 2006 for motivating a PP analysis for some dative-marked DPs; cf. Boneh and Nash 2017 for a specific implementation for Russian). The other PPs in the possessive PP complex will be referred to as PP₂.

(2) a.	[[<i>u</i> -PP u neë] [PP2 at her	iz sumki]] b. out.of bag	[[_{<i>u</i>-PP} u menja] at me	[NP2 doma]] home_loc
c.	[[_{<i>u</i>-PP} ko mne] towards me	[PP2 v rjukzak]] in backpack.acc		
d.	$\begin{bmatrix} u \\ u - PP \end{bmatrix} P_{\emptyset} Timuru \end{bmatrix}$ Timur dat	[PP2 na rabotu on work acc]]	

While in (1) the *u*-PP is associated with a locational PP both semantically and, we will argue, structurally, it can also be associated with an argument, *ves* 'weight' (3a) and *(na) nogu* 'on foot' (3b), but these cases, not involving a single constituent, have a different structure.

- (3) a. U futbolista Lebedja lišnij ves. Zimmerling 2000 at footballer Lebed' superfluous weight 'The footballer Lebed' is overweight.'
 - b. Mal'čik nastupil **devočke** na nogu. Leont'ev 2005 boy stepped girl_{.dat} on foot_{.acc} 'The boy stepped on the girl's foot.'

In what follows we will argue, following Corver 1992 analyzing the Dutch equivalent of u-PPs, that the possessive PP complex should be treated as a constituent consisting of two independent PPs. Whereas in (4) the u-PP, following Corver 1992, is an adjunct, we will not make a stand on that: it can equally well be that u-PP is the specifier of PP₂.



We claim that the possessive inference these constructions give rise to arises from combining locative PPs via Predicate Modification (Heim and Kratzer 1998:65). While PP₂ is visibly locative, the *u*-PP is argued to also be by appealing to the concept of the *sphere of influence* (Belvin and den Dikken 1997, Zimmerling 2000), recasting possession as a locative notion (a spatial metaphor, Lakoff 1993). We therefore derive possession pragmatically, and claim that it is not syntactically encoded as such (cf. Boneh and Sichel 2010). We further hypothesize that the notion of physical proximity encoded by the (cross-linguistic equivalents of the) prepositions *u*, *k* and the null preposition taken to precede some dative-marked NPs is a prerequisite for establishing the sphere of influence.

The paper is organized as follows: Section 2 provides evidence for the constituency in (4), showing, first, that the possessive PP complex is a

constituent (section 2.1), and that it is comprised of two independently attested PPs (section 2.2). Section 3 argues in favor of an intersective analysis for the possessive PP complex. Then in section 4, we outline the semantic analysis of locative possession establishing the term *sphere of influence*. Section 5 concludes.

2 Syntactic Properties of the Possessive PP Complex

2.1 Constituency

Evidence that the possessive PP complex is a constituent comes from standard constituency tests: it can form an answer segment (5), as well as be moved as a unit by topicalization (6). Wh-fronting the PP complex as a whole is the default, while splitting it affects the information structure (7) along the same line as NP-splitting does (see Pereltsvaig 2008 for an overview and references): e.g., while in (6b-c) the entire complex PP is under discussion as a question, in (7), PP₂ acquires a different informational status from the u-PP. In contrast to the possessive PP complex in (6) and (7), u-PPs associated with an argument give rise to the opposite effects, as in (8).

- (5) a. Kuda ona položila den'gi? (K) **Dime pod krovať**. where.dir she put money towards Dima.dat under bed.acc 'Where did she put the money? – Under Dima's bed.'
 - b. Gde ona sprjatala den'gi? U Dimy pod krovat'ju. where loc she hid money at Dima.gen under bed.ins 'Where did she hide the money? – Under Dima's bed.'
- (6) a. **UVasi v mašine** ona zabyla knigi, at Vasya incar she forgot books

a **u Lizy doma** – sumku. and at Liza home_{.loc} bag 'In Vasya's car she forgot books, and at Liza's home, a bag.'

b. **Komu na rabotu** ona prinesla knigi? who.dat on work.acc she brought books 'To whose office did she bring books?'

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- c. **K** komu na rabotu on postupaet? towards whom on work_{.acc} he applies 'To whose office does he apply?'
- (7) Komu ona prinesla knigi na rabotu?
 who.dat she brought books on work.acc
 'To whose OFFICE did she bring books?'
 'To whom did she bring books to the office?'
- (8) a. Čto slomalos'? #U menja mašina.
 what broke at me car
 'What broke? As for me, I had a car broken.'
 - b. *[U Leny mašinu]Ron slomal, a [u Very telefon] počinil. at Lena car Ron broke and at Vera telephone fixed

Yet another property of the possessive PP complex that suggests that the two PPs form a constituent is an obligatory match in direction. Not only is it impossible to combine a dynamic u-PP with a stative PP₂, or vice versa (9a, b), the configuration of the two PPs must match (9c, d).

- (9) a. *Ona prinesla knigi **u Saši na rabotu**. *ABL/LOC+ALL she brought books at Saša on work
 - b. #Ona prinesla knigu (k) Timuru na rabote. *ALL+ABL/LOC she brought book towards Timur.dat on work.loc 'She brought the/a book to Timur (while) at his office.'
 - c. *Ona zabrala knigi **u Saši na rabotu**. *ABL/LOC+ALL she took books at Saša on work.acc
 - d. #Ona prinesla knigi **Saše s raboty**. *ALL+ABL she brought books Saša.dat from work 'She brought (the) books to Sasha from (her) work.'

The possessive PP complex differs in this respect from complex paths, which are merged as separate PPs and which do allow a mismatch in configuration, as in (10), where a goal PP *v Moskvu* 'to Moscow' co-occurs with a source PP *iz Peterburga* 'from St. Petersburg' and a route PP *čerez Paris* 'through Paris'.

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(10) On exal iz Peterburga v Moskvu čerez Pariž. he rode from St. Petersburg to Moscow_{.acc} through Paris 'He traveled from St. Petersburg to Moscow via Paris.'

Contrary to the possessive PP complex, exemplified in (6) and (7), fronting all parts of a complex path results in a change in the information structure, whereby the second PP is construed as a separate aboutness topic (11a). In contrast, example (11b) illustrates the independent status of the PPs in a complex path.

- (11) a. #Kuda iz Moskvy ona edet? where.dir from Moscow she travels
 'Regarding her trip from Moscow, where is she going?'
 - b. Kuda ona edet iz Moskvy? where_{dir} she travels from Moscow 'Where is she going from Moscow?'

We have shown so far that the two PPs form a constituent, but haven't yet provided any evidence as to the internal structure of the possessive PP complex hypothesized in (4). A possible alternative to this structure, consistent with the abovementioned constituency tests, is treating P_1 as the head, with NP₁ forming a constituent with PP₂. However, several indications argue against this alternative. These will be reviewed in the next subsection.

2.2 Independent Status of u-PP and PP₂

u-PPs have independent existence outside of a possessive PP complex. In addition to the possessive interpretation available in, e.g., existential possessives (12), they can also have a locative interpretation of physical proximity (13): static, for u 'at', or dynamic, for k 'towards'.

- (12) **ULjuka** okazalos' mnogo druzej. atLuke turned.out many friends 'Luke turned out to have many friends.'
- (13) a. **U doma** priparkovany tri mašiny. at house.gen parked.ppp.pl three cars 'There are three cars parked near the house.'

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b. Učeniki podošli **k učitel'nice/stolu**. students approached towards teacher/table 'The students approached the teacher/table.'

In this locative use, they can fail to associate with another NP in the sentence (3a) without forming a constituent with it or to entail a possessive relation (13a-b) (and must so fail when the NP is inanimate, unless functioning as a predicate).¹ A mismatch in directionality or direction is then possible (14).

(14) **U Saši** ona položila knigi **pod krovat'**. at Sasha she put books under bed_{.acc} 'When at Sasha's, she put the books under her/his/the bed.'

Similarly, datives not forming part of a possessive PP complex can be interpreted as animate locations (15).

(15) Vasja prišil **kobyle** xvost. Vasya sewed mare.dat tail 'Vasya sewed a tail to the mare.'

Independent evidence for the existence of constituents consisting of two or more PPs is provided by locational/directional PP complexes without a u-PP, as in (16) and (17).

- (16) a. Ja brosila knigi **pod stol na pol**. I threw books.acc under table.acc on floor.acc 'I threw (the) books under the table on the floor.'
 - b. Kuda ty brosila knigi? Pod stol na pol. where you threw books.acc under table.acc on floor.acc
 'Where did you toss (the) books? – Under the table on the floor.'

¹ Dialectal Arabic is similar to Russian in having a preposition *Sind/Sand* 'near/at' that give rises to possessive interpretation only with animates, whereas otherwise it is interpreted as denoting physical proximity (see Boneh & Sichel 2010). The same is claimed to be true for the Finnish adessive (Kittilä, Västi and Ylikoski 2011, Sulkala and Karjalainen 1992:178).

- c. Postav' sabvufery na pol. Kuda na pol stand subwoofers on floor.acc where.to on floor.acc nevažno. unimportant
 'Put the subwoofers on the floor, no matter where on the floor.'
- (17) a. Ja brosala knigi **pod stolom na polu**. I threw books.acc under table.loc on floor.loc 'I threw (the) books (while) under the table on the floor.'
 - b. Gde ty brosala knigi? where you threw books.acc
 'Where were you throwing (the) books?
 - **Pod** stolom na polu. under table.loc on floor.loc
 - Under the table on the floor.'

No possession is established here and the interpretation can be derived by simple intersection of the denotations of the PPs (i.e., by Predicate Modification). We observe therefore (contra den Dikken 2010) that the actual constraint on the formation of such complex PPs is not a containment relation arising between the two locations involved, but rather the weaker need for the intersection of the denotations of the PPs involved to be non-empty. In both the directional/argument (16) and the locational/adjunct (17) PP complexes, neither PP contains the other and the denotation of the PP complex is determined by the intersection of the two locations, namely, it is the place that is both under the table and on the floor.

Given the evidence both for the independent existence of *u*-PPs with and without possessive effects and for the availability of PP complexes, the question is how the possessive interpretation in the possessive PP complex arises. As we will now show, there are good reasons to believe that the possessive interpretation of PP₂ is not dependent on *u*-PP/NP₁, and more generally, does not require a syntactic account.

3 PP Intersection: Deriving the Possession Interpretation

In Russian, a possessive pronoun need not be overtly expressed for both reflexives and non-reflexives (Grashchenkova and Grashchenkov 2006):

(18) Petjai udaril $\emptyset_{i,k}$ sobaku. G&G's ex. (37b) Peter hit dog.acc 'Peter hit the/his dog.'

Therefore, any NP can be interpreted as possessed by any individual salient in the discourse. Yet the question remains why in the possessive PP complex the characteristic possessive interpretation is felt to be obligatory. One possibility is possessor-raising to [Spec, ApplP], as proposed, mainly for datives, in Grashchenkov and Markman 2008, Tsedryk 2008, 2017 and Pshekhotskaya 2012. However, while this approach can account for structures with a dative possessor (if regarded as an NP) and an argument associate (3b), the possessive PP complex in its entirety is beyond its reach, since it would require movement into a non-c-commanding position (the complement of a preposition). An alternative approach (cf. Cuervo 2003, 2010, Bruening 2010), combining both PPs as arguments of a null applicative head inducing possessive interpretation would result in a type mismatch, since such an applicative head may either select two individuals or relate an individual to an event (cf. Pylkkänen 2008). This is why we appeal to the semantics of the two constituents, assuming that they are composed by Predicate Modification (Heim and Kratzer 1998:65) in (19) on the assumption that *u*-PP denotes a type of location.

(19) If α is a branching node, { β , y} is the set of α 's daughters, and $\llbracket \beta \rrbracket$ and $\llbracket \gamma \rrbracket$ are both in $D_{\langle e, t \rangle}$ then $\llbracket \alpha \rrbracket = \lambda x \in De$. $\llbracket \beta \rrbracket (x) = \llbracket \gamma \rrbracket (x) = 1$

More specifically, we will assume that while PP_2 has its usual denotation as a locus or path in actual physical space,² an animate *u*-PP denotes a

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 $^{^{2}}$ A number of approaches to the semantics of loci have been proposed, from pointbased (e.g., Kracht 2002) to vector-based (e.g., Zwarts and Winter 2000), to region-based (e.g., Wunderlich 1991), and the implementation of paths has been equally diverse. The formalization does not matter to us at this point, as long as the distinction between predicates (sets), *loci* and paths is maintained.

sphere of influence (see Brugman 1988, Cienki 1995, Belvin 1996, Belvin and den Dikken 1997, and Zimmerling 2000 for similar intuitions), viewed as a locus. More specifically, we assume that for an animate entity the proximity relation encoded in u and k involves non-spatial notions, viz., that of a sphere of influence: a set of loci where the individual in question exerts influence. Predicate Modification in the structure proposed in (4) then yields the intersection of the two sets, one of which is a sphere of influence. Likewise, sets of paths introduced by directional PPs can be intersected with the sets of paths into the *sphere of influence* introduced by k-PPs and dative DPs, as in (1c-d), respectively.³

(20) a. [[U Sasha]] = in Sasha's sphere of influence
 b. [[U Sasha in the bag]] = in Sasha's sphere of influence and in the bag

We can now obtain the possessive interpretation of NP₂ from the pragmatics of influence. In order for a locus to intersect with someone's *sphere of influence* the locus in question should, in general, be in the relevant individual's possession or otherwise associated to them. That possession is not 100 percent of the law here can be demonstrated by examples like (21), where NP₂ contains an overt possessor *papinoj* 'daddy's', *cužoj* 'other's'. In this situation the bag in question, while being the property of somebody else, must still be controlled by *her*.

(21) ?Vor vytaščil košelëk **u neë iz papinoj/cužoj sumki**. thief pulled.out wallet at her out.of daddy's/other's bag 'The thief pulled the wallet out of her daddy/other bag.'

4 The Semantics of Possession as Location

As discussed above, the Russian prepositions u 'at' and k 'towards' may have a purely locative interpretation indicating physical proximity, static or dynamic, respectively. While the dynamic approximative k is, just like the Dutch associative *bij* 'by, beside', compatible with both animate and

³ The obligatory match in configuration strongly suggests that the directional component is merged outside the locative possessive PP complex formed by a locative PP and a u-PP, but we will not elaborate on the issue further.

inanimate complements, *u* can be interpreted as a static approximative preposition only with inanimate complements.

- (22) a. Na stolike u krovati/#Very stojal stakan.
 on table at bed/Vera stood glass
 'A glass was standing on the bedside table/#the table at Vera's/
 *the table near Vera.'
 - b. Učeniki podošli k Vere/stoliku. students approached towards Vera/table 'The students approached Vera/the table.'

With an animate complement, however, both of these prepositions make available the reinterpretation of the NP as the *sphere of influence* rather than location, and this reinterpretation is also possible in the absence of a possessive PP complex (23).

(23) Ukogo moi spički? – Umenja. – Položi ko mne. at who my matches at me place.imp towards me 'Who has my matches? – I do. – Put them [in the relevant contextual location associated with me, where they are expected to be kept].'

The notion of a *sphere of influence* reflects the conception of possession as a composite notion (cf. Arylova 2013) consisting of a number of intersecting or concentric spheres: from the part-whole relation with the ground (including inherent properties and mental states) to the body surface (cf. Rooryck 2017 on French inalienable possession) to the house of the animate individual and finally, its extension (cf. Longobardi 2001 on the diachronic development of the French *chez*) to the general sphere of influence (specifically for Russian, see Iordanskaja and Mel'čuk 1995).⁴ While inanimate possessors permit only the part-whole relation, animate ones are more permissive:

⁴ The question remains open where kinship nouns fit in this schema. As possessive PP complexes do not provide any insight into the matter, we leave it aside.

(24) inanimate



While with body parts the sphere of influence is most naturally restricted to the body (25), in certain contexts it can be referring to the home (26) or may even not be physical, as in (27), which, if used at the TV station, does not, of course, imply that the entire world belongs to the speaker and their associates, but merely indicates the frame of reference.

- (25) **UVery** bolit golova. at Vera hurts head 'Vera's head is aching.'
- (26) a. Ja ostanovljus' u Mariny (na Arbate).
 I will.stay at Marina on Arbat_{loc}
 'I will stay at Marina's place (on the Arbat Street).'
 - b. Ja poedu **k** Marine (v Piter). I will.go towards Marina_{.dat} in St. Petersburg_{.acc} 'I will go to Marina's place in St. Petersburg.'
- (27) Čto **u nas** proisxodit? **U nas** cunami, ne znaju ešče, gde. What at us happens at us tsunami not know._{1sg} yet where 'What have we got? – We've got a tsunami, don't yet know where.'

We therefore have evidence for the *sphere of influence* interpretation of *u*-PPs independently of the possessive PP complex. By appealing to this interpretation we can explain now why the possessive PP complex is limited to animate NP₁:

(28) #Kačeli viseli u dereva na vetke.
swing hung at tree on bough_{.loc}
'The swing hung near the tree from a bough.'

Example (28) is telling in this respect since, with two inanimate PPs whose NPs otherwise stand in a part-whole relation that forms part of those naturally encoded as possession (e.g., with a possessive pronoun), a possessive PP complex cannot be properly employed. In other words, a possessive interpretation cannot be established between two inanimate PPs in the possessive PP complex.

The explanation is linked to how *influence* is exercised: while possession is not limited to animate entities, namely in part-whole relations (cf. Heine 1997, Boneh and Sichel 2010), it is only animate (or, more precisely, sentient) individuals that may exercise influence at distance, which requires volition.⁵ We furthermore can account for the fact that when the NP complement in *u*-PPs functions as a possessor, it is affected: assuming that the sphere of influence is an extension of the self, as sketched in (**Error! Reference source not found.**), it is natural that the self is affected by any changes in its sphere of influence.

Consequently, inanimate (or dead) referents cannot exercise influence, as illustrated in (29), which implies that (Hamlet's) Ophelia is not dead:

 Mogil'ščik stojal u Ofelii v mogile. gravedigger stood at Ophelia ingrave.loc
 'The gravedigger stood in Ophelia's grave.'

The question arises then whether the restriction of the *sphere of influence* to the body, the home or the social space of an individual is represented syntactically and therefore represents ambiguity rather than vagueness. Is it plausible to hypothesize that the *sphere of influence* interpretation of a *u*-PP is always connected to the presence of another PP, a locative one,

- (i) U etogo dereva listja okrašeny v fioletovyj cvet.
 - at this tree leaves colored in purple color 'This tree's leaves are colored purple.'

⁵ An anonymous reviewer asks why a u-PP with an inanimate complement can give rise to the possessive interpretation when associated with an argument NP (i) or in the predicate position.

We hypothesize that the possession relation in such cases is established as a result of the entire eventuality being interpreted as occurring in the sphere of influence of the relevant individual, which for inanimate entities is restricted to the whole, forcing the part-whole interpretation.

i.e., does the "home" interpretation in (26a) arise from the presence of a covert counterpart of the overt 'home', as in (30)?

(30) Idëm ko mne (domoj). go_{.imp.1pl} towards me home_{.dir} 'Let's go to my place.'

We believe that such is not the case, and the reason for this conclusion is the need to correlate the interpretation of a *u*-PP with the context. If a covert 'home' could in principle be inserted, what would preclude the *u*-PP in (31) from being interpreted as "at my place" (in the absence of a heavily biasing context)? The vagueness approach has an advantage here, since the relevant "home" interpretation would arise only when forced by the context. In other words, while both the syntactic and the pragmatic approach need to clarify what brings forward which understanding of the *u*-PP, only the syntactic approach would also require a mechanism for filtering out the unwanted interpretations.

(31) Umenja(est') dva okna. atme is two windows'I have two windows.' (NOT: 'My house has two windows')

Summarizing, our approach relies on the hypothesis that the so-called "possession", whether encoded by possessive morphology, the verb *have* and its equivalents, or a *u*-PP and its cross-linguistic counterparts, can in fact correspond to a volition-related notion of the *sphere of influence*, which can be linguistically treated as a location, following the generally available locative metaphor for abstract states (Reddy 1979, Lakoff and Johnson 1980, etc.). Following this assumption makes it possible to both explain the entailments that the use of locative *u*-PPs has for possession and the accompanying restrictions on the animacy of the complement. The question remains, however, of why the animacy constraint is only obtained in the possessive PP complex, as possession can be readily established with inanimates as long as the associated NP is an argument, as illustrated in (32).⁶

⁶ As noted by Cienki 1995, with inanimate entities possession can be either expressed with material parts or with inalienable abstract properties, such as names, heights, etc.

(32) Usamolëta bylo povrezdeno krylo. at airplane was damaged wing 'The airplane had a damaged wing.'

We hypothesize that the proximity interpretation that we have suggested for the preposition u 'at' is not its only one. In addition, we propose, u, as befits its origin as an allomorph of the preposition v 'in', can also be interpreted as 'within the material limits of', which makes it the unique preposition for expressing a part-whole relation, as in (32); this interpretation is, we assume, incompatible with modification by another PP being in itself uniquely specifying, as witnessed by the systematic use of definite determiners with body parts (Poesio 1994). We can then view the proximity interpretation as derived and, in turn, giving rise to the derived interpretation of the sphere of influence. Russian thus differs in this respect both from Finnish (where the locative adessive case can be used to indicate possession with animates but only proximity for inanimates, cf. Kittilä, Västi and Ylikoski 2011, Sulkala and Karjalainen 1992:178) and from Dutch (where the preposition bij 'beside' does not give rise to either a possessive interpretation or the *sphere of influence*). See also Boneh and Sichel 2010) on the syntax and semantics of prepositions implicated in the expression of clausal possession in Palestinian Arabic for yet another distribution of labor between proximity prepositions giving rise to possession with animates, but where a different directional preposition is employed to mediate part-whole relations.

5 Concluding Remarks

Investigating the structural and interpretative peculiarities of the hitherto unstudied possessive PP complex in Russian has lead us to propose a pragmatically motivated analysis of the obligatory possession inference arising in this construction.

We have singled out *u*-PPs, *k*-PPs and, possibly also, bare dative NPs as one essential part of the possessive PP complex that combines with a pure locative PP to form a constituent, in which the two PPs match in directionality or location.

It was then claimed that the syntactic setting combining the two PPs is not a necessary condition for deriving the possessive interpretation between the NPs contained in the two PPs, but that rather the possessive interpretation is derived from the pragmatics of influence, where if an

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object is placed in a human's *sphere of influence*, it may be understood to be possessed by the latter.

The current research opens up an investigation on human *loci* and the conditions that must obtain for them to be interpreted as exercising influence. Further research should broaden the investigation on the concept of *sphere of influence* to other types of constructions and also cross-linguistically.

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The Auxiliary 'be' as a Bundle of *phi*-features^{*}

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This paper addresses the distribution of perfect auxiliaries in Slavic. In particular, it offers a syntactic analysis of the special position of the 3^{rd} person singular auxiliary clitic (*j*)*e*, which is placed to the right of pronominal clitics. In this way (*j*)*e* occupies a different position than the other auxiliary forms, as illustrated in (1) for Serbo-Croatian.

(1)	a.	On <i>mu</i>	ih	je	dao	
		he him _{DA}				
		'He gave	them to	him.'		
	b.	Ja <i>sam</i>	ти	ih	dao	
		I am _{AUX}	naccgivepart			
		'I gave th	em to h	im.'	-	(S-C)

The special distribution of (j)e has so far been usually attributed to morphological or phonological factors (see Tomić 1996, Rivero 2005, Bošković 2001, Talić 2018, as well as Franks 2017 ch.5 for an overview). This paper argues that the position of (j)e is governed by syntactic mechanisms, related to person/number feature specification. The features are argued to operate in the syntax, rather than in the morphological component of PF. More generally, this paper also shows

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that the distribution of (j)e points to a general function of the auxiliary clitics in Slavic, which is to overtly express a person feature. This feature is not present on the *l*-participle (such as *dao* in (1)) functioning as the main verb, as it is marked only for gender and number.

This paper has the following organization. Section 1 addresses general properties of auxiliary verbs in Slavic and shows that their clitic and non-clitic forms display different semantic properties and restrictions. Section 2 outlines the distribution of different person forms of auxiliary verbs in Slavic, whereas section 3 describes the ways the special placement of (j)e has been explained in the literature. Section 4 provides an alternative analysis, which postulates two separate auxiliary positions in the structure, related to *phi*-feature specification. Empirical evidence for this analysis comes from observations concerning the distribution of the copula verb in Polish, the distribution of auxiliaries and subjects in Old Russian, as well as properties of presentative structures in Serbo-Croatian.

1 Properties of Auxiliary Verbs in Slavic

Virtually all Slavic languages form complex tenses with the verb 'be' as the exclusive auxiliary. The exceptions are Macedonian and Kashubian, which in addition use the auxiliary 'have'. The auxiliary 'have' selects the invariant singular neuter form of the passive participle as the main verb. In Macedonian 'have' is used with both unaccusative and unergative verbs, though with unaccusative verbs there are only experiential readings in such structures.

(2) Imam dojdeno ovde poveke pati have_{1SG} come_{PTP.SG.N} here more times 'I have come here more than once.' (Mac, Tomić 2012: 324)

In Kashubian unaccusative participles occur with the auxiliary 'be,' whereas unergative verbs are accompanied by the auxiliary 'have.'

(3)	a.	Та	białka	je	prec	CZ	jidzenô		
		this	woman _{F.SG}	be _{AUX.}	3.SG awa	ıy	goptp.f.sg		
		'This	woman has	gone a	way.'		(Csb, Stor	ne 2002: 77	7)
	b.	Τë	măš	to	wszétko) Z1	rob'iọné		
		you	have _{PRES.2SG}	this	all	d	OPTP.N.SG		
		'You	have made	all of it	.'	(Cs	sb, Migdals	ki 2006: 13	0)

Within the languages that make use of 'be' as the exclusive auxiliary, it is important to make a distinction between its clitic and strong, orthotonic form. As will be shown in this paper, the clitic auxiliaries provide *phi* feature specifications; in particular, they spell out the person feature. The strong auxiliaries are semantically richer and may impose selectional restrictions on the main verb. For instance, as shown in (4) for Bulgarian, the strong auxiliary may be explicitly marked for tense, such as aorist.

(4)	Ivan beše	čel	knigata	
	Ivan beAOR.150	readpart	г.м.sg book-the	
	'Ivan had read	the book	. ,	(Bg)

Furthermore, the auxiliary 'be' may show aspectual distinctions. For example, in Old Church Slavonic, the imperfective form of 'be' (*běaxõ* in 5a) is used to express pluperfect meanings. The perfective form of 'be' (*bõdemъ* in 5b) is used in future perfect structures. The *l*-participle is the main verb in both structures.

(5) ijudei běaxõ prišьlo kъ Martě a. Мъпозіžе ot many FOC from Jews beIMP.3PL comePART.SG.N to Marta 'Many of the Jews had come to Martha.' (Lunt 1974: 98) b. Vъskõjõ sę i rodili bõdemъ bearpart PL bepre 1PL why even 'Why will we have been born?' (Schmalstieg 1983: 159)

In some languages the strong forms of the auxiliary may impose aspectual restrictions on the main verb. For instance, in Polish the perfective form of 'be,' interpreted as the future auxiliary, may occur only with imperfective verbs.

(6)	a.	Maria	będzie	pić/piła	kawę		
		Maria	beprf.1se	G drinkpart.IMPF.F.SG	coffee _{ACC}		
		'Maria	will driv	nk coffee.'/'Maria	will be dri	nking coffee	e.'
	b.	*Maria	będzie	wypić/wypiła		kawę	
		Maria	be _{PRF.1S}	G drinkpart.prf.f.sg/d	rink _{INF.PRF}	coffeeAcc	
		'Maria	will dri	nk coffee.'			(Pl)

By contrast, in Slovenian the future auxiliary *bo*, which is a clitic, does not impose aspectual restrictions on the main verb (see Franks & King 2000)

In Bulgarian the strong auxiliary restricts the tense form of the main verb. Namely, the past auxiliary (*beše* in 7) may only combine with aorist *l*-participles, and it may not appear with imperfect participles, whether they are specified for perfective or imperfective aspect.

a.	Ivana	beše	pisala	stixove	
	Ivana	bepast.3SG	writepart.impf.aor.f.sg	poems	
	'Ivana	had written	n poems.' (Bg	Krapova	1999: 60-61)
b.	*Ivana	beše	napišela/pišela		stixove
	Ivana	bepast.3SG	writepart.prf.IMP.F.SG/V	write _{IMPF.IM}	poems
	a. b.	a. Ivana Ivana 'Ivana b. *Ivana Ivana	 a. Ivana beše Ivana bepast.3sg 'Ivana had writte b. *Ivana beše Ivana bepast.3sg 	 a. Ivana beše pisala Ivana bepast.3sg writepart.IMPF.AOR.F.SG 'Ivana had written poems.' (Bg, b. *Ivana beše napišela/pišela Ivana bepast.3sg writepart.prf.IMP.F.Sg/V 	 a. Ivana beše pisala stixove Ivana bepast.ssg writepart.impf.aor.f.sg poems 'Ivana had written poems.' (Bg, Krapova b. *Ivana beše napišela/pišela Ivana bepast.ssg writepart.prf.imp.f.sg/writeimpf.im

The properties of the non-clitic forms of auxiliaries in the Slavic languages illustrated above pose an empirical challenge for some assumptions made about auxiliary verbs in the literature. Thus, Chomsky (1993) posits that all auxiliaries are uninterpretable at LF. Correspondingly, Emonds (2000) argues that they are lexicalized postsyntactically (at PF) as they encode only formal features, which do not play any role at LF. These assumptions are clearly too strong, as otherwise structures such as the Old Church Slavonic ones in (5) should present no temporal contrast given that they differ only in the form of the auxiliary verb. The idea pursued in this paper is that auxiliaries may differ with respect to their semantic import, which within Slavic may correspond to their clitic/strong distinction. The strong auxiliaries are semantically richer, as they may express aspectual distinctions. The clitic auxiliaries are pure overt *phi*-feature exponents, and as will be shown in the subsequent sections, the richness of their *phi*-feature specification corresponds to their position in the structure.

2 Distribution of Clitic Auxiliaries in South Slavic

As was noted in the introduction, South Slavic languages display an intriguing variation in the position of the auxiliary clitic 'be': whereas the 3^{rd} person auxiliary *(j)e* follows pronominal clitics (see 8a), the other auxiliaries (e.g. *sam* in 8b) precede them.

(8)	a.	On <i>mu ih je</i> dao	
		he him _{DAT} them _{ACC} is _{AUX.3SG} give _{PART}	
		'He gave them to him.'	
	b.	Ja sam mu ih dao	
		I amAUX.ISG himDAT themACCgivePART	
		'I gave them to him.'	(S-C)

The distribution of the clitic form of 'be' is subject to microvariation across Slavic. In some languages, such as Czech and Macedonian, the third form of 'be' is morphologically overt only when it functions as a copula, and it is null when used as an auxiliary in compound tenses. In addition, in Macedonian both the singular and plural clitic forms of the verb 'to be' in the third person follow the other clitics (see Tomić 1996: 826; Franks & King 2000: 81).

(9)	a.	Ti <i>si mu</i> tatko
		you are _{2SG} him _{DAT} father
		'You are his father.' (lit. 'You are father to him.')
	b.	Nie sme mu roditeli
		we are _{1PL} him _{DAT} parents
		'We are his parents.' (lit. 'We are parents to him.')
	c.	Toj <i>mu e</i> tatko
		he him _{DAT} is _{3SG} father
		'He is his father.' (lit. 'He is a father to him.')
	d.	Tie <i>mu se</i> roditeli.
		they him _{DAT} are _{3PL} parents
		'They are his parents.' (Mac, Tomić 2012: 230)

Diachronically, all auxiliary forms followed pronominal clitics (Sławski 1946: 76–77), as shown for Old Bulgarian in (10). In the 17–18th century the first and second auxiliary forms shifted across the pronominal clitics,

adopting the current distribution, as in (11). I tentatively suggest in Migdalski (2016) that the change may have been caused by the strengthening of the person feature on T^0 , which triggered obligatory movement of all the person-marked auxiliaries across the other clitics.

a.	pustila	mę	sta	oba	carĕ	
	let-gopart.f.dual	meacc	areAUX.2DUAL	two	tsars	
	'Two tsars have	e sent m	e.'		(1	4^{th} c. Bg)
b.	tvoè zlàto što	ти	si	pròvo	оdilь	
	your gold that	t him _D	AT areAUX.2SG	send _P	ART.M.SG	
	'Your gold that	you hav	ve sent to hir	n.'		
	C	-	$(17^{th} c. I)$	Bg, Mi	igdalski	2016: 283)
a.	deto si	së	javilь	na	mòata	žena
	where areAUX.2	sg REFI	appearpar	тto	my-the	wife
	'Where you hav	ve appea	red to my w	ife.'	-	$(17^{\text{th}} \text{ c. Bg})$
b.	nó <i>sa</i>	gi	zváli	got	ïi	
	and areAUX.3PL	themaco	C.PL call part	.PL GO	ths	
	'And they calle	d them	Goths.'			
	2		(18 th c. I	Bg, Mi	igdalski	2016: 284)
	а. b. а. b.	 a. pustila let-gOPART.F.DUAL 'Two tsars have b. tvoè zlàto što your gold that 'Your gold that a. deto <i>si</i> where areAUX.2 'Where you have b. nó <i>sa</i> and areAUX.3PL 'And they calle 	 a. pustila mę let-goPART.F.DUAL MEACC 'Two tsars have sent mi b. tvoè zlàto što mu your gold that himp, 'Your gold that you hav a. deto si së where areAUX.2SG REFI 'Where you have appea b. nó sa gi and areAUX.3PL themACC 'And they called them of 	 a. pustila mę sta let-gopart.F.DUAL meacc areaux.2DUAL 'Two tsars have sent me.' b. tvoè zlàto što mu si your gold that himdat areaux.2sg 'Your gold that you have sent to him (17th c. H a. deto si së javilb where areaux.2sg REFL appearpar 'Where you have appeared to my w b. nó sa gi zváli and areaux.3PL themacc.PL callpart 'And they called them Goths.' (18th c. H 	 a. pustila <i>mę sta</i> oba let-goPART.F.DUAL MEACC areAUX.2DUAL two 'Two tsars have sent me.' b. tvoè zlàto što <i>mu si</i> pròvo your gold that himDAT areAUX.2SG sendp 'Your gold that you have sent to him.' (17th c. Bg, Mi a. deto <i>si së</i> javilь na where areAUX.2SG REFL appearPART to 'Where you have appeared to my wife.' b. nó <i>sa gi zváli got</i> and areAUX.3PL themACC.PL callPART.PL Go' 'And they called them Goths.' (18th c. Bg, Mi 	 a. pustila <i>mę sta</i> oba carě let-gopart.F.DUAL meACC areAUX.2DUAL two tsars 'Two tsars have sent me.' (1 b. tvoè zlàto što <i>mu si</i> pròvodilb your gold that himDAT areAUX.2SG sendPART.M.SG 'Your gold that you have sent to him.' (17th c. Bg, Migdalski a. deto <i>si së</i> javilb na mòata where areAUX.2SG REFL appearPART to my-the 'Where you have appeared to my wife.' b. nó <i>sa gi zváli gotïi</i> and areAUX.3PL themACC.PL callPART.PL Goths 'And they called them Goths.' (18th c. Bg, Migdalski

The subsequent section presents some previous accounts of (j)e placement, most of which attribute the special position of this auxiliary form to phonological or morphological factors.

3 Previous Accounts of the Exceptional Auxiliary Placement

The special placement of (j)e has been explained in a number of ways. On the one hand, Bošković (2001: 125ff) attributes it to PF factors. He observes that in Serbo-Croatian in sentences interrupted by intonation pauses, *je* precedes the pronominal clitics, on a par with the other auxiliaries (see 12). This fact shows on his view that in Serbo-Croatian all the auxiliaries occupy the same position in syntax, whereas *je* is spelled out at the end of the cluster only at PF, as it is in the "process of losing clitichood," which prevents it from occurring outside the edges of the cluster.¹

(12)	a.	?#On <i>je</i> , #	kao šte	sam va	m rekla	ı#,
		he is _{AUX}	as	am yo	UDAT SAYP	ART.F.SG
		predstavio	se	Pe	tru#	
		introducePA	RT.M.SG Se	lface Pe	terdat	
		'He, as I to	ld you, ir	ntroduced	l himself t	o Peter.'
	a'.	*#On <i>se</i> , # k	ao šte sa	<i>m vam</i> re	kla#, pred	lstavio <i>je</i> Petru
	b.	?#Oni su,	# kao	šte sam	vam	rekla#,
		they are	AUX as	amAu	JX YOUDAT	Say PART.F.SG
		predstavili	se	Pe	tru#	
		introducePA	RT.M.PL SC	lface Pe	terdat	
		'They, as I	told you,	introduc	ed themse	elves to Peter.'
	b'.	*#Oni se, #1	kao šte sa	<i>im vam</i> r	ekla#, pre	dstavili su Petru#
					(m m	

(S-C, Bošković 2001: 126)

Irrespective of the observation of the context in (12), Bošković's proposal does not explain why (j)e occurs as the final clitic in all South Slavic languages even though their clitics have different PF-requirements. Thus, although auxiliary clitics are phonologically enclitic in Bulgarian and proclitic in Macedonian (see 13 and 14), the third person forms uniformly follow pronominal clitics. Furthermore, unlike Serbo-Croatian, which features Wackernagel cliticization, Bulgarian and Macedonian have verb-adjacent clitics.

(13)	a.	Dal	li	si	ти	gi	parite?
		give _{PART.M.SG}	Q	be _{2SG}	him_{DAT}	them _{ACC}	money-the
		'Did you giv	e hir	n the r	noney?'		
	b.	* <i>Si mu gi</i> dal l	li pa	rite?		(Bg, Rud	in et al. 1999: 544)
(14)	a.	Si mu	gi		dal	li	parite?
		be _{2SG} him _{DAT}	the	m _{ACC}	givepar	t.m.sg Q	money-the
		'Did you giv	e hir	n the r	noney?'		
	b.	*Dal <i>li si mu g</i>	gi pa	rite?	(Mac, Rud	in et al. 1999: 544)

¹ A PF account has been recently proposed also by Talić (2018), though in contrast to Bošković (2001), she does not assume a lower copy pronunciation of *je*.

Moreover, the proposed relation between the final position of *je* and the alleged process of *je* loosing its clitichood in Serbo-Croatian is problematic in view of diachronic evidence from other languages (such as Polish; see below), which shows that the loss of clitichood involves the reinterpretation of clitics as affixes. In this scenario, *je* would rather be expected to occur right-adjacent to the participle than to the pronominal clitics. Furthermore, examples (10–11) illustrate a diachronic change affecting the auxiliary position. This change is more likely to have occurred across Slavic due to a syntactic factor (such as the strengthening of a person feature, postulated in Migdalski 2016) rather than as a result of a PF modification given that clitics in South Slavic languages have different prosodic requirements.

In a syntactic account of *je* placement, Tomić (1996: 839–841) attributes its exceptional distribution to its mixed clitic and root-like properties, arguing that the former property is assumed when *je* follows the other clitics (see 15), and the latter when *je* is adjoined into another auxiliary clitic, such as *sam* in (16) and creates a strong form of the auxiliary. The adjunction involves movement of *je* from V⁰ to I⁰, where it incorporates into the person/number forms (such as *ste* in 16), which otherwise function as auxiliary clitics.

(15)		On <i>mu ih je</i> dao	
		he him _{DAT} them _{ACC} is _{AUX.3SG} give _{PAR}	Т
		'He gave them to him.'	
(16)	a.	On jeste popio	
		He <i>je</i> +are _{3SG} drunk _{PART.M.SG}	
		'He has drunk more than enough.'	
	b.	$\begin{bmatrix} IP & [I je_i + ste] \begin{bmatrix} VP & [V t_i] \end{bmatrix} \end{bmatrix}$	(S-C, Tomić 1996: 840)

Still, it is not clear whether the two instances of *je* in (15) and (16) are categorially related. I posit that the morpheme *je* in *jesam* in (16) is unrelated to the auxiliary clitic *je*. It is rather a morphological realization of the Σ -head, which contains features related to polarity, focus, and force. The Σ -head can be realized also in the nominal domain, on strong pronouns such as *jeho/jego* 'him' in Czech and Polish, as has been argued for Slovak by Cardinaletti & Starke (1999).

4 An Alternative Account

Rivero (2005: 1092) argues that the distribution of the auxiliaries in South Slavic is determined by person marking, with 1^{st} and 2^{nd} forms carrying a morphological specification for person, and 3^{rd} variants being non-person forms. Following Bonet (1995), she assumes that clitic order is determined by morphological mechanisms. In the case of the auxiliaries, she proposes that they are ordered through a morphological rule sensitive to person status. I adopt Rivero's idea that auxiliary placement is dictated by a person feature, though I suggest that its placement is entirely syntactic and that the auxiliary may target two syntactic positions depending on its person specification. Sections 4.1–4.2 provide evidence for the two syntactic projections coming from Polish, whereas sections 4.3–4.4 substantiate the idea that the auxiliary is a spell-out of *phi*-features on the basis of Old Russian data and properties of presentative structures in Serbo-Croatian.

4.1 Complex Tense Formation in Polish

Modern Polish does not have an overt third person auxiliary, but the syntactic properties of the complex tenses and the distribution of the 3rd person copula 'be' lend support for the postulation of multiple auxiliary projections and for the idea that the lower projection specifies a number feature.

Polish features two types of complex tense structures formed with the perfect auxiliary:

(i) with auxiliary cliticization on the *l*-participle, see (17a),

(ii) with auxiliary encliticization on the clause-initial element, see (17b).

In this type of structure the *l*-participle stays low and the auxiliary encliticizes onto the clause-initial element. These constructions received considerable attention in the literature, starting with Borsley & Rivero (1994), who argue that in both instances the auxiliary targets the same position (I^0/T^0) , as shown in (17a') and (17b').

- (17) a. Ty czytał-eś książkę you read_{PART.M.SG}+_{AUX.2SG} book_{ACC} 'You have read the book.'
 - a.' [IP Ty [I czytał_i-eś] [VP [V t_i] [NP książkę]]]
 - b. Ty-ś czytał książkę you+_{AUX.2SG} read_{PART.M.SG}book_{ACC}
 - b.' [IP Ty-ś_i [I t_i] [VP [V czytał] [NP książkę]]]]

Borsley & Rivero's argumentation has been challenged on various grounds. For instance, Dornisch (1997) observes that when the auxiliary is affixed to the *l*-participle, the participle can be either preceded or followed by pronouns (see 18a). By contrast, when the auxiliary encliticizes to an element at the beginning of a clause, the pronoun may occur between the auxiliary and the participle or after the participle (cf. 18b), but it may not precede the auxiliary (cf. 18b'). This fact poses a challenge for the assumption of a uniform auxiliary placement in Polish.

(18)	a.	My (go)	spotk	ali- <i>śmy</i>	(go)	wczoraj
		we him _{AC}	c meet	PART.VIR.PL+AUX.1PL	him _{ACC}	yesterday
		'We met hir	n yeste	rday.'		
	b.	My- <i>śmy</i>	(go)	spotkali	(go)	wczoraj
		we+AUX.1PL	him _{ACC}	meet _{PART.VIR.PL}	him _{ACC}	yesterday
	b.'	*My go- <i>śmy</i>	spotkal	i wczoraj	(Pl, Dor	nisch 1997: 191)

I take Dornisch's observation to indicate that the auxiliary may target different positions in the structure. More evidence for this idea comes from diachronic observations. Namely, older variants of Polish allowed the two positions of the auxiliary to be filled simultaneously on the *l*-participle and the clause-initial element, which was presumably interpreted as topicalized or focused.

ja owszeki (19)Tedy-m straci*l-em* miasto a. then+AUX.1SG I irretrievably losepart+AUX.1SG city 'Then I irretrievably lost the city.' Iż-eś ty pobil-eś b. wszytki that+AUX.2SG you beatPART +AUX.2SG all sprzeciwiające się mnie REFL me opposing 'That you defeated all those who opposed me.' (16th c. Pl, Decaux 1955: 34; Bański 2000: 125)

Franks & Bański (1999) and Bański (2000) report corresponding examples from dialectal Modern Polish, attested in north-eastern Poland. They assume such forms instantiate double auxiliary insertion, as the head of AgrsP and as verbal inflection on the *l*-participle.

(20)	%Ale-ś pow	viedział-eś
	but+AUX.2SG sayp	ART.M.SG ⁺ AUX.2SG
	'But you said	' (Pl, Bański 2000: 123)

The examples provided so far indicate that the auxiliary may occur in different positions in the structure in Polish. The subsequent section will demonstrate that the lower position specifies the number feature and that it corresponds to the one occupied by the 3rd person auxiliary in South Slavic.

4.2 Two Ways of Copula Formation in Polish

Table 1 below shows that in Polish the copula may be formed in two ways, which in fact correspond to the complex tense formation in (17):

(i) via affixation of the person/number morpheme to *jest* (the 3^{rd} person singular form used as a stem). I analyze the process as movement of *jest* to T^0 , where it is affixed to a person/number morpheme such as *-eśmy* (see 21),

(ii) via encliticization of the person/number morphemes onto the clauseinitial element such as the subject (see 22).

Notably, when strategy (ii) is adopted, the copula stems *jest* and *sq* are compatible with any person variant of the copula enclitic, which indicates that they do not specify any person feature, but only a number feature.

	copula affixation	copula encliticization	
1SG	ja jest- <i>em</i>	ja- <i>m</i> jest	
	I be _{1SG}	I+ _{AUX.1SG} be _{3SG}	
2SG	ty jest- <i>eś</i>	ty-ś jest	
	you be _{2SG}	you+ _{AUX.2SG} be _{3SG}	
3SG	on/ona	/ono jest	
	he/she/	it be _{38G}	
1PL	my jest- <i>eśmy</i>	my- <i>śmy</i> są	
	we be _{1PL}	we+AUX.1PL be3PL	
2PL	wy jest- <i>eście</i>	wy- <i>ście</i> są	
	you be _{2PL}	we+AUX.2PL be3PL	
3PL	oni/one	są	
	theyvir/th	neynv be _{3PL}	

Table 1: Two ways of copula formation in Polish

(21)	a.	My jest- <i>eśmy</i> spóźnieni	
		we be+AUX.1PL latevir.PL	
		'We are late.'	(Pl)
	b.	[TP my [T jest $i + e smy$ [AuxP [Aux t i [VP	
(22)	a.	Wy-ście zawsze są spóźnieni	
		you+AUX.2PL always be3PL latevir.PL	
		'You are always late.'	(Pl)
	b.	TP WY T -ście AdvP zawsze AuxP są VP	

Crucially, the forms *jest* and *sq* are clearly located lower than the other members of the paradigm, as they can be separated from them by an adverb such as *zawsze* in (22). I propose they are in Aux⁰, the same projection that hosts (*j*)*e*, the [-person] auxiliary in South Slavic.

Given that the 3^{rd} person auxiliary is null in Polish, the correspondence between the South Slavic and Polish data is indirect and comes only from the copula distribution, but it is further supported by the diachronic facts concerning the emergence of copula structures. Namely, on a par with contemporary South Slavic languages, in Old Polish the *l*-participle occurred with an enclitic variant of 'be' functioning as the auxiliary. The auxiliary was subsequently reduced to an affix in all persons except for 1^{st} and 2^{nd} person plural forms, which are still

interpreted as clitics by most speakers. The change is illustrated in (23) for the 1st person plural variant of the auxiliary.

(23) przyszli smy \rightarrow przyszli-śmy comepart.vir.pl beaux.ipl comepart.vir.pl+aux.ipl (see Długosz-Kurczabowa & Dubisz 2001: 307)

In contrast to South Slavic languages, the copula verb in Modern Polish is not homophonous with the auxiliary 'be.' With the diachronic weakening of the auxiliary 'be,' a new copula form emerged, which was created via the morphological merger of the strong variant of 'be' *jest* with the affixes that were originally the clitic variants of the auxiliary 'be' (see Andersen 1987), as shown for the 1st person plural form in (24).

(24)
$$jest+(e)smy \rightarrow jestesmy$$

 $be_{FOC.3SG}+be_{1PL}$ be_{1PL} (Pl)

Since the copula forms emerged in the same way as the participle+auxiliary orders illustrated in (23), this fact suggests that the copula and the *l*-participle+auxiliary complexes target the same position in Modern Polish. The uniform placement of these elements indicates in turn that the third person copula occupies the same position as (j)e in South Slavic, which I argue is the projection that encodes the number feature. The next two subsections provide further evidence for the idea that auxiliary clitics are the elements that provide *phi*-feature specification, coming from Old Russian and Serbo-Croatian.

4.3 Distribution of Subjects and Auxiliaries in Old Russian

It has been observed in the literature (see Meyer (2011); Jung (2015, 2018)) that Old Russian displays partial complementary distribution between overt subjects and auxiliaries. The complementary distribution is constrained by the person feature, as it affects only 1/2 person auxiliaries and 1/2 person pronominal subjects, which are mutually exclusive, in contrast to 3^{rd} person *l*-past clauses, which normally lack both overt auxiliaries and subjects (see 25).

(25)	a.	dalŭ jesmĭ	(participle – AUX)
		give _{PART.M.SG} be _{AUX.1SG}	
	b.	azŭ dalŭ	(subject – participle)
		I givepart.m.sg	
	c.	*azŭ jesmĭ dalŭ	(subject – AUX – participle)
			(OR, Jung 2018)

Jung (2018) explains the contrast in the distribution by postulating that both the 1/2-person subjects and auxiliaries morphologically represent a [person] feature that needs to be checked in T. Since 3^{rd} person is [-person], which is not syntactically represented, it does not need to be checked. If her analysis is adopted, Old Russian facts provide support for the idea that auxiliaries are *phi*-feature bundles. Neither the 3^{rd} person auxiliary nor the pronoun needs to be realized, as they only encode a number feature, which is independently present on the *l*-participle in past tense structures.

4.4 Properties of Presentative Structures in Serbo-Croatian

Crosslinguistically, presentative structures introduce new entities into discourse, as in *Here is a book*. Raković (2016) observes that Serbo-Croatian displays two presentative patterns, the default one with a bare NP (see 26a) as well as the one that contains a pronominal clitic (such as ga in 26b) and a co-indexed NP.

(26)	a.	Evo telefona	
		here phone _{GEN.M.SG}	
	b.	Evo ga_i telefon _i	
		here CL _{GEN/ACC.M.SG} phone _{NOM.M.SG}	
		'Here's the phone.'	(S-C, Raković 2016)

The pronominal clitic shares *phi*-features with the corresponding NP (such as *telefona* in 26), but it may not match its case, which indicates that this structure does not instantiate clitic doubling (see 27a). Furthermore, the clitic may not be replaced with a full pronoun (see 27b).

(27)	a.	*Evo	ga tel	efona	
		here	CLGEN/ACC.M.SG ph	Onegen.m.sg	
	b.	*Evo	njega	telefon	
		here	himgen/acc.m.sg	phonenom.m.sg	(S-C, Raković 2016)

Raković provides a few other contexts of case mismatch in presentative structures, which include *wh*-environments in which the *wh*-operator bears nominative case, whereas the clitic carries accusative/genitive case. This context is illustrated in (28), in which the presentative structure in (28a) is followed by the *wh*-question in (28b).

(28) a. Evo ga here CL_{GEN/ACC.M.SG}
'Here he is.'
b. Ko?/*Koga? who_{NOM}/*who_{GEN/ACC}
'Who?' (S-C, Raković 2016)

Concerning the syntax of presentative constructions, Raković observes that the clitics do not form a constituent with the NP and do not behave like pronominal elements. Rather, they resemble verbal agreement forms. In view of this property, she postulates that the clitics are number and gender feature bundles that must be morphologically realized. These features cannot be expressed on the verb as there is no verb available in presentative structures, so they are realized on pronominal clitics instead. I take Raković's observation to be supportive of the assumption made in this paper: auxiliary clitics are a spell-out of *phi* features, which must be overtly marked on the predicate. In complex tense structures, the *l*-participle specifies number and gender features, whereas the auxiliary provides the person feature. In case there are no verbs marked for person available, this function may be performed by pronominal clitics, as is the case in presentative constructions.

5 Conclusion

This paper has drawn a distinction between two forms of auxiliary verbs in Slavic: strong variants, which are marked for tense and aspect and may impose restrictions on the aspectual form of the main verb, and

clitic variants of the auxiliary 'be,' which are pure *phi*-feature bundles. Depending on the *phi*-feature content, the auxiliary/copula 'be' targets different positions in the structure. The third person form (*j*)*e* specifies only the number feature and targets a low Aux^0 projection, below pronominal clitics, whereas T^0 is available only to the auxiliaries that carry person distinctions. Thus, the argument made in this paper is that the low position of (*j*)*e* is entirely a result of a syntactic operation. It is unlikely to be related to PF requirements given that the third person auxiliary is the same across Slavic irrespective of the vastly different prosodic properties of clitics in these languages.

More generally, the distribution of the auxiliary 'be' in Slavic conforms to Koeneman & Zeijlstra's (2014) generalization (which follows Pollocks' 1989 insights), which states that verb movement to the IP domain is possible if the [argument] feature, which comprises [plural], [participant], and [speaker] subfeatures, is available on the verb.

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A Phase-Theoretic Account of Restrictions on *Θ*-Roles of Postnominal Genitives in Russian Event Nominal Phrases^{*}

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The aim of this paper is to provide principled explanation for restrictions on θ -roles of postnominal genitives in Russian event nominal phrases as a syntactic problem, based on Distributed Morphology and Phase-Sliding. In addition, this paper proposes a second type of *n* (nominalizers), which introduces Possessor; the necessity of this *n* is evident from semantic analysis.

1 Introduction: Three Types of Event Nominals

"Event nominals" denote an event or process and inherits the argument structure of their base verb (Grimshaw 1990 in general, Schoorlemmer 1998, Pazelskaya 2007 for Russian) and they can be followed by a genitive complement in Russian. Event nominals can be divided into three types in accordance with what kinds of θ -roles the genitive nouns following them can have (i.e. the restriction on θ -roles). In the first type, a postnominal

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genitive noun can receive only an external θ -role as in $(1a)^1$. In the second type, a genitive noun can receive either an external or an internal θ -role as in (1b). In the third type, a genitive noun can receive only an internal θ -role² as in (1c).

udar { mužčina / *stola }
hit mangen tablegen
'the hit { by the man / of the table }'
poseščenie { vrača / rynka }
visit doctor _{GEN} market _{GEN}
'the visit { by the doctor / to the market }'
razrušenie { *vraga / goroda }
destruction enemygen citygen
'the destruction { by the enemy / of the city }'

In this paper, the event nominals such as in (1a) are defined as "type 1 event nominals," those in (1b) as "type 2," and those in (1c) as "type 3," respectively. The classification in this paper differs from Grimshaw's (1990) classification of simple event nominals, complex event nominals. I classify event nominals simply in terms of the θ -roles of the genitive nouns following them. Furthermore, the focus of this paper is limited to event nominals derived from transitive verbs, which can take accusative objects. It is necessary to exclude deverbal nominals derived from intransitive verbs since they typically do not take internal arguments.

Further examples of the three types of nominals are provided in $(2)^3$:

(2) a. Type 1: *poceluj* 'kiss,' *izmena* 'betrayal,' *tanec* 'dance,' *šepot* 'whisper' etc.

¹ The noun left to the slash is interpreted as that with an external θ -role and the one right to the slash is as that with an internal θ -role. The same applies to (1b, c). Note that in the example (1) I chose the typical nouns which can be easily interpreted as external θ -roles, respectively.

 $^{^2}$ In this case, agentive nouns are expressed in the form of the instrumental case as shown in (21a).

³ In terms of morphology, note that type 1 nominals do not contain a verbal nominalizer *-nie/-tie* in their forms, but that it is observed in the forms of many nominals in type 2 and 3. This matter is stated again in section 3.

- b. Type 2: *prodaža* 'sale,' *predatel*'stvo 'betrayal,' *pinok* 'kick,' *ispolnenie* 'performance' etc.
- c. Type 3: *postroenie* 'construction,' *okruženie* 'surrounding,' *sbitie* 'shooting,' *zapolučenie* 'acquisition' etc.

The aim of this paper is to propose syntactic structures that explain the restrictions shown in (1), based on the ideas of Miyauchi and Ito (2016), and to demonstrate that those syntactic structures follow from the principles of Distributed Morphology (DM; e.g. Halle and Marantz 1993), Gallego's (2010) Phase-Sliding and Chomsky's (2000) Phase Impenetrability Condition (PIC). This paper focuses on examining the phenomena in (1) from a syntactic perspective⁴ instead of from a lexical perspective as has been before (Pazelskaya 2007 etc.). In addition, I propose two kinds of *n* through semantic verification of the analyses presented in this paper.

The rest of this paper is organized as follows. In section 2, I introduce the theoretical frameworks and assumptions adopted in this paper. Section 3 presents syntactic structures which explain the restrictions on θ -roles in Russian event nominal phrases. In section 4, I provide analyses of the respective restrictions in type 1/2/3 by using the syntactic structures proposed in section 3. Section 5 provides verification of the analyses presented in this paper in terms of semantics and proposes two kinds of *n*: n_{cat} and n_{poss} .

2 Theoretical Frameworks Adopted

2.1 Distributed Morphology

I adopt the framework of DM (Halle and Marantz 1993). In DM, lexical items are registered in lexicon as a root ($\sqrt{}$) and a categorizer (*n*, *v*, *a*, etc.),

⁴ Note that semantic characteristics observed in common within each type lie outside of the scope of this paper. In terms of aspect, many type 1 nominals are cognate with activity verbs and many type 2 nominals are cognate with achievement verbs. Furthermore, in type 2, states with many nouns with internal θ -roles do not change from the start and to the end of the event expressed by the nominal, while in many nouns with internal θ -roles in type 3, change of state are undergone. This may be related to the existence or absence of the CAUSE function in Lexical Conceptual Structure. There are exceptions in both these observations, however. To generalize semantic characteristics of each type of event nominals, more detailed observation and consideration are needed and thus this matter should be the subject of further study.

which is located at the head of a functional phrase, determines its category. Hence, the root ($\sqrt{}$) head-moves to a categorizer and thus determines its category and derives its form.

For example, in English, dog (noun) is formed by head-moving to the nominalizer n as illustrated in (3a) and dog (verb; 'follow') is derived by moving up to the verbalizer v as in (3b). These are examples in which the categorizers have phonologically empty forms but sometimes categorizers have their own phonological forms. *Nominalization* is formed as in (3c). The root ($\sqrt{}$; *nomin*-) head-moves to the nominalizer n (*-tion*), stopping successively at the adjectivizer a (*-al*) and at the verbalizer v (*ize*).



2.2 Phases and Phase-Sliding

I adopt Chomsky's (2000) version of the phase theory, under which a phase is a unit of syntactic computation that can be sent to the interfaces. Chomsky proposed that phases are CPs and v^*Ps . Regarding the phases, Phase Impenetrability Condition is stipulated as in (4).

(4) Phase Impenetrability Condition (PIC)

In phase α with head H, the domain of H is not accessible to operations outside α , only H and its edge are accessible to such operations. (Chomsky 2000: 108)

Furthermore, I adopt Gallego's (2010) Phase-Sliding, through which v^* -to-T movement extends the phase from v^*P to TP under certain conditions, which has been used to explain the word orders of interrogative

sentences, the behavior of left peripheries and the derivation of a V-O-S order in Spanish. Under this proposal, when a verb head-moves from v^* to T, the phasehood due to v^* also moves to T. To implement the Phase-Sliding, Gallego (2010) assumes that the head-movement is undergone in narrow syntax according to Pesetsky and Torrego (2001). Moreover, he adopts Labeling Algorithm (5) proposed by Chomsky (2008). Note that (5b) applies here since it involves a case where a head (α) internally merges with another head (β) as illustrated in (6a), but that (5a) does not apply here since it does not involve a case where a head (H) merges with a phrase (α) as shown in (6b).

- (5) Labeling Algorithm (LA)
 - a. In $\{H, \alpha\}$, H an LI, H is the label
 - b. If α is internally merged to β , forming $\{\alpha, \beta\}$ then the label of β is the label of $\{\alpha, \beta\}$ (Chomsky 2008: 145)



Gallego (2010) argues that as a result of the v^* -T movement, the label of T turns to v^*/T , which is a hybrid label, and v^*/TP , headed by it, functions as a phase as illustrated in (7).⁵



The Phase-Sliding in Gallego (2010) predicts that when headmovement occurs in narrow syntax, a phasehood of a phase head also

⁵ The boxed parts in (7) represent the complement domains of phases and the same applies thereafter.

moves. In DM, the event nominals involve head-movement to n as shown in (3c) and the head-movement to form an event nominal occurs in narrow syntax. Therefore, Phase-Sliding takes place even in deriving a form of an event nominal since n is a phase head according to, for example, Carstens (2001), Arad (2003), Hicks (2009).

3 Structures of Event Nominals⁶

This section gives specific structures proposed for each type of event nominals in Russian. The idea to explain the restrictions shown in (1) is that type 1 nominals and type 2/3 nominals differ in structure. The structure of the former is (8) and that of the latter is (9).⁷

⁷ In the trees (8) and (9), the top nodes are not DP but XP/VoiceP. In fact, hypotheses vary as to the structure of Slavic nominal phrases without overt articles. Some researchers insist on the presence of DPs even in Slavic (UDPH: Veselovská 1995, Progovac 1998, Rutkowski 2002, Pereltsvaig 2007, Rutokowski and Maliszewska 2007, Caruso 2012 etc.) while the others maintain that nominal phrases in Slavic are NPs (PDPH: Corver 1990, Zlatić 1997, Trenkic 2004, Bošković 2005, 2008, 2009, Petrovic 2011, Despić 2013 etc.). I do not assume DP in this paper since according to the analyses presented in section 4 of this paper, the data (i) appears to result in supporting PDPH.

(i) a.	*ameriki	razrušenie	goroda	bomboj
	America _{GEN}	destruction	city _{GEN}	bomb _{INS}
b.	amerikanskoe	razrušenie	goroda	bomboj
	American	destruction	city _{GEN}	bomb _{INS}
c.	America's dest	ruction of th	e city by	the bomb

c. America's destruction of the city by the bomb (=17a) Prenominal genitives are permitted in English but they are basically not in Russian as shown in (i a). The phrase (i b) is a Russian example that corresponds to the English one (i c). The difference in grammaticality of prenominal genitives between in English and in Russian can be straightforwardly explained by reducing the difference to the existence or absence of DP (PDPH). However, consideration of space does not permit further explanation and investigation on this matter in this paper.

⁶ The outline of the idea presented in this section has already been presented by Miyauchi and Ito (2016). The most significant difference here between Miyauchi and Ito (2016) and this paper is the existence or absence of the DP layers.



The structure in (9) has VoiceP, higher than XP but that in (8) does not. This structural difference is supported by the absence of a verbal nominalizer *-nie/-tie* in type 1 nominals.⁸ This argument is premised on the assumption that the nominalizer occupies the head of VoiceP. This premise is supported by the fact that the nominalizer can be decomposed into a morpheme of a passive participle *-n-/-t-* (Babby 1997). This fact is reflected in examples (10-11).

(10)	a.	razrušit' razrušen razrušenie
		destroyINF destroyPASS.PTCP destructionNOM.SC
		'to destroy destroyed destruction'
	b.	napisat' napisa n napisa n ie
		write _{INF} write _{PASS.PTCP} writing _{NOM.SG}
		'to write writing'
(11)	a.	otkryt' otkryt otkrytie
		close _{INF} close _{PASS.PTCP} closing _{NOM.SG}
		'to close closed closing'
	b.	vzjat' vzjat vzjatie
		take _{INF} take _{PASS.PTCP} taking _{NOM.SG}
		'to take taken taking'

The selection of *-n-* or *-t-* depends upon the lexicon. It is important that the distribution of the affixes *-n-/-t-* of deverbal nouns coincides with that of

⁸ See (2a). There are event nominals without *-nie/-tie* even in type2/3. In this case, it is necessary to assume a zero morpheme (φ) instead of *-nie/-tie*. However, what is important in this paper is that type1 nominals do not contain *-nie/-tie* in their forms.

passive participles. This means that the -n- or -t- affixes are shared between them. Thus the marker of nominalization -nie/-tie is located at the head of VoiceP.⁹

Moreover, I suppose that the root ($\sqrt{}$) directly takes an internal argument according to, for example, Harley (2009). The genitive Case of an argument is licensed through Agree of X with it. This X is a counterpart of Num in Carstens (2001), which is claimed to be a licenser of Case.¹⁰

4 Analyses

This section gives an account of the restrictions on θ -roles that genitives following event nominals can have (mostly based on Miyauchi and Ito 2016).

4.1 Analysis on Internal Θ-Roles

4.1.1 Type 1 Event Nominals. Accepting the proposal that *n*P is a phase (Carstens 2001, Arad 2003, Hicks 2009)¹¹, from PIC shown in (4), it naturally follows that the nouns with internal θ -roles cannot be in genitive in type 1 nominals as illustrated in (12).

⁹ To be morphologically accurate, what is related to Voice is only the affixes *-n-/-t-*. However, I analyze *-nie/-tie* as a syntactically conditioned allomorph of *-n-/-t-*. Voice taking vP/VP as a complement appears as the form of *-n-/-t-* but Voice taking XP appears as the form of *-nie/-tie*. The condition can be formulated as follows:

⁽ii) -n-, -t- \rightarrow -nie, -tie / XP

The similar analysis is presented in Legate (2014).

¹⁰ Carstens (2001) shows that the head of NumP, located between DP and nP, assigns Case to possessor DP from Swahili data. However, X is used as a genitive-licenser in this paper since what and how licenses Case is not our present concern. This is the matter of further research.

¹¹ Carstens (2001) insists that nP is a phase on the basis of argument structures. Arad (2003) argues it in terms of accessibility in morphology and Hicks (2009) claims it to explain binding relations.



The internal argument in the complement of \sqrt{P} must Agree with X, which is a probe so that its genitive can be licensed. *n*P, which is a phase, however, blocks this Agree because of PIC. This is why internal arguments of type 1 nominals cannot have the genitive Case.

4.1.2 Type 2/3 Event Nominals. The head of \sqrt{P} moves to the nominalizer *-nie/-tie*, located at the head of VoiceP, in order to derive forms of event nominals. Thus a phase expands from *n*P to VoiceP because of Phase-Sliding (Gallego 2010). This Phase-Sliding makes it possible that the head of XP Agrees with the internal argument, the complement of \sqrt{P} . Consequently, the internal argument is allowed to have genitive Case in type 2/3 nominals.



As shown in (13), $\sqrt{}$ moves up to Voice via n and X because of Head Movement Constraint (Travis 1984 Matushansky 2006 etc.). The complement domain of the new phase (VoiceP) owing to Phase-Sliding,

includes X, which is a genitive-licenser. Thus X can Agree with the internal argument and its genitive is realized.

4.2 Analysis on External Θ-Roles

4.2.1 Type 1/2 Event Nominals. The noun with external θ -roles in type 1/2 (apparent Agent), in fact, receives a θ -role of Possessor and is merged in the specifier of *n*P (Carstens 2000, 2001, Adger 2003 etc.). This Possessor is c-commanded by the probe, X, as illustrated in (14) and thus X can Agree with it. Consequently, nouns with external θ -roles in type 1/2 can be genitive at the postnominal position.



4.2.2 Type 3 Event Nominals. Nouns with external θ -roles in type 3 receive a θ -role of Agent. As Bruening (2013) points out, it is merged as an adjunct to VoiceP. This Agent is not c-commanded by the probe, X, as shown in (15) and hence X cannot Agree with it. This is why the nouns with external θ -roles in type 3 cannot appear in genitive at the postnominal position.¹²



¹² In section 5, I propose that there are two kinds of *n*: n_{cat} , which is a simple categorizer and n_{poss} , which functions as introducing Possessor. See (23) for more detail.

4.2.3 The Structural Differences in Nouns with External Θ -Roles. Where does the difference between Possessor and Agent in the positions come from? The validity of the structural difference between Possessor and Agent is in line with the Uniformity of Theta Assignment Hypothesis (Baker 1988).

(16) Uniformity of Theta Assignment Hypothesis (UTAH)
 Identical thematic relationships between items are represented by
 identical structural relationships between those items at the level of
 D-structure. (Baker 1988: 46)

It follows from UTAH that the θ -role of Possessor and that of Agent must be located in the different position from each other.¹³

Furthermore, it is expedient to assume the positional difference between the two in order to capture the English example as in (17a) properly. The example (17a) can be semantically interpreted as in (17b) in neo-Davidsonian representation.

(17) a. America's destruction of the city by the bomb
b. ∃e [destroy (e) ∧ Possessor (America, e) ∧ Agent (the bomb, e)
∧ Patient (the city, e)]

In the example (17a), *America* can be interpreted as Possessor, *the city* as Patient and *the bomb* as Agent, respectively.¹⁴ The dialogue in (18) shows the evidence that the bomb can be interpreted as Agent.

(18) A: What destroyed the city?B: The bomb.

¹³ Since what UTAH shows is that some elements with different θ -roles are located at different positions in underlying structures, it is necessary to find direct empirical evidence that genitive nouns with external θ -roles in type 1/2 and those in type 3 have different θ -roles. This matter is the subject of future work.

¹⁴ The example (17a) has also the following interpretation (iii).

⁽iii) $\exists e[\text{destroy}(e) \land \text{Agent}(America, e) \land \text{Instrument}(the bomb, e) \land \text{Patient}(the city, e)]$

B can answer "*The bomb*" because it is Agent.¹⁵ Therefore, in accordance with the above-mentioned positions of Possessor and Agent, the example (17a) is given a tree representation as illustrated in (19).



Fukui and Speas (1986), Abney (1987) argue that possessors display the properties similar to sentential subjects. Adger (2003: 226) also points out that Possessor moves up to the specifier of DP from the specifier of PossP, located between DP and *n*P, in order to check its Case feature.¹⁶ In English, Possessor DPs rise from the specifier of *n*P to the specifier of DP to get Case and the linear order is realized through this movement as in (19). That is, a (Saxon) genitive licenser in English is not X but D, unlike

b. $\exists e [$ writing $(e) \land$ Agent $(my \ dog, e) \land$ Instrument $(a \ pencil, e) \land$ Patient $(a \ letter, e)]$

¹⁵ In the dialogue in (iv), however, *B* cannot answer "*A pencil*" but must answer "*Your dog*."

⁽iv) A: What wrote the letter?

B: Your dog. / #A pencil.

Thus the example in (v a) must be interpreted as in (v b) unlike (17b).

⁽v) a. my dog's writing of a letter with a pencil

¹⁶ In this paper, I do not assume PossP for Russian. However, what is significant here is that Possessor rises from the low position to the specifier of DP.

in Russian. If I assume the parallelism between in Russian and in English, then it follows that X licenses of-insertion to assign oblique Case in English.

Semantics 5

This section shows that the analyses presented in section 4 correctly predicts an interpretation of event nominal phrases in terms of semantics and this interpretation can be compositionally computed by employing Event Identification (Kratzer 1996).

(20) Event Identification (EI)

Event Identification (\dots, f) $f \quad g \rightarrow h$ $\langle e, \langle s, t \rangle \rangle \quad \langle s, t \rangle \quad \langle e, \langle s, t \rangle \rangle$ $\lambda x_e \lambda e_s [f(x, e) \land g(e)]$ (Kr (Kratzer 1996: 122)

EI needs introducing as a new rule since Functional Application (FA)¹⁷ cannot apply to combination of the expression of type $\langle e, \langle s, t \rangle \rangle$ and that of (s, t). FA can apply when there is an open argument slot and its sister node saturates it. As schematized in (20), EI makes it possible to chain the function f from individuals to functions from eventualities to truth values and g from eventualities to truth values. The two functions, f and g, are inputs and are conjoined into the function h from individuals to functions from eventualities to truth values, as output.

Under event semantics and EI, the example $(21)^{18}$ can be calculated as shown in (22).

(21) a. razrušenie goroda vragom destruction cityGEN enemyINS 'the destruction of the city by the enemy'

¹⁷ FA is defined as follows:

⁽vi) If α is a branching node, $\{\beta, \gamma\}$ is the set of α 's daughters, and $[\beta]$ is a function whose domain contains $[\![y]\!]$, then $[\![\alpha]\!] = [\![\beta]\!] ([\![y]\!])$. (Heim and Kratzer 1998: 44) ¹⁸ I assume that the instrumental agent *vragom* 'by the enemy' is adjoined to VoiceP

in the same manner as the nouns with external θ -roles in type 3. In the tree (21b), X and *n* are omitted as semantically null elements.



Since *-nie* is of type $\langle e, \langle s, t \rangle$ and \sqrt{P} is of type $\langle s, t \rangle$, in combining these two expressions, EI applies and yields Voice' of type $\langle e, \langle s, t \rangle$. The top node of the tree (21b) is VoiceP of type $\langle s, t \rangle$. That is how the example (21) can be compositionally calculated.

The semantic analysis presented above suggests that there are two

kinds of *n*. One is *n* as a simple categorizer (23a), which is semantically null as presented in (22). The other is *n* introducing Possessor, which has lexical representation shown in (23b).¹⁹

¹⁹ To introduce Possessor, it may be thought that PossP is projected instead of n_{poss} . This way of thinking has the advantage that the inventory of *n* does not increase in number. However, the PossP analysis cannot straightforwardly deal with the binding fact shown in (vii). For details on Serbo-Croatian, please see Despić (2013) and on Russian, Zanon (2015), Miyauchi (2016).

(23) a. $[[n_{cat}]] = \varphi$ b. $[[n_{poss}]] = \lambda x \lambda e$ [Possessor (x, e)]

This distinction between the kinds of n corresponds to that between types 1/2 and 3. For example, $(24)^{20}$, in which n introducing Possessor (n_{poss}) is used, can be computed as shown in (25).



(25)	a.	$\llbracket udar \rrbracket = \lambda e \ [hitting \ (e)]$	
		$[[n_{poss}]] = \lambda x \lambda e [Possessor (x, e)]$	
		[[mužčiny]] = m	
	b.	$\llbracket \sqrt{P} \rrbracket = \llbracket udar \rrbracket = \lambda e \ [hitting \ (e)]$	
		$[[n_{poss}']] = \lambda x \lambda e \text{ [hitting } (e) \land \text{Possessor } (x, e)]$	(: EI)
		$\llbracket n_{poss} \mathbf{P} \rrbracket = \llbracket n_{poss}] (\llbracket mužčiny \rrbracket)$	
		$= \lambda e$ [hitting (e) \wedge Possessor (m, e)]	(: FA)
		$\Leftrightarrow \exists e \text{ [hitting } (e) \land \text{Possessor } (m, e) \text{]}$	

(: applying existential closure)

The syntactic analyses presented in section 4 were confirmed in terms of semantics by employing EI and by assuming the two kinds of n corresponding to the distinction between type 1/2 nominals and type 3 nominals.

(vii) a. Serbo-Croatian *Kusturicin_i najnoviji film ga_i je zaista razočarao. Kusturica's latest film him is really disappointed 'Kusturica_i's latest film really disappointed him_i.' (Despić 2013: 245) b. Russian *Kolin_i poslednij fil'm sil'no razočaroval ego_i. Kolya's latest film really disappointed him 'Kolyai's latest film really disappointed himi.'

²⁰ In the tree (24b), X is omitted as a semantically null element.
As a summary, Table 1^{21} shows all the differences between the three types of event nominals from descriptive and structural perspectives.

	Description			Structure		
	can take I?	can take E?	has Voice?	has n_{cat} ?	has n _{poss} ?	
Type 1	Ν	Y	Ν	Ν	Y	
Type 2	Y	Y	Y	Ν	Y	
Type 3	Y	Ν	Y	Y	Ν	

Table 1: The differences between the three types of event nominals

In accordance with the proposal that there are two types of *n*, the proposed structures of each type of Russian event nominal phrases are modified as illustrated in (26).²²



6 Conclusions

In this paper, I have proposed syntactic structures to explain the restrictions on θ -roles of postnominal genitives in Russian event nominal phrases under DM and Phase-Sliding. In addition, I have proposed that there are two kinds of *n* (*n_{cat}*, which is a simple categorizer and *n_{poss}*, which

²¹ In Table 1, "I" is short for an internal argument and "E" means a noun with external θ -roles (Possessor or Agent). Moreover "Y" stands for "yes" and "N" for "no."

²² In the tree (26a), type 1 nominals do not have VoiceP and type 2 nominals have.

functions as introducing Possessor) through semantic verification of the analyses.

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Nominal Stress in Ukrainian*

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1 Introduction

The stress system of Ukrainian is characterized by lexical stress, meaning that morphemes in Ukrainian are inherently (lexically) accented. Generative analyses of Ukrainian nominal stress are few: Butska (2002), Yanovich&Steriade (2010, 2011 and 2015, the latter two are focused on stress in derived words). While these accounts mention the patterns where stress is inconsistent throughout the paradigm (unaccented stems), they do not provide a sufficient account for them. Unaccented stems are treated as special cases of the stems that consistently have stress on the stem or on the suffix depending on the number (shifting stems). Idsardi's (1992) analysis of Russian, on the other hand, provides means to account for unaccented stems, but they are not sufficient for some Ukrainian shifting stems. In this paper, I extend Idsardi's analysis to Ukrainian, discuss the problems this poses, introduce the notion of shifting stems and propose the Shifting rule, which will allow us to account for all inflectional stress patterns of Ukrainian underived nouns.

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Type of stem	SG	PL	Gloss
Type 0: inconsistent	ruk-á _{NOM SG} ri	ú k-у _{NOM PL}	hand
	rúk-u _{ACC SG} ri	и к- áт _{DAT PL}	
	etc.		
Type 1: stem always	koróv-a _{NOM SG} k	оróv-y _{nom pl}	cow
stressed	etc.		
Type 2: suffix always	kum-á _{NOM sg}	<i>kum-ý</i> _{NOM PL}	god-
stressed	etc.		mother
Type 3: stem stressed	$b\acute{a}b$ - $a_{\rm NOM SG}$	$bab-\acute{y}_{\text{NOM PL}}$	woman
in SG, suffix in PL	etc.	etc.	
Type 4: suffix stressed	<i>pomel-ó</i> _{NOM SG}	pomél-a _{NOM PL}	broom
in SG, stem in PL	etc.	etc.	
Type 5: different	<i>ózer-o</i> _{NOM SG}	<i>ozér-a</i> _{NOM PL}	lake
syllables of the stem	etc.	etc.	

While in Ukrainian stress can surface on any syllable of the word, there are only several stress patterns in terms of whether the stress is on the stem or on the suffix:

Table 1: Nominal stress patterns in Ukrainian

I will argue that Idsardi's (1992) analysis of Russian can be extended to account for Types 0, 1 and 2, and will propose my own solutions to the problematic Types 3, 4 and 5, which I propose to treat as a single class, *shifting stems*.

I will use bracketed grid representations as proposed by Idsardi (1992), Halle and Idsardi (1995). This framework has certain advantages, such as simple computation of stress based on the settings of few parameters, which can be used to derive stress patterns of multiple world languages. It is especially well suited for comprehensive accounts of lexical stress, e.g. Halle (1997), Dresher (2009), Doner (2017) among others. I will use the term *accent* for underlying stress, and *stress* for surface stress.

2 Extending Idsardi's Analysis to Ukrainian

As Halle and Idsardi (1995) note, in languages with lexical stress Syllable Boundary Projection is triggered by an idiosyncratic property of

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the morpheme and not by phonetic properties of the syllable. In their framework, each element that can bear stress (a head of a syllable) is linked to Line 0, but only the prominent heads marked by brackets project to the next levels, Line 1 and Line 2. The positioning of brackets on each line is defined by language-specific metrical grid parameters. I propose that in Ukrainian metrical parentheses are introduced lexically, in line with Idsardi's (1992) analysis of Russian:

- (1) Edge marking Parameters (Idsardi 1992: 110)
 - a. Line 0: Edge: RRR (Mark the edge placing a parenthesis on a Right boundary to the Right of the Rightmost element).
 - Head: L (Project the leftmost element in a constituent to Line 1)
 - b.Line 1: Edge: LLL (Mark the edge placing a parenthesis on a Left boundary to the Left of the Leftmost element).
 - Head: L (Project the leftmost element in a constituent to Line 2).
 - c. Conflation (Eliminate all but the main stress).

These Edge marking parameters interact with the lexical Edge markings, the metrical parentheses which are present on the stems in the lexicon. I propose that Ukrainian features the same types of stems as Russian, as well as shifting stems that I will discuss below:

(2) Types of stems in Ukrainian (consistent with Idsardi's analysis)
a. accented (Edge: LLL, LRL, LLR): Edge: LLL: /jáhod-/ in jáhod-a 'berry', Edge: LLR /koróv-/ in koróv-a 'cow' (x x x x (x já hod- ko róvb. post-accenting (Edge: LRR): /kum-/ in kum-á 'godmother' x(kumc. unaccented stem (no Edge): /ruk-/ in ruk-á 'hand' x rukI propose that inflectional suffixes are also lexically marked for stress in Ukrainian:

- (3) Types of suffixes in Ukrainian
 - a. Unaccented suffixes (no Edge), e.g. ACC SG -u of form x
 - b. Accented suffixes (Edge LLR), e.g. NOM SG -á of form (x

DAT PL -*ámy* of form (x x

Next, I will explain in detail how Edge parameters interact with the lexical Edge markings through the derivations for each type, beginning with unaccented suffixes:

(4) ACC SG -u (unaccented): ruk- 'hand' (unaccented), kum- 'godmother' (post-accenting), koróv- 'cow' (accented)

	a. rúku _{ACC SG}	b. kumú _{ACC SG}	c. koróvu _{ACC SG}
Line 2	Х	Х	Х
Line 1	(x	(x	(x
Line 0	x x)	x(x)	x (x x)
	ruk+u	kum+u	korov+u

Note the right parenthesis on the rightmost element on Line 0, which is provided by Edge RRR (as defined in 1a) and marks the word boundary: this will happen in every derivation. In (4a), there are no left parentheses on Line 0, as neither morpheme is lexically marked for stress. As there must be stress in the word, the leftmost element is projected to Line 1 due to Head L and gets a left parenthesis to the left due to Edge: LLL (as in 1b). The same element is projected to Line 2, resulting in a default first syllable stress: $r\acute{u}k$ -u. In (4b) a parenthesis appears to the right of the second element on Line 0 due to the lexical Edge: LRR. The last element is projected to Line 1, gets a parenthesis to the left and is projected to Line 2, which results in the desired stress kum- \acute{u} . In (4c), the stem edge LLR provides the left parenthesis to the second element on Line 0. This is the only element with a parenthesis; it is projected to Line 1 and Line 2, which results in the desired penultimate stress $kor\acute{o}v$ -u.

Now, let us consider accented suffixes:

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	a. ruká _{NOM SG}	b. kumá _{NOM SG}	b. koróva _{NOM SG}
Line 2	Х	х	Х
Line 1	(x	(x	(x x
Line 0	x (x)	x((x)	x (x (x)
	ruk+a	kum+a	korov +a

 (5) NOM PL -á (accented): ruk- 'hand' (unaccented), kum- 'godmother' (post-accenting), koróv- 'cow' (accented)

In (5a), the left parenthesis on the rightmost element is provided by the suffix's lexical Edge marking: LLR. As the stem does not contribute anything, the only prominent element is projected to Line 1, receives a parenthesis and is projected to Line 2, which results in the desired stress on the last syllable: *ruk-á*. In (5b), the contribution of the ending is not significant as the stem's marking LRR places the parenthesis at the same spot. As two parentheses act as one in terms of marking, the derivation proceeds in the same way as (4b) above, resulting in the desired stress on the suffix: *kum-á*. In (5c), in addition to the stem's marking, the accented suffix contributes a left parenthesis on the last element on Line 0. As a result, there are two prominent elements on Line 0. According to Head L, both constituents are projected to Line 1; but due to Conflation (1c), only one stress can remain. The leftmost element gets a parenthesis from Edge LLL and is projected to Line 2, which results in the desired stress on the penultimate syllable: *koróv-a* (not **korov-á*, cf. unaccented stem *ruk-á*).

The generalization here is that accented stems (Type 1) keep stress on the stem and post-accenting (Type 2) on the suffix, while unaccented stems of Type 0 have the largest number of stress alternations. Consider the paradigm of *ruk-á* 'hand':

	SG	PL
NOM	ruk-á	rúk-y
ACC	rúk-u	rúk-y
GEN	ruk-ý	rúk-Ø
DAT	ruk-í	ruk-ám
INSTR	ruk-óju	ruk-ámy
LOC	na/u ruk-í	na/u ruk-áx
VOC	rúk-o	rúk-v

Table 2: Paradigm of *ruk-á* 'hand' (unaccented, Type 0)

Note that the stem is stressed only in ACC SG, VOC SG, NOM=ACC PL and GEN PL. I don't find Butska's (2002: 128) explanation for this pattern elegant: she proposes that the nouns of this type are marked in the lexicon with the list of cases specifying when a stem should be stressed. Since the cases where the suffix is stressed are the same for all these nouns, there is no need for the list of the cases for every stem.

I suggest that a better way to account for all these alternations is to assume that suffixes have lexical accents in Ukrainian, as I proposed above following Idsardi; even if these accents do not affect derivations for accented and post-accenting stems. I propose that inflectional suffixes feature the following accents:

Number	SG				PL
Declension	$I^{st}(f)$	2^{nd} (m/n)	$3^{rd}(f)$	$4^{\text{th}}(f)$	all
NOM	-á	-Ø/ -o	-Ø	-Ø	-y/-i/-a
ACC	-u				=NOM or GEN
GEN	-ý	-a	-i	-i	-Ø, -ív, -éj (-ь́) ¹
DAT	-í	-u	-i	-i	-ám
INST	-óju	-om/-em	-ju	-em/-am	-ámy
LOC	-í	-i/(-ú)	-i	-i	-áx
VOC	-0	-e/-o	-u/-e	-Ø	=NOM

Table 3: Lexical accents of inflectional suffixes.

⁽i) *holov-* 'head' (unaccented) + GEN PL accented yer

	a. <i>holová</i> NOM SG	b. <i>holiv</i> GEN PL	
Line 2	Х	Х	
Line 1	(x	(x	
Yer deletion		x x()	
Line 0	x x (x)	x x (x)	
	holov+a	holiv+ъ	

In (ib), *yer* is deleted on Line 0, but it still has to project its parenthesis on Line 1. The only constituent it can be projected on is the final constituent of the stem. The result is the desired form *holiv* (o > i in historically neo-acute syllables).

¹ Zero suffix of GEN PL is underlyingly accented v (*yer*). In Modern Ukrainian, *yer* effects on stress are noticeable only in GEN PL of two-syllable unaccented stems like *holov*- 'head': *holív*- $\dot{v}_{\text{GEN PL}}$. I propose that the *yer*-deletion rule Idsardi (1992: 115) proposes for Russian works for Ukrainian as well:

This chart omits some details but is representational of all stress patterns of unaccented stems in Ukrainian, including the 3rd and 4th declensions stems which are not discussed in previous analyses.

The majority of underived nouns are distributed between the 1^{st} declension, which consists of mostly feminine *a*-stems, and the 2^{nd} declension, which consists of *o*-stems and *e*-stems (masculine and neuter). The 1^{st} declension stands out from the rest, as its suffixes in SG are mostly accented except for ACC SG -*u*. For all other declensions, the suffixes are unaccented in SG. The 1^{st} declension has stems of all kinds (from most to least numerous): accented, shifting (Type 4 and Type 3), and unaccented stems (the majority of all existing unaccented stems belong to this declension). Type 3 stems in this declension are specific to Ukrainian. Post-accenting stems are very few, as most historically post-accented *a*-stems are shifting of Type 4 in Ukrainian.

The 2^{nd} declension also represents accented, post-accented, shifting (Type 3, Type 4 and Type 5), and very few unaccented stems: most historically unaccented stems of this declension became shifting of Type 3 (unlike in Russian). It consists of masculine and neuter stems. Most of the stems of Type 5 are neuter *o*-stems that belong to the 2^{nd} declension.

The less numerous 3^{rd} and 4^{th} declensions consist exclusively of native nouns. The 3^{rd} declension consists of feminine *i*-stems: unaccented, accented and shifting of Type 3.

The 4th declension, consisting of neuter *n*-stems and *t*-stems, is the least numerous. This declension is extinct in Russian and is not covered by existing analyses of Ukrainian. The 4th declension consists of post-accenting stems and shifting stems of Type 3.

Another difference from Russian is preservation of VOC SG which stress pattern is different from NOM SG for masculine and feminine nouns. If the stress is already on the first or second syllable, then nothing happens. For unaccented stems, the stress shifts all the way to the left, like the default stress in the forms with unaccented suffixes, cf. VOC SG *hólov-o* and ACC SG *hólov-u*. If the stem behaves as post-accenting in SG, regardless whether it is shifting of Type 4 (NOM SG *novyn-á* - VOC SG *novýn-o*) or a real post-accenting stem (GEN SG *korol'-á* - VOC SG *koról-u*), VOC SG suffix causes stress shift to the left, same as the shift of Type 4 in PL.

2 Problematic Stress Patterns

The analysis presented above accounts for the first three stress patterns presented in Table 1: Type 0 (inconsistent stress), Type 1 (stress always on the stem), and Type 2 (stress always on the suffix). However, it is problematic for Types 3, 4 and 5 where stress patterns change depending on the number. Idsardi considers these stems unaccented, but as their stress patterns are different from unaccented stems, he proposes additional rules to account for them. As we will see, they do not give the desired results for Ukrainian data.

2.1 Suffix Allomorphy is not Enough

Note that in Table 3 above I propose that NOM PL suffixes are unaccented, contra Idsardi (1995) who suggests that there are two NOM PL suffixes: -y and $-\dot{y}$, allomorphs only in terms of stress. He proposes this allomorphy in order to derive stress patterns of stems like Russian $d\dot{a}r$ - \emptyset 'gift', which he considers unaccented, same as Russian $z\dot{u}b$ - \emptyset 'tooth' (Ukrainian cognates have the same stress patterns):

1		a. zúby _{NOM PL}	b. darý _{NOM PL}
	Line 2	Х	Х
	Line 1	(x	(x
	Line 0	x x)	x (x)
		zub+v	dar+v

(6) *zub* 'tooth', NOM PL -*y*; *dar* 'gift', NOM PL - \dot{y}

In (6a) both stem *zub*- and NOM PL suffix -*y* are unaccented, so there is no left bracket on Line 0, and we have default stress on the first syllable: $z\dot{u}b$ -*y*. In (6b) stem *dar*- is again unaccented but the allomorph -*ý* is accented, so it enters the derivation with the left bracket on Line 0, then the second element is projected to Line 1, which results in the desired stress on the suffix: *dar*-*ý*.

Now, consider Ukrainian báb-a 'woman' (1st declension):

	SG	PL
Nom	báb-a	bab-ý
Acc	báb-u	bab-ý / bab-ív

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Gen	báb-y	bab-ív
Dat	báb-i	bab -ám
Instr	báb-oju	bab -ámy
Loc	na/u báb-i	na/u bab -áx
Voc	báb-o	bab-ý

Table 4: Paradigm of báb-a 'woman'

This stress pattern, accented in SG and post-accenting in PL, is identical to the one of *dar* (note that in Russian this pattern is not attested in the 1^{st} declension). If we assume that NOM SG *-a* is accented, as suggested in Table 3, then we have to conclude that *bab-* is an accented stem:

(7) bab-a 'woman_{NOM SG}', bab- (accented) + NOM SG - \dot{a} (accented)

	а. <i>bába</i> _{NOM SG}	b. * <i>babá</i> _{NOM SG}
Line 2	Х	Х
Line 1	(x x	(x
Line 0	(x (x)	x (x)
	bab+a	bab+a

In (7a), *bab*- provides a left parenthesis to the first element and *-a* provides a left parenthesis to the second element. Both are projected to Line 1, but only the first one is projected to Line 2, which results in the desired form *báb-a*. Note that if we assumed that *bab*- is unaccented, as in (7b), we would have *bab-á.

However, if we assume that *bab*- is accented, we will run into the a problem with the NOM PL form. Whether we assume that NOM PL -y is accented or unaccented, both derivations in (8) will give us the wrong results:

	a. * <i>báby</i> _{NOM PL}	b. * <i>báby</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x x
Line 0	(x x)	(x (x)
	bab+y	bab+y

(8) $bab-\dot{y}$ 'woman_{NOM PL}', bab- (accented) + NOM PL -y

In (8a), the suffix is unaccented. Accented stem provides the only left parenthesis on the first element, it is projected to Line 1 and to Line 2, but this gives us the wrong result with the stress on the first syllable *b $\dot{a}b$ -y, while the desired form is bab- \dot{y} . In (8b), we assume that the NOM PL ending -y is accented: unlike (8a), the accented suffix also provides a left parenthesis to the last element, so there are two elements on Line 1. Due to Conflation, this will result in the projection of the first element to Line 2, and gives us *b $\dot{a}b$ -y instead of bab- \dot{y} .

One possible solution would be to analyze the NOM PL ending as not just accented, but also stress-deleting $-\dot{y}$, same as Idsardi (1992: 114) proposes for Russian LOC SG $-\dot{u}$ (e.g. v plen- \dot{u} 'in captivity_{LOC SG}'): it makes stress surface on the suffix even when combined with accented stems.

(9) bába 'woman', bab- (accented) + NOM PL - \dot{y} (stress-deleting)

	babý _{nom pl}
Line 2	Х
Line 1	(x
Accent Deletion	x (x)
Line 0	(x (x)
	bab+y

If we assume that $-\dot{y}$ deletes the left parenthesis on the first element on Line 0, it would not be projected to Line 1. Instead, the last element will be projected to Line 1 and Line 2, giving us the desired *bab-\dot{y}*.

However, several problems arise from this analysis.

First, while stress-deleting LOC SG $-\dot{u}$ exists in Ukrainian as well, it is a rather rare form that is limited to certain one-syllable masculine inanimate nouns when used with certain prepositions (*na* 'on', *u* 'in', *pry*

'by'). For many of them, an alternative LOC SG ending *-i* can be used for the same word without change in meaning, e.g. Ukrainian *kraj* 'country_{NOM SG}' - *u/na kraj-ú* and *na/u kráj-i* 'in a country_{LOC SG}'. Unlike LOC SG -*ú*, NOM PL -*y* is used with majority of masculine and feminine nouns. So even if a stress-deleting suffix is possible in Ukrainian (e.g. in derivational suffixes), it is rather unusual for inflection.

Second, assuming stress-deleting $-\dot{y}$ would suggest a three-way allomorphy for all PL endings. Thus, NOM PL -y would have to be accented for stems like $dar-\dot{y}_{NOM PL}$, unaccented for stems like $r\dot{u}k-y_{NOM PL}$ and stress-deleting for stems like $bab-\dot{y}_{NOM PL}$. Three-way allomorphy in terms of stress is not attested in Ukrainian; besides, it would be harder to learn.

Instead, I propose that $b\dot{a}b$ -a and $d\dot{a}r$ -Ø belong to the same class, which I call Type 3 (while $z\dot{u}b$ -Ø 'tooth' - NOM PL $z\dot{u}b$ -y is a true unaccented stem).

2.2 Additional Rules Complicating the Analysis

There are other stress patterns which cannot be explained using the original parameters and suffix allomorphy. In Table 1, I call these patterns Type 4 (suffix stressed in SG, stem stressed in PL) and Type 5 (different syllables of the stem stressed in SG and PL). To account for them, Idsardi proposes the following lexically and morphologically restricted rule:

 (10) Parenthesis Doubling rule (Idsardi 1992: 119)
 Ø → (/_x(: lexically and morphologically restricted: Insert a left parenthesis to the left of an element that has a left parenthesis to its right (only certain nouns and only in NOM PL).

According to Idsardi, this rule can apply to a limited class of nouns. There are nouns with the same stress patterns in Ukrainian: first, let us apply the Doubling rule to Ukrainian *pomel-ó*_{NOM SG} 'broom' (suffix stressed in SG and the second syllable of the stem stressed in PL):

	a. <i>pomeló</i> _{NOM SG}	b. <i>poméla</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x x
Doubling		x (x(x
Line 0	$\mathbf{x} \mathbf{x}(\mathbf{x})$	$\mathbf{x} \mathbf{x}(\mathbf{x})$
	pomel+o	pomel+ a

(11) Parenthesis Doubling application: *pomel-ó* 'broom'

In (11a), *pomel*- acts as a regular post-accenting stem. In (11b), the Parenthesis Doubling rule applies on Line 0 and creates an additional left parenthesis to the left of the second element. Next, both the last and the second element are projected to Line 1, but only the leftmost one with the parenthesis is projected to Line 2 due to Conflation, resulting in the desired stress *pomél-a*.

Now let us consider $\delta zer - o_{\text{NOM SG}}$ 'lake' which has stress on the first syllable in SG and on the second syllable in PL ($\sigma zer - a_{\text{NOM PL}}$):

	a. <i>ózero</i> _{NOM SG}	b. <i>ozéra</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x x
Doubling		x (x (x
Line 0	x x x)	x x (x)
	o zer+o	o zer+ a

(12) Parenthesis Doubling application: *ózer-o* 'lake'

In (12a), *ozer*- acts as an unaccented stem and gets a default first-syllable stress. In (12b), Doubling applies on Line 0 and doubles the parenthesis of the suffix; the result is another left parenthesis to the left of the second element. Again, both last and second elements are projected to Line 1, but only the leftmost gets a parenthesis and is projected to Line 2: the second element wins, hence the desired stress *ozér-a*.

Note that in both (11) and (12) NOM/ACC PL -*a* is treated as accented, which must be another case of allomorphy according to Idsardi. Note that in Ukrainian (as well as in Russian) this suffix does not always act as accented. While for (11) it does not change anything, it is crucial for (12) as the suffix conveniently provides the only parenthesis that can be doubled. So we need both allomorphy and Doubling to work together to

achieve the right results here. However, for other cases like *dar*, allomorphy alone is enough.

I am arguing against Idsardi's proposal that NOM/ACC PL suffixes have allomorphy exclusive to stress. It would make these suffixes exceptional for inflectional morphology: NOM/ACC PL -*y* vs -*ý* and -*a* vs - \dot{a} , while NOM/ACC PL -*i* (which is in fact a variant of -*y*) is always unaccented. The only other case which has two different stress patterns is LOC SG discussed above, but its allomorphy is not exclusive to stress. In fact, LOC SG has two different suffixes: it is either unaccented Russian -*e* / Ukrainian -*i*, or stress-deleting -*ú* (both languages). Instead, I propose that all NOM/ACC PL suffixes are unaccented (Table 3).

In the next section, I will propose a solution that will treat all nouns with the stress patterns depending on number with one device, and relying on stem properties only.

3 The Proposed Account: Shifting Rule

Following the stress patterns presented in Table 1, I propose that besides of unaccented, accented and post-accenting stems proposed by Idsardi for Russian in (1), Ukrainian features three more types of stems:

Туре	Stress pattern in SG	PL		
0	unaccented stems of type x, xx:	varies depending on the suffix		
1	accented stems of type (x, (xx, x(x: same in both			
2	post-accenting stems of type x(, xx(: same in both			
3	accented of type (x, (xx post-accenting of type x(, xx(
4	post-accenting of type x(, xx(accented of type (x, x(x		
5	accented of type (xx	accented of type x(x		

Table 5: Types of stems in Ukrainian

As we saw in the previous sections, the first three types can be derived using Idsardi's analysis; but the remaining types are problematic. I will call the stems of Type 3, type 4 and Type 5 *shifting stems*. They have consistent stress patterns which, unlike unaccented stems, seem to depend rather on number than on the specific case endings. They also behave differently from both accented and post-accenting stems, as their stress pattern consistently changes depending on number as described in the above table.

Many previous analyses, especially of Russian (e.g. Alderete 1999: 68), ignore both unaccented and shifting types as statistically insignificant. Idsardi (1992) also treats cases like $d\acute{a}r$ - \emptyset (Type 3) and *pomel-* \acute{o} (Type 4) as rare exceptions. However, while absolute numbers of nouns like these are low, they are found among the most frequently used words in Russian and even more so in Ukrainian. Here are the results I obtained by coding the first thousand most frequent nouns in Ukrainian and in Russian by the types presented in (17), based on the Ukrainian National Corpus and the Russian National Corpus:

Туре	Ukrainian	Russian
0	25	27
1	698	796
2	83	64
3	135	66
4	54	45
5	5	2

Table 6: The distribution of stem types by frequency

Not surprisingly, Type 1 is the most common type (note that most derived nouns and loan words belong to Type 1). But the next most common type is Type 3 (more common in Ukrainian), then Type 2 and Type 4, with Type 0 and Type 5 being the least frequent. The list of nouns of Type 0 is exhaustive: while this type is not productive, unlike the shifting Types 3 and 4, unaccented stems belong to core vocabulary (e.g. $zub-\emptyset$ 'tooth', vod-a 'water') and have kept their stress patterns despite being the least regular type. At the same time, the stress pattern of unaccented stems is not productive, while the shifting stem pattern is.

3.1 Shifting Stems in the Lexicon

As I discussed above, Idsardi proposes three different solutions for Types 3, 4 and 5 which don't work for all the patterns and rely on allomorphy and the rule that applies to 'only certain nouns', treating these nouns as a

subclass of unaccented stems. However, judging from the numbers, shifting stems are not a list of peculiar exceptions: unaccented stems are. I claim that shifting stems constitute an accentual class that has its own properties: they differ on the one hand from accented and post-accenting stems which never move their stress, and on the other hand from unaccented stems which always rely on the lexical accent of the suffix.

I propose that accented stems like koróv-a 'cow' and post-accenting stems like kum-á 'godmother' are marked in the lexicon differently from shifting stems like báb-a 'woman' and pomel-ó 'broom'. In a sense, this echoes Idsardi's idea about introducing anchored and unanchored parentheses, with anchored parentheses being "stronger" than unanchored ones (Idsardi 1992: 48). Anchored parentheses would be the ones of accented stems, which are always connected to the head and never move. I will mark them here with a superscript L which refers to the fact that they are lexical.

(13) Accented stems *jáhod-* 'berry', *koróv-* 'cow'; post-accenting *kum-*'godmother' x(^Lx ko-rovx(^L Line 0 $(^{L}x x)$

kum-

ja-hod-

Further, I propose that shifting stems have a special parenthesis on Line 0 which I will mark with a superscript S:

(14)	Shifting	stems: hólub	'pigeon', pomel-ó	'broom', <i>ózer-o</i>	'lake'
	Line 0	(^s x x	x x(^S	(^s 'x x	
		ho-lub-	po-mel-	o-zer-	

Note that S-parentheses are always at the edge of the stem: stems of type x(x, e.g. koróv-a 'cow', never show shifting properties in Ukrainian (or other East Slavic languages). The bracket is marked S' in the limited class of two-syllable stems which shift the stress depending on number but only within the stem.

This distinction is very important as according to Dresher (2016), the heads on Line 1 must be projected from the marks adjacent to the lexical brackets; if this restriction is not observed, it will result in impossible derivations.

3.2 Introducing the Solution: the Shifting Rule

I propose that shifting stems are subject to the Shifting rule, which comes with the following constraints. In order to shift, an S-parenthesis must be already present on the stem, i.e. the stem cannot be unaccented. Another constraint for the rule is that the shifting parenthesis cannot lose contact with the stem, i.e. it cannot shift to the middle of the suffix.

- (15) Shifting rule, restricted to shifting stems when a PL suffix is present:
 - a) Move a left S-parenthesis minimally to start a foot on an adjacent morpheme: $({}^{S}x x > x x({}^{S} \text{ or } x x({}^{S} > x ({}^{S}x;$
 - b) Move a left S'-parenthesis minimally: $({}^{S'}x x > x ({}^{S'}x.$

In (15a), in order to shift stress from the stem onto the suffix, the bracket has to move to the right edge of the stem, i.e. two constituents to the right (in case of one-syllable stem, it would be one constituent to the right). However, to shift stress from the suffix onto the stem, shifting the bracket one constituent to the left is good enough. Version (15b) applies only to S'-stems, which can only bear the parenthesis on the first of the two elements: the only available movement for them is to the right.

Applying the Shifting rule will result in the following derivations (the suffixes are treated as unaccented; in any case, they would not affect the outcome of the derivations).

	a. <i>hóluba</i> _{GEN SG}	b. <i>holubý</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x
Shifting (a)		$x x(^{s} x)$
Line 0	(^s x x x)	$\begin{pmatrix} ^{S}x & x & x \end{pmatrix}$
	holub+a	holub+y

(16) *holub* 'pigeon': *holub*- (Type 3) + GEN SG - a, NOM PL -y

Here, the shifting parenthesis starts at the left edge of the stem. In (16a) the stem keeps its stress as an accented stem would (I use GEN SG here as NOM SG has zero suffix). Once combined with the PL ending in (16b), the Shifting rule as defined in (15a) applies on Line 0: in order to move the stress to the suffix, it moves the left parenthesis two constituents to the

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right, to the edge of the stem. The final constituent is projected to Line 1 and to Line 2 and the result is the desired NOM PL form *holub-ý*. The derivations will work in the same way for *báb-a* 'woman' and *dár-Ø* 'gift' discussed above, with the only difference that the S-parenthesis would be moved one element to the right.

(17) pomeló 'broom': pomel- (Type 4) + NOM SG -o, NOM PL -a

	a. <i>pomeló</i> _{NOM SG}	b. <i>poméla</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x
Shifting (a)		$x \begin{pmatrix} s \\ x \end{pmatrix}$
Line 0	x x(^S x)	$\mathbf{x} = \mathbf{x}(\mathbf{S} \mathbf{x})$
	pomel+ o	pomel+a

In (17), the shifting parenthesis starts at the right edge of the stem. Again, in SG (17a) the stem acts like a regular post-accenting stem. In PL (17b), the Shifting rule as defined in (15a) applies at Line 0: to end up on the stem, the parenthesis moves away from the suffix one constituent to the left at Line 0, which results in the projection of the stem-final element to Line 1 and Line 2, giving the desired NOM PL form *pomél-a*.

(18) ozero 'lake': ozer- (Type 5) + NOM SG -o, NOM PL -a

	a. <i>ózero</i> _{NOM SG}	b. <i>ozéra</i> _{NOM PL}
Line 2	Х	Х
Line 1	(x	(x
Shifting (b)		$\mathbf{x}(\mathbf{x} \mathbf{x})$
Line 0	(^s 'x x x)	$\begin{pmatrix} S'x & x & x \end{pmatrix}$
	o zer+o	o zer + a

Here, the stem is marked as having an S' bracket. In SG (18a), it acts as an accented stem. In PL (18b), the Shifting rule as defined in (15b) applies at Line 0 and moves the S'-parenthesis minimally, one constituent to the right, which results in the projection of the stem-final element and gives the desired NOM PL form $oz\acute{er-a}$.

These derivations will work for all Ukrainian shifting stems.

5 Conclusions

I proposed that there are six types of accentual patterns in Ukrainian, which can be further narrowed down to three types of stems marked in the lexicon as unaccented (no mark), accented and post-accenting (marked as L) and shifting (marked as S or S'). From these types, only unaccented stems rely on the lexical accents of the individual suffixes. All shifting stems are subject to the Shifting rule which is sensitive only to the plural marking on the suffix. Most of historically unaccented stems have been reanalyzed as shifting in Ukrainian, and number of the stems which preserved original unaccented stress patterns is very small. Since unaccented stems constitute the least numerous pattern and the only one that still relies on lexical accent of the suffixes for computation of stress, I propose that Ukrainian has moved towards a system where the endings no longer have lexical stress, and the difference between singular and plural paradigms is reinforced with the help of the Shifting rule. However, unaccented stems cannot be omitted from a comprehensive analysis of Ukrainian stress.

This analysis covers all the existing stress patterns in Ukrainian and can be extended to Russian and Belarusian data, allowing us to propose a unified account for East Slavic stress, which I leave for future research.

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Russian Stress in Inflectional Paradigms*

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1 The Outline of the Proposal

1.1 Introduction

Russian stress is contrastive (cf. minimal pairs like $z\acute{a}mok$ 'castle' vs. $zam\acute{o}k$ 'padlock') and mobile: the position of stress within a wordform depends on the morphemes that it consists of. In this paper I will focus on stress assignment in inflectional paradigms, that is, on how tense and agreement suffixes for verbs and case and number suffixes for nouns influence the position of stress within a given wordform.

Most of the traditional analyses of Russian stress, e.g. Zaliznyak (1967, 1980, 1985), Halle (1973), Melvold (1990), agree that in order to account for the position of stress in a Russian wordform one needs to distinguish between at least three kinds of morphemes, usually marked underlyingly with three special diacritics: stressed, not stressed and "right-stressed". The morphemes in the last class attract stress to the syllable immediately following them. In Halle's (1973) terms these

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special morphemes are stressed underlyingly, but they invoke a rule that shifts stress one syllable to the right. Zaliznyak (1985) uses diacritics \rightarrow_D vs. \downarrow_D (D for dominant).

The three-way distinction among morphemes accounts for the position of stress within finite verbs. Nouns, on the other hand, present a puzzle, because, as Zaliznyak (1985, 2010:37) points out, with the same set of case-number suffixes, up to seven different stress patterns are attested. The center problem here is that the stress assignment pattern may be different in the singular and plural subparadigms. This leads most analyses to propose further specific diacritics and lexically marked rules applied only for specific sets of nouns, cf. Halle (1973) and Melvold (1990). Within the framework of Optimality Theory of Prince and Smolensky (1993) the most recent proposal on the market seems to be the one in Steriade and Yanovich (2015) for Ukranian. Steriade and Yanovich's analysis makes use of Alderete's (1999) paradigmatic polarity constraints.

1.2 The Proposal

In this paper I will argue that with respect to stress the only underlying lexical information that one needs is the three-way distinction between morphemes, the rest is derived by the morphological set up of a given wordform.

The proposed diacritics seem to be more intuitive, than the ones in the traditional approaches. I propose to distinguish underlyingly between segments specified for [+stress], segments specified for [-stress] and segments unspecified (unvalued) for stress u[stress]. The stress feature can be either +valued, or -valued, or unvalued. In a combination with the preference to stress the leftmost syllable (cf. Melvold's (1990) BAP principle), this distinction derives most stress assignment patterns.

For the problematic cases in nominal paradigms I assume that the plural stem is derived from the singular stem. For a certain class of nouns the plural stem has an additional suffix PL, which is a dominant morpheme in the sense of i.a. Halle and Vergnaud (1987) Halle and Kenstowicz (1989). The morpheme bears the stress feature, but in most cases is phonologically null.

The framework that I am going to use is Optimality Theory. The technical implementation of the discussed analysis, however, can be made in other terms. The core proposal consists of three basic

assumptions: a) [–stress], [+stress] vs. u[stress] morpheme distinction (henceforth [stress] is abbreviated as [str]); b) the preference to stress the leftmost syllable (constraint STRESSLEFT in optimality theoretical terms); and c) an auxiliary assumption for nouns: plural stem is derived from the singular one and at this step of the derivation for certain nouns a $Ø_{PL}$ dominant morpheme is added to the singular stem.

The material for the research is Zaliznyak's (1980) grammatical dictionary, a sample of roughly 50k nouns and 30k verbs.

1.3 A Preliminary Consideration

Before I proceed, I would like to make one preliminary observation. There are null inflectional suffixes in Russian, e.g., PL.GEN for certain nouns or SG.M for past tense finite verbs. Whenever the generalizations predict stress to go on the suffix and the suffix is null, stress falls on the **immediately preceding** syllable. I am going to account for this phenomenon in a traditional way, following i.a. Jakobson (1963), Zaliznyak (1967, 1985), Halle (1973), Halle and Vergnaud (1987) and Melvold (1990). There are phonologically empty morphemes that are, nevertheless, marked for stress, in particular, they can be marked as [+str]. For these morphemes stress is automatically realized on the **immediately preceding** syllable. This may be the result of two things: a) the floating [+str] feature trying to be realized on the closest morpheme (hence *immediately*) and b) the STRL constraint forcing stress to land as left as possible (hence *preceding*).

2 Simple Case: Verbs

2.1 Finite Verb Inflectional Morphology

Non-derived finite verbs in Russian (verbs that do not have prefixes or secondary imperfective suffix) may consist of three or four morphemes:

(1) [root (+ Thematic Vowel) + tense]_{stem} + agreement

There are two synthetic tenses: past and present¹. The present tense marker can be either -j or $-\emptyset$. The past tense is always marked by -l

¹ Future is either realized as morphological present (perfective) or analytically with a future auxiliary (imperfective).

(which deletes in certain phonologically conditioned cases). For certain classes of verbs the so-called thematic vowel (/i/, /a/ or /e/) is inserted before the tense markers. It can be present in both finite stems, or only in the past, or in neither:

Thematic vowel in both tenses:			
čit- <i>a-</i> j-u	čit- <i>a</i> -l-a		
read-TV-PRS-1SG	read-TV-PST-SG.F		
b. Thematic vowel in past:			
l ^j ubl ^j -u	l ^j ub ^j - <i>i</i> -l-a		
love.PRS-1SG	love-TV-PST-SG.F		
Thematic vowel in	neither tense:		
b ^j er ^j eg-u	bjerjeg-l-a		
keep.safe.PRS-1SG	keep.safe-PST-SG.F		
	Thematic vowel in čit- <i>a</i> -j-u read- <i>TV</i> -PRS-1SG Thematic vowel in l ^j ubl ^j -u love.PRS-1SG Thematic vowel in b ^j er ^j eg-u keep.safe.PRS-1SG		

In the past tense there are four agreement suffixes: plural and singular, distinguishing three genders. In the present tense agreement reflects person and number (two series of suffixes for two morphological classes of verbs, so called 1st and 2nd conjugation). For a detailed account of Russian verb morphology see i.a. Zaliznyak (1980), Jakobson (1985), Dressler, Gagarina (1999), Itkin (2007).

2.2 Stress in Verbs

2.2.1 Present Tense. According to Zaliznyak (1980) there are only three possible stress assignment patterns in the present subparadigm of a Russian verb. Stress is either always on the stem (class a verbs), or always on the suffix (class b verbs) or is mobile (class c verbs). Mobility means that the position of stress (on the suffix vs. on the stem) depends on the suffix, cf. the term "mobile" in Melvold (1990).

	on the stem on the suffix		suffix	mo	bile	
	a: <i>lopatⁱi</i>	t ^j 'spade'	b: <i>govorⁱit^j</i> 'say, talk'		c: xoron ^j it ^j 'bury'	
	SG	PL	SG	PL	SG	PL
1	lop á č-u	lop á t ^j -im	govor ^j -ú	govor ^j -ím	xoron ^j -ú	xor ó n ^j -im
2	lop á t ^j -iš	lopát ^j -it ^j e	govor ^j -íš	govor ^j -ít ^j e	xor ó n ^j -iš	xor ó n ^j -it ^j e
3	lop á t ^j -it	lop á t ^j -at	govor ^j -ít	govor ^j -át	xor ó n ^j -it	xor ó n ^j -at

Table 1. Stress assignment in present subparadigm Zaliznyak (1980)

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Thus, there are three classes of verbs: StST (stem stress triggers), like *lopatiti* 'spade'; SuST (suffix stress triggers), like *govoriti* 'say'; and MoST (mobile stress triggers), like *xoroniti* 'bury'. Note the following two generalizations:

- (3) a. If the stress is mobile, it is predictable by the suffix: $-u_{1SG}$ is always stressed, in the rest of the forms stress is on the stem.
 - b. For StST-triggers the position of stress within the stem is lexically determined: *lopáti-it* 'spade.PRS-3SG' vs. *pákosti-it* 'play.dirty.PRS-3SG'.

	on the stem		on the suffix		mobile	
	a: <i>pakost^jit^j</i>	'play.dirty'	b: <i>b^jer^ječ</i> 'keep.safe'		c: <i>vzorvat^j</i> 'blow.up'	
	SG	PL	SG	PL	SG	PL
F	p á kost ^j il-a		b ^j er ^j egl-á		vzorval-á	
Μ	p á kost ^j il-Ø	p á kost ^j il ^j -i	b ^j er ^j óg-Ø	b ^j er ^j egl ^j -í	vzorvál-Ø	vzorv á l ^j -i
Ν	pákost ^j il-o		b ^j er ^j egl-ó		vzorvál-o	

2.2.2 Past Tense. The same picture is seen in the past tense finite forms.

Table 2. Stress assignment in past subparadigm, Zaliznyak (1980)²

The same generalizations hold:

- (4) a. If the stress is mobile, it is predictable by the suffix: $-a_{SG,F}$ is always stressed, in the rest of the forms stress is on the stem.
 - b. For StST-triggers the position of stress within the stem is lexically determined: *lopáti-i-l-a* 'spade-TV-PST-SG.F' vs. *pákosti-i-l-a* 'play.dirty-TV-PRS-SG.F'.

2.2.3 Analysis. The class of the verb (StST vs. SuST vs. MoST) is determined lexically. Hence one needs a three-way underlying distinction between verb stems. The proposed distinction comes from the underlying stress feature, which may be +valued, -valued or unvalued. The bearers of the underlying stress feature are vowels and some null morphemes (see the preliminary observation in section 1.3)³.

² Here I am leaving out Zaliznyak's (1980) class c', which is the stress assignment pattern that is sometimes seen in verbs with the derivational morpheme -s/a.

³ Syllables and null morphemes bear stress feature.

- (5) The underlying stress features of stems:
 - a. stressed [+str] StST-triggers (stress always on the stem);
 - b. unstressed [-str] SuST-triggers (stress always on the suffix);
 - c. unvalued for stress u[str] MoST-triggers (mobile stress).

The underlying stress features in (7) should be read as following. If at least one of the vowels within a stem is [+str], the stem is a StST-trigger. **Otherwise**, if at least one of the vowels in the stem is u[str], the stem is a MoST-trigger. **Otherwise** all the vowels in the stem are [-str] and the stem is a SuST-trigger.

The inflectional suffixes fall into two categories. The suffixes $-u_{ISG}$ and $-a_{SG,F}$ attract stress from u[str] stems. The rest do not attract stress from u[str] stems. Both categories of suffixes are stressed with [-str] stems and are not stressed with [+str] stems.

For $-u_{ISG}$ and $-a_{SG,F}$ we can safely assume that they are [+str]. They are stressed with [-str] and u[str] stems, but not with [+str] stems. In the latter case there are two possibilities. 1) Either some stem faithfulness over suffix faithfulness is at play. That is, the system chooses to stress the [+str] stem over the [+str] suffix. 2) Or stress has a tendency to go on the left. Stems are always to the left: the system chooses to stress the leftmost [+str]. In this paper I will adopt the second option⁴.

The rest of the inflectional suffixes cannot be [+str]. They do not bear stress with u[str] and [+str] stems.

If the stem is u[str] or [+str] and the suffix is not [+str], the "stress the leftmost" will always stress the stem, regardless of the suffix being [-str] or u[str]. Crucially, in a combination of a [-str] stem, a [-str] suffix will also trigger stress on the stem due to the "stress the leftmost" consideration.

Thus, if there were [-str] inflectional suffixes, they would always trigger stress on the stem. This is not the case. The suffixes that are not

⁴ An independent reason for "stress the leftmost" might come from the behavior of those verbal prefixes that attract stress from the root, e.g. *vi*-. For example, the verb root *bii* 'beat' is a StST-trigger and hence [+str]. Its derivative *vi-bii* 'PR-beat' is also a StST-trigger, but stress always goes on the prefix. Stress shifts from the right (the root) to the left (the prefix). It is natural to assume that *vi*- is [+str] (it triggers "stress always on the stem" pattern). In a combination of a [+str] prefix and a [+str] root the system chooses to stress the leftmost morpheme, that is, the prefix.

[+str] attract stress with both u[str] and [-str] stems. Hence they should be u[str], not [-str].

The summary of the proposed analysis is given in (9).

- (6) a. The underlying stress features of stems: stressed [+str] – StST-triggers (stress always on the stem); unstressed [-str] – SuST-triggers (stress always on the suffix); unvalued for stress u[str] – MoST-triggers (mobile stress).
 - b. The underlying stress features of suffixes.
 - (i) $-u_{ISG}$ and $-a_{SG,F}$ are [+str];
 - (ii) the rest of the suffixes are u[str].
 - c. The logic of the system: stress the leftmost syllable, while maximally preserving the underlying stress feature.

In Optimality Theory the logic in (9c) can be formalized as an interaction between two constraints:

(7) a. Constraints:

ID(STR) := * for any change from [+str] to [-str] and backwards. STRL(EFT) := * for any vowel between the leftmost and stressed.

b. Ranking: ID(STR) >> STRL(EFT)

The analysis in (9-10) will derive all the desired stress patterns. For [+str] stems stress will always go on the stem, regardless of the suffix. In this case the stress on the suffix would violate both ID(STR) and STRL. For [-str] stems stress will always go on the suffix, because stressing the stem will violate the undominated constraint ID(STR). For u[str] stems and [+str] suffixes stress will fall on the suffix, due to ID(STR); while for u[str] stems and u[str] suffixes stress will fall on the stem, in accordance with STRL.

[+str] suffix = stress on the stem			
lopáč + ú	ID(STR)	StrLeft	
lopač-ú	*	**!	
→lop á č-u	*	*	
lópač-u	**!*		

u[str] suffix = stress on the stem		
lopáč + It	ID(STR)	StrLeft
lopat ⁱ -ít	*	**!
→lop á t ^j -it	*	*
lópat ^j -it	** *	

Table 3a. [+str] stem; stress always on the stem⁵

⁵ v for [-str], \acute{v} for [+str], upper case V for *u*[str]

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[+str] suffix = stress on the suffix			u[str] suffix = stress on the suffix		the suffix	
govor ^j + ú	ID(STR)	STRLEFT		govor ^j + It	ID(STR)	STRLEFT
→govor ^j -ú		**		→govor ^j -ít		**
gov ó r ^j -u	*!*	*		gov ó r ^j -it	*!	*
g ó vor ^j -u	*!*			g ó vor ^j -it	*!	
	Table 3b. [-str] stem; stress always on the suffix					
[+str] suffix = stress on the suffix			u[str] suffix = stress on the suffix			
xorOn ^j + ú	ID(STR)	STRLEFT		xorOn ^j + It	ID(STR)	STRLEFT
→xoron ^j - ú		**		xoron ^j -ít		**!
xor ó n ^j -u	*!	*		→xor ó n ^j -it		*
x ó ron ^j -u	*!*		1	xóron ^j -it	*!	

Table 3c. u[str] stem; mobile stress (depends on the suffix)⁶

2.3 Present and Past Stems

2.3.1. A Puzzle. In the general case ($\approx 75\%$ of verb stems in Zaliznyak's (1980) sample) the stress pattern in the past and in the present subparadigms is the same: either stress on the stem in both tenses, or stress on the suffix in both tenses, or mobile stress in both tenses. This is as predicted. If a root is [+str], it is [+str] both before the past tense suffix *-l* and the present tense suffixes *-j/-Ø*.

But $\approx 25\%$ of verbs in Zaliznyak's (1980) sample have different stress patterns in the present and past. All possible combinations are attested.

- (8) Stress pattern in the present subparadigm/in the past subparadigm
 - a. Mo/StST družit^j 'be.friends' d. St/SuST l^ječ 'lie.down'
 - b. Mo/SuST moč 'can'
- e. Su/StST govor^jit^j 'talk, say'
- c. St/MoST *pr^jibit^j* 'arrive'
- f. Su/MoST vzorvat^j 'blow.up'

However, the absolute majority of stems with different past and present stress patterns in Zaliznyak (1980) have different morphological set up. All the mismatches in (12) fall into three categories.

⁶ Here I am leaving two phenomena for the future research. First, the certain peculiarities with the derivational morpheme *-sⁱa*. Second, the following systematic effect with *u*[str] stems: all polysyllabic *u*[str] stems in Zaliznyak's sample have a *u*[str] vowel in the end of the stem, not at the beginning. They can only have a sequence of <[-str]; *u*[str]> syllables, not <*u*[str]; *u*[str]> or <*u*[str]; [-str]>.

2.3.2. Case 1. This is $\approx 24.25\%$ of verbs with different stress patterns in the two tenses. The past stem contains a thematic vowel, while the present stem does not. The thematic vowel can be either [+str] and always bear stress in the past subparadigm, or it can be *u*[str] and trigger mobile stress in the past subparadigm.

The verb *stiditi* 'shame' represents the first subcase. Its present stem does not have a thematic vowel (*stiž/stid*) and is [-str], triggering the "stress always on the suffix" pattern. Its past stem, meanwhile, has a [+str] thematic vowel (*stidi-i-*), which always attracts stress to itself, thus resulting in the "stress always on the stem" pattern.

The verb *roditi* 'give.birth' represents the second subcase. Its present stem does not have a thematic vowel (*rož/rod*) and is [-str], triggering the "stress always on the suffix" pattern. Meanwhile, its past stem has a u[str] thematic vowel (*rodi-I-*), which only bears stress, if the inflectional suffix is u[str], thus triggering the "mobile stress pattern"⁷.

2.3.3. Case 2. This is $\approx 0.15\%$ of verbs with different stress pattern in the two tenses. The verb root has two different allomorphs, one for the present and one for the past tense. A couple of examples are *bit^j* 'be' and *l^ječ* 'lie.down'. The root of the verb *bit^j* 'be' is *bud* in the present (triggering "stress on the stem" pattern) and *bi* in the past (triggering "mobile stress" pattern). The root of the verb *l^ječ* 'lie.down' is *l^jag/l^jaž* in the present (triggering "stress on the stem" pattern) and *bi* in the past (triggering "tress on the stem" pattern) and *l^ječ* is natural to assume that their present and past allomorphs differ not only in segmental features, but also in the stress feature. For instance, the *bud* allomorph of *bit^j* 'be' is [+str], while the *bi* allomorph is *u*[str].

2.3.4. Case 3. This is the remaining $\approx 0.6\%$ of verbs with different stress pattern in the two tenses. These verbs seem to be "true" exceptions. They have the same stems in the past and present subparadigms, but still the stress pattern is different. Their roots might also have two allomorphs for the past and the present, but in this case the allomorphy is only expressed in the stress feature. There are only 13 such roots: *grizt^j* 'gnaw', *past^j*

⁷ Note that this means that the thematic vowel shows not only lexically conditioned segmental allomorphy, but also lexically conditioned allomorphy in stress feature.

'fall', *klast^j* 'put', *krast^j* 'steal', *žit^j* 'live', *plit^j* 'swim', *slit^j* 'be.famous.for', *str^jič* 'cut', *gn^jit^j* 'rot', *dat^j* 'give', *pr^jast^j* 'spin', *kl^jast^j* 'swear, curse', *moč* 'can'.

3 Nouns: Straightforward Cases

The question now is: could we extend the proposed analysis to the inflectional paradigms of nouns? At the first glance nouns posit a serious problem for maintaining the three-way underlying stress distinction. As Zaliznyak (1985) points out, with the same set of inflectional suffixes up to seven different stress patterns are attested. His example are the seven nouns of the *-a* declension: *viera* 'faith', *čerta* 'line', *bieda* 'trouble', *guba* 'lip', *spina* 'back', *noga* 'leg', *dolia* 'fate/part', Zaliznyak (1985, 2010:37).

However, if we assume that the plural stem is derived from the singular one and that for certain nouns at this step of the derivation a dominant $Ø_{PL}$ morpheme is attached to the stem, we could account for all the attested patterns.

At first, however, let us consider the most straightforward cases, which constitute $\approx 96\%$ of nouns in Zaliznyak's (1980) sample.

3.1 Morphology

A noun in Russian consists of a nominal stem and a case-number suffix. There are 2 numbers (singular and plural) and 6 basic cases (and 2 additional ones, see e.g. Zaliznyak (1967)).

There are four sets of case-number suffixes (four declensions). Each noun idiosyncratically selects one of them. The first three declensions very roughly correspond to grammatical genders (grammatical gender in Russian shows in e.g. adjectival agreement): feminine, masculine and neuter. The forth class of case-number suffixes is the so-called exceptional i-class, attached to a closed set of nouns (8th class in Zaliznyak (1967)). For more details see i.a. Zaliznyak (1967), (1980), Itkin (2007). Henceforth I am going to refer to the declensions by roman numerals: Class I (-*a* nominative \approx feminine), Class II (-*Ø* nominative \approx masculine), Class III (-*o* nominative \approx neuter), Class IV (-*i* declination).

3.2 Stress Assignment

Approximately 96% of nouns in Zaliznyak's (1980) sample behave exactly in the way predicted by the proposed analysis.

- (9) \approx 96% of nouns split into three familiar classes:
 - a. StST-triggers = Zaliznyak's (1980) class a - stress always on the stem
 - b. SuST-triggers = Zaliznyak's (1980) class b - stress always on the suffix
 - MoST-triggers = Zaliznyak's (1980) classes f' and f''
 the position of stress depends on the suffix

Note that the mobile stress (13c) is mobile in Melvold's (1990) sense. That is, it does not mean that stress on the stem in SG and stress on the suffix in PL, but rather that the position of stress depends on the suffix.

The StST and SuST cases are straightforward. An example of the first one is *obiid*- 'offense/resentment', which always bears stress on the stem (*obiid-a* '-SG.NOM', *obiid-u* '-SG.ACC', *obiid-i* '-PL.NOM', *obiid-am* '-PL.DAT', etc.). An example of the second one is *saranč-* 'locust', which is never stressed (*saranč-á* '-SG.NOM', *saranč-ú* '-SG.ACC', *saranč-í* '-PL.NOM', *saranč-ám* '-PL.DAT', etc.). It is natural to assume that StST-triggers have a [+str] stem, while the SuST-triggers have a [-str] stem. The mobile cases are Zaliznyak's classes f' and f''. Crucially class f' nouns are **only** compatible with declension class I, while class f'' nouns are **only** compatible with declension class IV.

CASE	SG	PL
NOM	golov-á	G Ó LOV - I
ACC	G Ó LOV - U	=NOM
GEN	golov-í	gol ó v-Ø
DAT	golov ^j -é	golov- á m
INSTR	golov-ój	golov- á m ^j i
LOC	golov ^j -e	golov-áx

Table 4a. Mo-trigger golov- 'head' (class I), Zaliznyak's class f'

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CASE	SG	PL
NOM	st ^j ép ^j -Ø	ST ^j ÉP ^j -I
ACC	=NOM	=NOM
GEN	st ^j ep ^j -í	st ^j ep ^j -éj
DAT	st ^j ep ^j -í	st ^j ep ^j - á m
INSTR	ST ^j ÉP ^j -JU	st ^j ep ^j - á m ^j i
LOC	st ^j ep ^j -í	st ^j ep ^j -áx

Table 4b. Mo-trigger stiepi- 'steppe' (class IV), Zaliznyak's class f'

Again, the suffixes split into the same two categories with respect to their behavior with mobile stress triggers. Namely, with a mobile stem (u[str] stem) SG.ACC -u of class I, SG.INSTR -ju of class IV and PL.NOM -i are unstressed; the rest of the suffixes are stressed.

Note that it is the particular suffixes, e.g., $-u_{\text{SG.ACC}}$, $-ju_{\text{SG.INSTR}}$ and $-i_{\text{PL.NOM}}$ that are special, not, for instance, the morpheme SG.INSTR in general, cf. unstressed -ju in (14b) and stressed -oj in (14a).

The mobile cases seem to be parallel to the ones we have seen in verbs. We could assume that the stems of nouns of Zaliznyak's (1980) classes f' and f' are u[str]. As for the suffixes, they must be all [+str]; except, of course, SG.ACC -u of class I, SG.INSTR -ju of class IV and PL.NOM -i, which are u[str].

- (10) a. The underlying stress features of stems:
 - stressed [+str] StST-triggers (stress always on the stem); unstressed [-str] – SuST-triggers (stress always on the suffix); unvalued for stress u[str] - MoST-triggers (mobile stress).
 - b. The underlying stress features of suffixes.
 - (i) $-u_{\text{SG.ACC}}$, $-ju_{\text{SG.INSTR}}$ and $-i_{\text{PL.NOM}}$ are u[str]
 - (ii) the rest of the suffixes are [+str].

The analysis works in the same way. There are two constraints at play: ID(STR) and STRLEFT. The system tries to preserve the underlying stress feature. Everything else being equal, the system stresses the leftmost syllable. The tableaux for StST vs. SuST vs. MoST-triggers are parallel to the ones for verbs.
4 Nouns: Problematic Cases

4.1 The puzzle

The puzzle arises with the remaining $\approx 4\%$ of nouns in Zaliznyak's (1980) sample. They are "mixed" cases, where the stress assignment is different in the singular and plural subparadigms. These are Zaliznyak's (1980) classes c, d, e, f, d' and b'. They behave as if they had different stress assignment patterns in the singular and plural.

CASE	SG	PL
NOM	str ^j ekoz- á	str ^j ek ó z-i
ACC	str ^j ekoz-ú	=GEN
GEN	str ^j ekoz-í	str ^j ek ó z-Ø
DAT	str ^j ekoz ^j -é	str ^j ek ó z-am
INSTR	str ^j ekoz- ó j	str ^j ekóz-am ^j i
LOC	str ^j ekoz ^j -e	str ^j ek ó z-ax

Table 5a. striekoz- 'dragonfly', Zaliznyak's (1980) class d; Su/StST

CASE	SG	PL
NOM	vólos-Ø	v ó los-i
ACC	=NOM	=NOM
GEN	v ó los-a	volós-Ø
DAT	v ó los-u	volos -á m
INSTR	v ó los-om	volos -á m ^j i
LOC	vólos ^j -e	volos -á x

Table 5b. volos- 'hair', Zaliznyak's class (1980) e; St/MoST

4.2 Digression: Dominant Morphemes

Most analyses of Russian stress since, i.a. Halle (1973), Zaliznyak (1985), Halle and Vergnaud (1987), Halle and Kenstowicz (1989), Melvold (1990), Alderete (1999) distinguish between so called [+dominant] and [-dominant] morphemes. All inflectional morphemes that we have seen so far are [-dominant]. The [+dominant] morphemes constitute a special case. The description of dominance from Melvold (1990:71): "To account for these facts, we need to postulate that certain suffixes wipe out any accent on the stem to which they attach". Zaliznyak (1985) has a very similar notion of dominant morphemes. Halle and Vergnaud (1987) and Halle and Kenstowicz (1989) assume that only dominant morphemes are cyclic. Melvold (1990) postulates two

classes of [+dominant][+accented] suffixes: right-shifting and not right-shifting, represented in (17).

- (11) From Melvold (1990:70-74):
 - a. Not right-shifting -ag '-man': rabót 'work', a StST-trigger with a [+str] o → rabot^j-ág 'work-man', a StST-trigger with always stressed -ag.
 b. Right shifting -ač '-man': sⁱíl 'strength', a StST-trigger with a [+str] i →
 - sil-ač 'strength-man', a SuST-trigger (stress on the infl. suffix)

Within the present proposal there are two ways of formulating the suffix dominance. 1) Dominant morphemes make all the vowels in the stem to which they attach [-str], along the lines of Melvold (1990). 2) Dominant morphemes make the stem to which they attach inaccessible for the consequent stress assignment, along the lines of Halle and Vergnaud (1987), Halle and Kenstowicz (1989). In what follows I am going to adopt the first option for simplicity, although I am not committed to either analysis.

The two kinds of dominant morphemes differ in being [+str], as in (17a), and [-str], as in (17b). Both turn the stem that they attach to into [-str]. If the dominant morpheme is [+str], it will trigger StST stress pattern, attracting stress to itself. If the dominant morpheme is [-str], it will trigger SuST stress pattern.

4.3 A Solution

Coming back to the puzzle, there are several nouns that have different stress patterns in the singular and in the plural forms. Within the present proposal it means that they have different stems in the singular and in the plural forms.

2)		SG	PL	
	a. class d:	$[-str] \rightarrow$	[+str]	str ^j ekoza 'dragonfly'
	b.class d':	$u[\text{str}] \rightarrow$	[+str]	sp ^j ina 'back'
	c. class c:	$[+str] \rightarrow$	[-str]	xljeb 'bread', profjesor 'professor'
	d.class b':	$u[\text{str}] \rightarrow$	[-str]	l ^j ubov ^j 'love', voš 'louse'
	e. class e:	$[+str] \rightarrow$	u[str]	volos 'hair', d ^j er ^j evn ^j a 'village'
	f. class f:	$[-str] \rightarrow$	u[str]	žel ^j eza 'gland'

(12)

Suppose that the derivation of plural forms proceeds in two steps. First, the plural stem is formed out of singular one. Second, a plural case suffix is attached. At the first step three different things can happen.

4.3.1. Case 1. Singular stem \rightarrow [+str] plural stem, classes d and d'. In this case a dominant [+str] plural suffix is attached to the stem. It does not have any segmental features (is phonologically null), but it does have a stress feature, specified for [+str]. Being dominant, it makes the stem that it attaches to [-str]. Thus, e.g., a [+str] *strjekoz*- 'dragonfly-' in the singular becomes [-str] in the plural, in the same way as [+str] *rabot*-'work' becomes [-str] in *rabotj-ag*- 'work-man-'.

Crucially the null [+str] suffix is treated **in the same way** as other null suffixes that are supposed to be stressed. Remember the discussion in section 1.3. If a suffix is supposed to bear stress, but is phonologically null, the stress falls on the **immediately preceding** syllable: *immediately*, probably, due to the [+str] feature being realized on the closest segment, and *preceding*, probably, due to STRL.

Thus, the proposed analysis predicts that all nouns that change into [+str] in plural will invariably have stress on **the last** syllable of the stem in their plural forms. Indeed all the nouns of Zaliznyak's (1980) classes d and d' support this prediction (*str^jekóz-i*, not *str^jékoz-i* for 'dragonfly-PL.NOM').

For nouns in classes d and d' the $Ø_{PL}$ suffix is attached to a [-str] or a u[str] stem respectively. What does the analysis predict to happen, if it attaches to a [+str] stem? Either, if in the singular stem the [+str] syllable was the last one, there will be no difference between the plural and the singular subparadigms. Or, if in the singular stem the [+str] syllable was not the last one, we will see the shift of stem-stress to the last syllable in the plural stem. This is also found in Russian. The example is the noun *oziero* 'lake'. It is a StST-trigger in the singular, stress always on the first syllable: *ozióra*. If the plural stem is derived from a singular [+str] one with the same dominant [+str] $Ø_{PL}$ suffix, these are exactly the stress patterns that we predict. The dominant plural suffix turns the stem into [-str] and, being [+str], attracts stress to itself. However, the suffix being null, stress falls on the preceding syllable: the last syllable of the stem.

4.3.2. Case 2. Singular stem \rightarrow [-str] plural stem, classes c and b'. In this case a dominant [-str] plural suffix is attached to the stem. It does not have any segmental features (is phonologically null), but it does have a stress feature, specified for [-str]. Being dominant, it makes the stem that it attaches to [-str]. Thus, e.g., a [+str] *profiesor*- 'professor-' in the singular becomes [-str] in the plural, in the same way as [+str] *s'il*- 'strength' becomes [-str] in *s'il-ač*- 'strength-man-'.

Interestingly, the dominant [-str] plural suffix is not null for all nouns. In some cases it does have a phonological realization, cf. *-es* in *čudiesa* "miracles". The stem *čud* 'miracle' is a StST-trigger in the singular, stress always on the stem: *čúd-o* '-NOM', *čúd-u* '-DAT', *čúd-e* '-LOC', etc. Thus, it is a [+str] stem. In the plural forms the plural suffix *-es* has to be attached to it: čud_{sG} \rightarrow čud^j-es_{PL}. The plural stem is a SuST-trigger, stress always on the suffix: *čud^j-es-á* '-NOM', *čud^j-es-ám* '-DAT', *čud^j-es-áx* '-LOC', etc. Thus, *-es* is a dominant [-str] suffix. It makes the stem it attaches to [-str] and triggers stress on the inflectional suffix. It is true for all nouns that derive plural forms with *-es*, e.g. *njebo* 'sky', *tjelo* 'body' etc.

In classes c and b' the [-str] plural suffix attaches to a u[str] and a [+str] stem respectively. If it attaches to a [-str] stem, the analysis predicts no difference in the singular and the plural stress assignment patterns.

4.3.3. Case 3. This is the case of Singular stem $\rightarrow u[\text{str}]$ plural stem, classes e and f. In this case the plural stem is derived from the singular one via a morphological operation that turns valued stress features into unvalued.

Note that in class e in the plural paradigm the position of stress within the stem is lexically determined and furthermore is **the same** as in the singular. For instance, *volos* 'hair' has stem-stress on the **first** syllable in the singular (*vólosⁱ-e* '-LOC'). In the plural it has mobile stress, but whenever stress in the plural falls on the stem, it also falls on its **first** syllable (*vólos-i* '-NOM'). On the other hand, *dierievnia* 'village' has stem-stress on the **second** syllable in the singular (*deriévni-e* '-LOC'). In the plural it has mobile stress, but whenever stress, but whenever stress in the plural falls on the stem, it also falls on its **second** syllable in the singular (*deriévni-e* '-LOC'). In the plural it has mobile stress, but whenever stress in the plural falls on the stem, it also falls on its **second** syllable (*dieriévni-i* '-NOM'). In these cases the morphological operation turns all [+str] syllables into *u*[str]. If it was the first syllable, the mobile stress in the plural alternates

between the case suffix and the first syllable of the stem. If it was the second syllable, the mobile stress in the plural alternates between the case suffix and the second syllable of the stem.

In class f the singular stem is [-str]. At the derivation of the plural stem the morphological process turns all of them into u[str]. As the result, the mobile stress in the plural for class f nouns always alternates between the case suffix and the first syllable of the stem, cf. *željeza* 'gland'.

The morphological rule for these cases then can be described in the following way. If there are [+str] vowels in the singular stem, all of them are turned into u[str]; if there are no [+str] vowels in the singular stem, all of the vowels are turned into u[str].

4.3.4. Back to Straightforward Cases. Let us now come back to the straightforward cases described in section 3. What happens when the stress pattern is the same in the singular and the plural? Is the $Ø_{PL}$ morpheme not dominant in these cases? Remember that there are three options here.

Firstly, both subparadigms can have MoST-pattern, e.g. golov-'head'. This means that the singular stem only has u[str] syllables. Since the plural stem also only has u[str] syllables, either the \mathcal{O}_{PL} morpheme is not dominant and u[str], or it is another case of application of the rule described in section 4.3.3. Secondly, both subparadigms can have SuSTpattern, e.g. saranč- 'locust'. This means that either the $Ø_{PL}$ morpheme is not dominant, or it is dominant, but [-str]. Since these stems are already [-str], the stress pattern would not change from the singular to the plural, see section 4.3.2. Thirdly, both subparadigms can have StST-pattern, e.g. obiid- 'offense/resentment' or pálub- 'deck'. There are two subcases here: either stress is always on the last syllable of the stem (obid-) or not (*pálub*-). In the first subcase we can safely assume that the $Ø_{PL}$ morpheme is dominant and [+str]. Then it would not change stress assignment pattern, see section 4.3.1. In the second case we will have to posit a non-dominant $Ø_{PL}$ morpheme. This would lead us to the assumption that the \mathcal{O}_{PL} morpheme does not only show allomorphy in segmental and stress features, but also in dominancy, which is not attested elsewhere.

5 Conclusions

In this paper I argued that the needed three way distinction between morphemes in Russian with respect to the stress assignment can be formalized as an underlying stress feature. The feature can be +valued, – valued or unvalued. In a combination with "stress the leftmost syllable", this predicts most stress assignment patterns for verbs and for nouns. In Optimality Theory this idea can be formalized as an interaction between constraints ID(STR) and STRLEFT (the former being ranked higher).

The problematic cases for nouns can be explained, if one assumes that the plural stems are derived from the singular ones and that for certain classes of nouns an additional dominant plural morpheme is involved in the derivation. The morpheme is marked for stress feature, but is usually phonologically null.

The proposed analysis, if extended to derivational morphology, makes many interesting predictions and provides a new and potentially interesting perspective on Russian morphophonology in general. For instance, certain verb prefixes in Russian attract stress to themselves, e.g. perfective vi-, cf. b^j-*i*-l-a 'beat-TV-PST-SG.F' vs. v*i*-b^j-*i*-l-a 'PR-beat-TV-PST-SG.F'. In the proposed theory vi- must be [+str], STRLEFT predicts it to always shift stress to itself. However, the secondary imperfective -iva always "overrules" the prefix vi-: [[vi-bi]] PFV-ivá] PFV-l-a 'PR-beat-IPFV-PST-SG.F'. The secondary imperfective -iva in this case attracts stress to itself (vibiva- is a StST-stem) and is thus [+str]. It seems that the root and *-iva* in this case behave as an item, separate from the prefix. The prefix does not participate in the stress assignment decisions, although it clearly merges with the root first (otherwise the resulting verb would have been perfective). This would seem a contradiction to the proposed analysis. Interestingly, however, there are other morphophonological ways in which -iva and the root interact, even with a prefix, which has been merged to the root before -iva. Namely, -iva may trigger root allomorphy: $[[vi-nos^j]-i]-t^j$ 'PR-bear-TV-INF' $\rightarrow [[vi-nas]-iva]-t^j$ 'PRbear-IPFV-INF'. With this respect the stress data begins to pattern with other morphophonological phenomena.

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Null Objects in the Early Stages of Grammar

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While the study of null subjects in Slavic has received much attention (Franks 1995, Lindseth 1998, Fehrmann and Junghanns 2008, Müller 2006, among others), null/missing/implicit direct objects still constitute an under-researched area and the distribution of object drop is still not uniformly capturable. Object drop has not been used extensively as a way to classify languages in a typology. In other words, whereas it is common to talk about pro-drop or null subject languages, references to 'object drop' or 'null object' languages are much less frequent in the literature. One important reason for this classificatory asymmetry is that object drop appears to be much more variable than subject drop. Most attempts to identify a common denominator for null objects have failed in cross-linguistic terms. Possible restrictions on object drop have been discussed previously, such as, for instance, overt morphological verbobject agreement, which is true for Swahili or Georgian but not for Russian or Chinese; topic drop, true for German but not for other nullobject languages; as well as other conditions like specific structural contexts favoring the appearance of null objects (e.g. sequence of verbs or imperatives). Generally, it is assumed that null objects are a licit option in the grammars of Russian, Polish, to some extent German, European and Brazilian Portuguese, and Chinese among other languages. Languages such as Bulgarian, Serbo-Croatian or Spanish, on the other hand, disallow null objects.

In this paper, I examine the omission of referential, definite objects as in (1a, b) leaving aside contexts of non-referential, generic null objects as in (2). For the sake of terminology clarity, I use 'null objects', 'object omission' and 'object drop' to refer to the phonological non-realization of direct objects in transitive contexts, cf. (1).

- (1) a. What did you do with the newspaper?
 *I read Ø.
 b.Čto ty delaeš s etim rasteniem? (Russian) what you_{NOM} do_{1SG} with this plant_{ACC}
 'What are you doing with this plant?' Polivaju Ø./Ja polivaju ego.
 (I) watering (it)/ I watering it
 'I'm watering it.' referential/definite null object
- (2) A: What are you going to do while you wait?
 B: I'll buy a newspaper and I'll read Ø. *non-referential/indefinite/generic null object*

Object realization or omission has both a syntactic component (what kinds of mechanisms govern the licensing and recoverability of null objects) and a lexical component (what types of verbs allow optional realization of their direct object argument). In this paper I concentrate on the syntactic approach to transitivity, the so-called Transitivity Requirement (TR) proposed by Roberge (2002) and Cummins and Roberge (2005). In parallel to the Extended Projection Principle (EPP) for subjects, it suggests that the direct-object position is given by Universal Grammar and is not dependent on the lexical features of the verb. The syntactic analysis of null objects is particularly appealing as it provides very concrete and testable predictions about transitivity development in first language acquisition. Under the TR null objects are predicted to be a default initial setting for acquisition purposes. Omissions should therefore be found in typologically different languages, irrespective of the availability of null objects in the target grammar.

The main agenda of this paper is to evaluate the empirical validity of the TR by examining acquisition data from sixteen typologically different languages, among which five Slavic representatives (cf. Table 1). Such a secondary approach of primary data reanalysis is justified since as more research on a given topic within a particular language

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family emerges, it is really valuable to have research that consolidates the studies and elucidates patterns that are similar and different across the family. For a thorough discussion on the necessity and advantages of meta-studies see Norris (2013).

The paper is organized as follows. Section 1 sketches some theoretical approaches to object omission focusing on the discussion of the syntactic transitivity approach by Roberge (2002) and Cummins and Roberge (2005) and outlining the predictions of this analysis for the acquisition of objects, with respect to the object omissions children are predicted to show. In Section 2, I discuss experimental and naturalistic child data from Russian, Serbo-Croatian, Bulgarian, Polish, Ukrainian, French, English, Spanish, Catalan, Italian, European Portuguese, Brazilian Portuguese, Romanian, Standard Modern Greek, Cypriot Greek, and Chinese. The participants in the studies are typicallydeveloping, monolingual children, core age two to four years, as well as four to six years for some languages (for a detailed data description and methodology see Section 2.1). The survey of the data shows that the predictions made under the TR are not borne out and null objects are not a default setting in the early stages of grammar. Based on the empirical findings, I suggest that there is a strong link between children's object omissions and the allowance on null objects in the target grammar. This view is compatible with the proposal made in Varlokosta et al. (2016), suggesting that children generally opt for the weakest alternative on the scale pronoun > clitic > null, depending on what is available in their language. Of course, this proposal needs further investigation in studies that test *different* types of objects, i.e. full pronouns, clitics and full DPs.

1 The Transitivity Requirement and Its Predictions for Child Grammar

To start off, I briefly sketch the contrast between purely lexical and syntactic approaches to object omission with a special emphasis on the syntactic transitivity approach by Roberge (2002) and Cummins and Roberge (2005) and its prediction for the development of objects in the early stages of grammar.

Rizzi (1986) highlights the role of the lexicon suggesting that it plays a significant role in the presence and interpretation of null objects. In his analysis null objects result from a lexical subcategorization available only with certain transitive verbs. For Italian, and subsequently for English, he proposes that there is a type of null object available only with certain transitive verbs whose interpretation involves default features and arbitrary reference. Other, discourse-motivated, approaches as in Groefsema (1995) and Fellbaum and Kegl (1989) associate the use of certain null objects with discourse factors and pragmatic considerations.

An alternative analysis is provided by the modular account relying on a strictly syntactic approach to the occurrence of null objects. The Transitivity Requirement (TR) by Roberge (2002) and Cummins and Roberge (2005), parallel to the Extended Projection Principle (EPP) for subjects, suggests that the direct-object position is given by Universal Grammar and is not dependent on the lexical features of the verb. Thus, the direct-object position is not seen as a result or a characteristic depending on the lexical-semantic features of the verb, but rather as an integral, essential element of the predicate. Under the TR transitivity is viewed as a universal grammatical property. Null objects are structurally present and all VPs contain an object position that can be overtly expressed or not (Cummins and Roberge 2005, Pesetsky and Torrego 2004, Hale and Keyser 2002). When an object is not structurally realized, it remains as a null object in the VP and verbs differ in the degree of realization that is required of their object. This applies to both transitive and unergative verbs.

Under the premises of the syntactic transitivity approach, transitivity is a syntactic property and the Transitivity Requirement is considered to be a universal structural template for objects (Cummins and Roberge 2005, Perez-Leroux et al. 2008). The template is shown in the tree below, where N is an implicit null object.

V V V N V 0→ s-selection

(3)

The main premises made by the transitivity-based approach, i.e. i) transitivity is a universal grammatical property, and ii) null objects are a default structural possibility present in all languages, provide a fruitful ground for making precise predictions about the initial states of human grammar. If null objects are always presented in the syntactic structure and transitivity is a default, we should expect children to go through a stage of object optionality (cf. Perez-Leroux et al. 2008), irrespective of the object-drop capacity of the specific target grammars. Under the TR null objects are predicted to be a default initial setting for acquisition purposes. An overgeneralization of the free availability of null objects due to a failure to restrict the null structure to the appropriate context is predicted. Omissions should therefore be found in typologically different languages, irrespective of the availability of null objects in the target grammar and without relevance to the pronominal system of the specific language, e.g. objects are expected to be dropped in the early development of languages with and without clitic systems (such as Bulgarian and English, for example). The emerging research question, do children of all languages go through a null object stage, is addressed in the next section bringing on empirical data from sixteen languages.

2 Null Objects in Child Grammar

In order to test the validity of the predictions made under the TR, I turn to the examination of the question how children acquiring various languages deal with direct objects in the acquisition process. The comparison of developmental patterns in typologically different languages such as Russian, Greek, French, and Chinese, to name only a few, helps hypothesize about universally represented structures as the starting point of linguistic development and about the grammatical elements that are specific to a particular language. More importantly, and this is the primary goal here, such a scrutinized empirical study of research conducted on the acquisition of objects in different languages can test the predictions made under the transitivity approach, expecting that children of *all* languages go through a null object stage.

2.1 Data

In order to verify the predictions made under the transitivity approach for the acquisition of objects, I review data from a solid number of experimental studies (cf. Table 1) concerned both with the production and comprehension of direct objects in elicited and naturalistic environments. As more research on a given topic within a particular language family or language families emerges, it is valuable to have research that consolidates the studies and elucidates patterns that are similar and different across the families. Serving such research is the primary goal of this paper.

The data I deal with stems from studies on sixteen typologically different languages. The main focus falls on the five Slavic representatives, Russian, Serbo-Croatian, Bulgarian, Polish, and Ukrainian, but the data analysis is also positioned in a cross-linguistic context by a comparison to other eleven languages, for which object drop has been studied, namely French, English, Spanish, Catalan, Italian, European Portuguese, Brazilian Portuguese, Romanian, Standard Modern Greek, Cypriot Greek, and Chinese. Table 1 gives an overview of the languages and the conducted studies including information about the type of data, i.e. elicited or/and spontaneous as well as about the ages tested in the individual studies. For French, English, Spanish, and Italian, there is a vaster number of studies but only a selection of the newest and most representative studies could be included here. The overview of studies evidences the fact that the acquisition of objects has been well examined over the last three decades covering a vast number of languages and providing both spontaneous and elicited child data from production and comprehension, something which is rather rare in the study of the acquisition of other grammatical phenomena. This is particularly beneficial and guarantees the validity of the present meta-study, since the claims made under the transitivity approach have broad consequences predicting object drop in the early stages irrespective of typological differences found in individual language systems.

Language	Studies	Type of data	Age
Russian	Gordishevsky& Avrutin (2004)	spont.	1;9-2;6
	Frolova (2016, subm.)	elicit.	2;10-6;1
Serbo-Croatian	Stiasny (2003, 2006)	elicit. and spont.	1;10-4;7
Bulgarian	Radeva-Bork (2013, 2015)	elicit.	2;2-4;3

Table 1: An overview of the reviewed studies on the acquisition of objects in sixteen languages

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Language	Studies	Type of data	Age
	Neokleous (2011)	"	"
Chinese	Wang et al. (1992)	elicit.	3;0-4;0

Here I analyze production and comprehension data from Polish, French, English, and Spanish. For Russian, Serbo-Croatian, Bulgarian, Ukrainian, Catalan, Italian, European Portuguese, Brazilian Portuguese, Romanian, Standard Modern Greek, Cypriot Greek, and Chinese I deal with production data in elicited and spontaneous contexts. The core age of the participants in the studies lies between two to four years, with some languages (Russian, Polish, French, English, European Portuguese, and Cypriot Greek) including older children, up to the age of six years, in some of the studies. In the majority of the studies participants are controlled for gender. The subjects are typically-developing, monolingual children, recruited from day cares or schools.

The comparison of results from the included studies is legitimate due to the use of a conform and highly comparable experimental methodology, which is described in the next paragraph. In fact, in a recent analysis of meta-megastudies, Myers (2016) shows that methodological differences across studies seem generally insufficient to explain large differences in results, and that what seems to have a bigger effect are typological differences between languages. Whereas a detailed discussion of methodological effects in object elicitation tasks is beyond the scope of this paper, I hold that it is legitimate to compare the results from the presently included studies mainly due to the use of a common elicitation procedure. However, see Varlokosta et al. (2016), who argue for an effect of the used elicitation methodology on the production of clitic objects in experimental tasks.

Studies on the acquisition of objects employ a standard elicited production task (Schaeffer 2000, Pérez-Leroux et al. 2008, Radeva-Bork 2012, among others) to examine how children use direct objects in transitive contexts of the kind as in (4) where (4a) is a licit option in the adult grammar of some languages such as Russian or Polish but not in others such as Bulgarian or Serbo-Croatian. (4) What did the boy do? (Bulgarian)
a. (Toj) ritna _.
*he kicked Ø.
b. (Toj) ritna topkata/ neja.¹
he kicked ball_{FEM.DEF} her_{ACC}.
'He kicked the ball.'/'He kicked it.'

In such elicitation tasks² participants are shown simple act-outs with toys and props, or picture cards illustrating simple activities such as kicking a ball, drawing a flower or building a house. Every activity represents a transitive scenario with an agent and an object. The studies include a big number of test items, usually between six and twelve. After the visual prompt, participants hear a control question of the kind "What did X do?" without mentioning the target object. Depending on the peculiarities of the language, target answers contain a transitive structure with an overt object or allow an omission, cf. (4). Transitive verbs such as *kick*, *draw*, *build*, *give*, *hug*, *drink*, *hit*, *push* etc. are used. A screening prior to the study guarantees that children understand the objects and the verbs as well as the actions denoted by the verbs in the tasks. An example of a model elicitation of direct objects is given in (5). The use of an object is obligatory here. Similar tasks have been used in the elicitation studies presented in Table 1.

(5) Model elicitation of direct objects in Bulgarian

Experimenter 1: This is Maria. This here is her favourite doll. The doll's hair is so bushy. (*An act-out of the experimenter combing the doll*)

Experimenter 2: Kakvo napravi Maria?

what did Maria 'What did Maria do?'

¹ Alternatively an answer with a clitic pronoun is possible, *Toj ja ritna* (he it kicked, *He kicked it.*). In all three contexts the use of an object is obligatory in Bulgarian.

² Naturally, for the spontaneous data, recordings and transcripts are used.

# Child 2;6:Sresa *kuklata.* combed doll_{DEF} 'She combed the doll.' (adapted from Radeva-Bork 2012: 79)

#### 2.2 Results

A qualitative analysis of the results from the studies shows that there is a big degree of variance in the transitivity of early grammars and children's omission of objects differs across languages. Since it is impossible to give a detailed presentation of the results from the individual studies in this paper, I focus on the Slavic data (marked in bold in Table 2 below), and present the results from the other languages for the sake of cross-linguistic comparison.

Generally, we find evidence for object omission in Russian, Ukrainian, Polish, European Portuguese, Brazilian Portuguese, Chinese, Italian, and Catalan, but not for Bulgarian, Serbo-Croatian, Spanish, Modern Greek, Cypriot Greek, and Romanian. Children in the latter group produce their obligatory objects in transitive contexts from the onset in a target-like manner. In contrast, Russian, Ukrainian, Polish, European Portuguese, Brazilian Portuguese, Chinese, Italian, and Catalan undergo a stage of object omission, in which obligatory transitive contexts do not yield an object in the early stages. For our purposes, we have to put French and English aside, since the studies on these languages have yielded contrasting results with regards to how much object omission was found in children. Table 2 summarizes the main results from the studies on the sixteen languages under analysis.

<b>Object omission</b>	No object omission	Conflicting data
Russian	Bulgarian	French
Ukrainian	Serbo-Croatian	English
Polish	Spanish	
E. Portuguese	Modern Greek	
Br. Portuguese	Cypriot Greek	
Chinese	Romanian	
Italian		
Catalan		

Table 2: General results of the spead of (non)omission

Although results from individual studies on Spanish vary as to how much omission is found in the early stages, all of the studies support the view that Spanish objects are acquired early, around the age of two to three years. On the basis of the elicitation data from 28 children, Wexler, Gavarró, and Torrens (2004) show that two-year-olds literally never omit objects (omission is at 0%). These results are consistent with the spontaneous data provided in Stiasny (2006). In contrast to Spanish, for Catalan Wexler et al. (2004) find high rates of object omission. Two-year-olds omit objects 74% of the time. The object omission remits as age progresses but does not disappear by the age of four years.

Italian patterns with Catalan with respect to object omission – the rate of object omission is high in both languages for ages two to four. Object omissions in Italian have been evidenced both in spontaneous speech (a.o. Guasti 1993/94) as well as in elicitation data (Schaeffer 2000). The two-year-olds in Schaeffer's study omit objects at high rates of up to 64%. Object omission at 15% is still present in the production of threeyear-olds. These findings are confirmed by similar rates of object omission for the same ages in Tedeschi (2008). It is not before the age of four that Italian children cease omitting their objects and omissions fall to 0%. So whereas Spanish children produce overt objects from the early on, Italian children go through an initial phase of object omission (ending at around four years).

In an experimental study for Romanian, Babyonyshev and Marin (2006) find that Romanian-speaking children "produce object clitics freely as soon as they are able to produce utterances that are long enough to contain them" (Babyonyshev and Marin 2006: 31). The authors divide their population into groups according to MLU and not according to age. The results indicate object omission of 82% for children with MLU smaller than two, and omission of 13% for children with MLU greater than two. Since Babyonyshev and Marin show that object omission in Romanian is due to production limitations (such as low MLU) instead of a grammatical constraint, we can conclude that the initial stage of language development in Romanian is not characterized by object omission.

With regards to Slavic, we find child Bulgarian and Serbo-Croatian to pattern together since the children in the studies do not omit objects in obligatory contexts (cf. studies in Radeva-Bork 2013, 2015 and Stiasny 2006). No object omission or misplacement is found in Serbo-Croatian in

either elicited or naturalistic production (Stiasny 2006). The same holds for Bulgarian, objects do not get omitted and are used in a target-like manner already from the age of 2;3 onwards (Radeva-Bork 2015). In child Polish, Ukrainian, and Russian null objects are used at very high rates and are often the preferred option (cf. studies in Tryzna 2015, Mykhaylyk and Sopata 2016, Gordishevsky and Avrutin 2004, Frolova 2016). In Polish and Ukrainian, children prefer to use null arguments up to the age of five. At the age of three they omit objects at 89% in Polish and at 68% in Ukrainian (Mykhaylyk and Sopata 2016). The onset of direct object use seems to be semantically affected since around the age of five, clitics/pronouns are used more often for animate referents, and it is only around the age of six that they start being used also for inanimate objects (Mykhaylyk and Sopata 2016).

In Russian, Ukrainian, and Polish, children do not only omit direct objects in obligatory transitive contexts, but they overproduce the null option when compared to adults. This holds particularly for Russian, where three- to six-year old children produce more null objects than adults in the contexts where object omission is a grammatical possibility. Object omission of around 80% was found for the age of three years (Frolova 2016). Even at the age of five, Russian children omit referential objects at 73% and non-referential ones at 54%. As Frolova (submitted) shows, Russian children even omit direct objects in strongly transitive (perfective) contexts where adults tend to use overt nouns but where the null object is still grammatical. Generally, production of null objects in Russian is attested at a similar rate across all age groups up to the age of six years and it is higher than for adults (Frolova 2016). In nonreferential contexts, a gradual decrease in object drop, an increase in lexical object use and a low production of pronouns is observed with the age progression. The rate of null objects is higher in referential contexts. Here we rarely find lexical objects but the percentage of pronouns is higher. Similarly to their Russian peers, children acquiring Polish overuse null objects in comparison with adults and the omission rate decreases in the process of language development (Mykhaylyk and Sopata 2016, Tryzna 2015).

From a cross-linguistic perspective, European Portuguese, Brazilian Portuguese, Chinese, Italian, and Catalan pattern with Russian, Ukrainian, and Polish in terms of the attested object omission in the early stages (for ages two to four and above). Spanish, Modern Greek, Cypriot Greek, and Romanian behave like Bulgarian and Serbo-Croatian in that they are not characterized by object drop in the acquisition process, and objects are present in a target-like manner already at the age of two years. The latter finding contradicts the predictions made by the Transitivity Requirement (cf. Section 1).

#### 2.3 Discussion and implications

The data survey from sixteen typologically different languages (including five Slavic representatives- Bulgarian, Serbo-Croatian, Russian, Ukrainian, and Polish) challenges the obligatory structural presence of null objects postulated by the transitivity-based approach and calls for a re-evaluation of the theoretical analysis of the null object phenomenon in adult grammar. The prediction made by the Transitivity Requirement is not borne out – out of the sixteen languages, eight allow object omission in early grammar, six languages do not, and two languages (French and English) show conflicting results. Therefore there is no evidence that null objects are a default initial setting in the acquisition process. Instead, there seems to be a clear division between languages with and without object drop in the early stages.

How can the division between languages in terms of object (non)omission be accounted for? Based on the results presented in Section 2.2, a parallel between children's performance with objects and the actual allowance or prohibition on object drop in the target grammars emerges. Children omit objects only if their target grammar provides the null object option, which is the case for Russian, Ukrainian and Polish, European Portuguese, Brazilian Portuguese, Italian, Catalan, and Chinese. In contrast, adult Bulgarian, Serbo-Croatian, Spanish, Modern Greek, Cypriot Greek, and Romanian do not allow object drop in the sense of example (1), and children seem to act according to the target grammar rules and produce objects from early on. Hence early object omissions seem to reflect the presence of (optional) object drop in the target grammar. Children overgeneralize novel intransitives out of novel transitives and drop objects at higher rates than adults, provided that their target grammar allows that option. They seem to be conservative and faithful to the syntax of the input. This observation is generally supported by experimental evidence in the first language acquisition literature, indicating strong input sensitivity in acquisition and often target-like omissions in spontaneous data (Ingham 1993/4). In addition, the data discussed here (see Section 2.2), supply support to the proposal in Varlokosta et al. (2016) that children generally opt for the weakest alternative, in accordance with the scale pronoun > clitic > null, depending on what is available in their language.

Children seem to be faithful to the syntax of the input as their object drop reflects the presence of (optional) object drop in the target grammar and gives no evidence that null objects are a default setting for all languages. Furthermore, for the languages in which children omit objects (see Section 2.2), they seem to overgeneralize the null option. Data from Chinese as well as from European and Brazilian Portuguese confirm that children tend to overuse the option of object-dropping, licensed by their target grammar in some contexts, as late as at the age of five (Wang et al. 1992, Costa et al. 2012, Lopes 2009). In addition, it seems that if a null argument is available in the grammar, the discourse-pragmatic or semantic features of the direct object referent play an important role in argument realization. This is supported by studies showing a semantic effect on the use of direct objects in Polish, for example (see Section 2.2). In Polish, overt objects (clitics/pronouns) are used more often for animate referents around the age of five. Around the age of six, they are used for inanimate referents. It may be the case that null objects are different from null subjects in that semantic and discourse factors play a greater role in the presence and interpretation of the null object. This, however, needs further investigation.

#### **3** Conclusion

The aim of this paper was to investigate object omission in early child grammar in light of the Transitivity Requirement (TR) approach (Roberge 2002, Cummins and Roberge 2005), which states that transitivity is not dependent on the lexical features of the verb but is a universal grammatical property. Within this approach, null objects are predicted to be a default initial setting for language acquisition. If null objects are indeed default, we expect to find evidence for object drop in the early stage of development in various languages, irrespective of the (non)omission capacity of the specific target grammars.

The paper reviewed naturalistic and experimental child data from sixteen typologically different languages and showed that out of the sixteen languages, eight languages (Russian, Ukrainian, Polish, European Portuguese, Brazilian Portuguese, Italian, Catalan, and Chinese) allow object omission in early grammar, six languages (Bulgarian, Serbo-Croatian, Spanish, Modern Greek, Cypriot Greek, and Romanian) do not, and two (French and English) show conflicting results. The predictions of the TR approach are not borne out and the idea of null objects being a default setting in the early child grammar is invalidated. Instead, there is a clear division between languages with and without object drop in the early stages. In fact, the results from the studies suggest that early object omissions reflect the presence of (optional) object drop in the target grammar. In other words, children seem to omit objects only if their target grammar allows for this option, as it is the case, for example, in Russian, Ukrainian, and Polish.

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# Definiteness of Bare NPs as a Function of Clausal Position: A Corpus Study of Czech^{*}

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We provide novel corpus evidence that the definiteness of a bare (nondetermined) noun phrase (NP) depends on the position of the NP in the clause, thus corroborating an intuition common among Slavic linguists since the 1970s. The most significant finding is that indefinite bare NPs are very unlikely to occur in clause-initial position, which is in line with Geist's (2010) predictions. A further notable result is that definiteness of a bare NP is affected by its absolute position in the clause (clause-initial vs. clause-final), but not its position relative to the verb (preverbal vs. postverbal). This has worrisome implications for theories according to which the verb partitions the clause into a presupposed and nonpresupposed area (Kučerová 2007 and, with some reservations, Diesing 1992). Finally, we are able to tease apart the effect of clausal position from the effect of syntactic function, to the effect that being a subject or

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object (properties that strongly correlate with being clause-initial and clause-final, respectively) does not increase the likelihood of bare NPs to be interpreted as definite or indefinite, respectively.

The paper is organized as follows. Section 1 introduces the core empirical issue – what we call the definiteness–word order interaction. Theoretical approaches to this interaction and their predictions are discussed in section 2. Section 3 is the main contribution of this paper – a corpus study of the definiteness–word order interaction in Czech, designed to test for the validity of what we call the absolute position hypothesis (effect of clause-initiality/finality on (in)definiteness) and the relative position hypothesis (effect of pre-/postverbality on (in)definiteness). Section 4 discusses and rules out the potentially confounding factor of syntactic function (subject/object). Section 5 provides a discussion of the results and their theoretical implications.

## 1 Definiteness–Word Order Interaction

It is a common and long-standing observation that the definiteness of bare NPs in articleless Slavic languages depends, at least in part, on word order. Descriptively speaking, a clause-final bare NP tends to be interpreted as indefinite and a clause-initial bare NP tends to be interpreted as definite. The observation has gradually been qualified (see e.g. Geist 2010): it is now often claimed that there is an effect of the initial but not the final position; the latter is believed to remain neutral with respect to (in)definiteness (consider also Chvany's and Krámský's intuition about *stole* 'table' in (1b)/(2b)).

<ul><li>(1) a. Na stole je kniha. on table is book</li><li>'There is a book on the table.'</li></ul>	b. <b>Kniha</b> je na stole. book is on table ' <b>The</b> book is on the table.' [Cz; Krámský 1972:42]
<ul><li>(2) a. Na stole stojala lampa. on table stood lamp</li><li>'There was a lamp on the desk.'</li></ul>	b. Lampa stojala na stole. lamp stood on table 'The lamp was on a/the desk.' [Ru; Chvany 1973:266]

(3)	W in	pokoju room	siedziała sat	dziewczyna.	[Pc	; Szwedek1974:215]
	'Th	nere was	a girl sitting	in the room.		
	a. \	Wszedł	chłopiec.	b	. Chłopiec	wszedł.
	e	entered	boy		boy	entered
	د	A boy e	ntered.'		'The boy	entered.'

Despite the fact that the definiteness—word order interaction has been well-known for half a century, there are important unresolved questions, the answers to which would be highly informative for the theories that aim to explain or model the interaction.

# 2 Approaches to the Definiteness–Word Order Interaction

Consider our examples (1)-(3) again. We stated, following a common opinion, that clause-initiality correlates with definiteness and, potentially, clause-finality with indefiniteness. But there are at least two other factors that could be held responsible for the effect: position with respect to the verb (preverbal  $\rightarrow$  definite, postverbal  $\rightarrow$  indefinite) and prosodic prominence (non-prominence  $\rightarrow$  definite, prominence  $\rightarrow$  indefinite). None of these three perspectives on the data pattern is a priori implausible, but each is a proxy for a potentially very different theory: clause-initiality is expected to correlate with topichood (and thereby definiteness), preverbality with presuppositionality (Diesing 1992, Kučerová 2007), and prosodic non-prominence with givenness, which in turn correlates with anaphoricity - one common kind of definiteness (Szwedek 2011). Yet another plausible analysis relies on the relative position of NPs: if indefinite NPs cannot precede definite NPs - as suggested for Russian double objects by Titov 2017 - then the definiteness of the subject NP in (1b/2b) follows from the definiteness of stole 'table'. Finally, one could expect there to be an effect of syntactic function (subject vs. object) or perhaps a devoted syntactic "subject position" (such as SpecTP). The idea that subjecthood is associated with definiteness goes back to Li & Thompson's (1976) work on Chinese.

Table 1 summarizes the landscape of (i) plausible empirical generalizations that subsume the definiteness—word order interaction, (ii) the hypotheses that these could be a proxy for, and (iii) selected existing proposals that entail one of the hypotheses.

	GENERALIZATION	Hypothesis		PROPOSALS
Α	Initial	Initial	Topic	Hlavsa 1975
	→ Definite	→ Topic	$\rightarrow$ Referential	Chvany 1983
		_		King 1995
			Referential	Geist 2010
B	Subject	Subject	$\approx$ Definite	Li &
	→ Definite	→ Topic		Thompson 1976
				Matthews &
				Yip 1994
				Jenks 2018
С	Preverbal	Preverbal	Out of vP	Diesing 1992
	→ Definite	$\rightarrow$ External to	→ Presuppositional	Junghanns &
		vP		Zybatow 1997
			Presuppositional	Brun 2001
			$\approx$ Definite	Späth 2003
				Biskup 2011
				Mykhaylyk 2011
D		Preverbal	Pre-G-operator	Kučerová 2007
		$\rightarrow$ Pre-G-	→ Presuppositional	
		operator		
			Presuppositional	
		$\approx$ Definite		
E	Precedes	Precedes Referential		Titov 2017
	Referential	$\rightarrow$ Referential		(extrapolation)
	→ Definite	(subcase of		
		*Non-Prominent precedes Prominent)		
		Referential		
		$\approx$ Definite		
F	Unstressed	Unstressed	Given	Szwedek 2011
	→ Definite	→ Given	$\approx$ Anaphoric	
			î	
			Anaphoric	
			$\approx$ Definite	

Table 1: Approaches to the definiteness-word order interaction

A number of clarification remarks are due. To start with, the hypotheses listed in Table 1 entail a relation between some *formal property* (e.g. position) and some *semantic property* (e.g. referentiality), whereby the semantic property is not specifically definiteness. The notions of referentiality (A, B, E) and presuppositionality (C, D) are applicable to indefinites, too (so called specific indefinites). It has been argued,

however, that bare NPs – if indefinite – cannot be specific. This is a reasonable conjecture not just for Slavic (see Geist 2010 on Russian), but possibly for bare NPs in general (e.g. Dayal 2011). Thus, bare NPs are either definite or non-specific indefinite. If this assumption is correct, Hypotheses A through E establish a relatively safe connection between the respective formal property and definiteness.

The notion of anaphoricity, implicated under F, represents a more complicated case. In Szwedek's (2011) work, the lack of prosodic prominence is directly tied to anaphoricity. From a broader perspective, however, this is somewhat unorthodox. Most relevant literature postulates a connection between lack of stress and *givenness* (starting with Schmerling 1976; more recently Féry & Samek-Lodovici 2006) and while givenness is often defined in terms of discourse anaphoricity (e.g. Rochemont 1986, Schwarzschild 1999), it does not necessarily entail definiteness (Umbach 2001). I.e., indefinites (even non-specific ones) can also be given and subject to avoiding prosodic prominence (see Šimík & Wierzba 2015 for an experimental argument for Czech).

There is a caveat that concerns hypothesis C, which states that NPs located externally to vP are presuppositional. It is certainly a simplification to assume that whatever is preverbal is external to vP. While the vP-edge is not an unlikely position of the (finite) verb in Slavic languages (Bailyn 2004, Wiland 2009), it is by far not a settled matter (cf. Migdalski 2006). This problem is sidestepped in the approach of Kučerová (2007) (hypothesis D), which entails an intimate connection between overt verb position and the partition into the presuppositional and non-presuppositional area (mediated by the G-operator). Including preverbality as a factor will thus directly test a prediction of Kučerová's (2007) approach to the definiteness–word order interaction.

# 3 Corpus Study

#### 3.1 Motivation and Aim

The above-mentioned approaches have rarely (if ever) been explicitly and systematically compared. Much of the existing work concentrates on proving a particular theory and centers around isolated and ad hoc observations. While we consider the development of theories about the definiteness–word order interaction important, we believe that a solid understanding of the empirical matter is equally important. In our view, there is plenty of work that needs to be done in order to establish even the basic empirical generalization, namely which factor or factors are behind the pertinent interaction. Further unresolved questions are whether and how these factors interact and whether they are subject to cross-linguistic variation.

The present work supplies corpus evidence from Czech, which sheds new light on generalizations/hypotheses A through D. More particularly, our study is designed to directly assess the adequacy of generalization A (Initial  $\rightarrow$  Definite), as compared to generalization C/D (Preverbal  $\rightarrow$ Definite). An additional post-hoc analysis also tests for the adequacy of generalization B (Subject  $\rightarrow$  Definite) and compares it with generalization A, for which it constitutes a potential confound.

While we find a strong dependency of definiteness on clauseinitiality (and finality), our data support neither the view that definiteness depends on pre-/postverbality, nor that it depends on subject/objecthood. We interpret these results as a step towards reducing the hypothesis space. We will further show that the most clearly pronounced restriction is one on clause-initial indefinites, in line with Geist (2010).

#### 3.2 Hypotheses

The two hypotheses that we aim to compare are in (4) and (5).¹

- (4) ABSOLUTE POSITION HYPOTHESIS: The absolute clausal position of bare NPs (initial/final) has an impact on their (in)definiteness.
  - a. Clause-initial bare NPs are more likely to be definite.
  - b. Clause-initial bare NPs are less likely to be indefinite.
  - c. Clause-final bare NPs are more likely to be indefinite.
  - d. Clause-final bare NPs are less likely to be definite.

¹ For presentational and rhetoric purposes, we treat (in)definiteness as the dependent variable, such that position is assumed to have a (causal) impact on (in)definiteness. Technically, however, we can only measure a correlation between (in)definiteness and position. It cannot be ruled out that it is (in)definiteness that affects position.

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- (5) RELATIVE POSITION HYPOTHESIS: The position of bare NPs relative to the verb (pre-/postverbal) has an impact on their (in)definiteness.
  - a. Preverbal bare NPs are more likely to be definite.
  - b. Preverbal bare NPs are less likely to be indefinite.
  - c. Postverbal bare NPs are more likely to be indefinite.
  - d. Postverbal bare NPs are less likely to be definite.

The one-tailed directional sub-hypotheses in (a) through (d) are expected manifestations of the respective "matrix" hypotheses. They need not all be true in order for the matrix hypothesis to hold. As discussed above, the intuitions expressed in the literature give us a reason to believe that (4a/b) are more likely to hold than (4c/d). A comparable expectation holds for (5). Biskup (2011), for instance, claims that bare NPs in the preverbal position (in the CP phase) are obligatorily specific or definite, but the postverbal position (the vP phase) has no effect on NP interpretation. This is inherited from the classical works on semantic effects of scrambling, particularly Diesing (1992) and de Hoop (1992).

#### 3.3 Method, Material, Annotation

Our basic method is very simple: we annotated bare NPs for (in)definiteness and looked whether their (in)definiteness correlates with (i) the absolute position in the clause and (ii) the relative position to the verb.² Our sample was drawn from the Czech National Corpus and particularly from the SYN2010 subcorpus – a representative corpus of synchronic written Czech (at the time when the research was carried out). In order to ensure a certain stylistic homogeneity and at the same time an affinity to colloquial Czech, we concentrated on fiction only. As argued in Berger (1993), style and register are factors relevant for the formal expression of definiteness in Czech. However, we had no intention and capacity to include genre as a factor into the analysis. We further excluded translations, in order to avoid interference from other

² The corpus research originated as Burianová (2016), which was carried out under the supervision of RŠ. As presented here, the corpus study consists in a re-annotation of the original sample by RŠ; the raw results remain largely unaffected, but the present work departs from Burianová (2016) significantly in its theoretical anchoring. The raw data, annotations, analyses, as well as selected glossed corpus examples are made available at <a href="https://osf.io/jauhw">https://osf.io/jauhw</a>.

languages. The resulting subcorpus of SYN2010 had about 15 million tokens.

We proceeded by a search for nouns, followed by an automatic removal of proper names and nouns with determiners. Out of the resulting 2.37 million tokens (0.16 i.p.m.), we drew a random sample of 800 noun (phrase) occurrences. These underwent further manual filtering, whereby the following NPs were removed from the sample:

- the remaining determined NPs,
- NPs that were parts of idioms or collocations (motivated by the assumption that these cannot be meaningfully (in)definite),
- NP fragments or appositions (no clear clausal position),
- attributive NPs (significantly reduced freedom of position),
- predicative NPs (no referential properties, hence no clear definiteness),
- kind-denoting NPs (inherently hard to judge for definiteness), and
- cases where definiteness was simply too hard to decide on.

We ended up with a final sample of 315 bare NP occurrences, which then entered an annotation for (i) DEFINITENESS (definite, indefinite), (ii) ABSOLUTE POSITION (initial, medial, final), and (iii) RELATIVE POSITION (preverbal, postverbal). For each occurrence we included an auxiliary annotation for SYNTACTIC FUNCTION (subject, object, adverbial), DEFINITENESS TYPE (unique, anaphoric, plus a number of subtypes of each), INDEFINITENESS TYPE (presentational, quantified-over), REFERENT TYPE (entity, event, temporal interval, ...), GRAMMATICAL NUMBER (singular, plural), MODIFICATION (none, premodified, postmodified, both), GIVENNESS (given, new), and FOCUS (narrow focus, part of focus, part of background).³ For an analysis of some of these auxiliary factors (e.g. modification), see Burianová (2016). In this paper, we will only concentrate on syntactic function (see section 4).

The annotation of the two position factors was not particularly complicated and included only a number of relatively uncontroversial assumptions, namely: (i) position of the whole NP was considered (not

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³ The annotation of the third core information structural category, namely topic (vs. comment), was not performed (despite its relevance), because it has proved to be particularly difficult (see Cook & Bildhauer 2013), and would require an extra study.
just the N from the concordance), (ii) clause-initial function words, such as conjunctions or complementizers, were ignored (i.e., in sequences like 'although new car...', 'new car' would count as an initial NP), and (iii) the position of the lexical verb was considered (not, e.g., of an auxiliary).

The annotation of definiteness was, expectedly, less trivial. For each NP occurrence, we inspected the preceding context (up to where it felt necessary, often the whole paragraph) and considered (i) whether adding an overt indefinite (e.g. nějaký 'some') or definite (demonstrative ten) determiner to the NP is possible without a meaning change, (ii) whether uniqueness of the referent is satisfied – by means of contextual bridging, binding, etc., (iii) whether the translation to English vielded a definite or indefinite NP (a method used for some cases by RS). Our annotation methodology was, of course, not without shortcomings. The annotation was performed by the authors of the study and was sequential - first done by MB (Burianová 2016) and later revised by RŠ. Because the two annotations were not mutually independent, there was no way to meaningfully measure the interannotator agreement (Cohen 1960). The annotation procedure was relatively informal: there was no decision tree and the three above-mentioned criteria were used in a case-by-case fashion – depending on which one(s) suited best the occurrence at hand. Despite this, the annotation was done with great care and in an unbiased manner, so we are confident that it represents a robust and useful approximation of the facts.

# 3.4 Results

Table 2 presents the results qua the absolute position hypothesis. The numbers in boldface represent the attested frequencies; for instance, of all the 315 occurrences, there were 61 definite bare NPs in clause-initial position. The bracketed numbers indicate the frequencies expected under the null hypothesis; for instance, had there been no effect of position on definiteness (or of definiteness on position), we would have found about 43 definite bare NPs in the initial position.⁴

⁴ Expected frequencies can be intuitively grasped if one realizes (by inspecting the table) that their ratio matches the ratio of attested total frequencies (e.g.  $43.4 : 113.0 : 50.6 (DeF) \sim 66 : 172 : 77 (TOTAL) \text{ or } 43.4 : 22.6 (INITIAL) \sim 207 : 108 (TOTAL)).$ 

	INITIAL		FINAL		MEDIA	TOTAL	
Def	61	(43.4)	88	(113.0)	58	(50.6)	207
INDEF	5	(22.6)	84	(59.0)	19	(26.4)	108
TOTAL	66	. ,	172		77		315

Table 2: Results qua the absolute position hypothesis

Overall, there were more definite than indefinite NPs (207:108). Higher frequency of definites should not come as a surprise, however, as an auxiliary search of the German corpus (using articles as a proxy for definiteness) yields a 4:1 ratio in favor of definites. If anything, we should therefore be surprised to have found so few definites.⁵ But let us leave the issue at that and move on to our main interest: the definiteness–word order interaction. We find that the absolute position hypothesis is confirmed: the position of the NP has an effect on its definiteness ( $\chi^2(2) = 40.22$ , p < .001, n = 315) – with numbers clearly departing from the null hypothesis in initial and final position. We find more initial definites & fewer initial indefinites than expected ( $\chi^2(1) = 20.90$ , p < .001, n = 66) and fewer final definites & more final indefinites than expected ( $\chi^2(1) = 16.16$ , p < .001, n = 172). Medial position has no or only marginal effect on definiteness ( $\chi^2(1) = 3.16$ , p = .08, n = 77).⁶

Let us now turn to the relative position hypothesis. In order to assess this hypothesis properly, we need to focus our attention on the 77 medial NPs, i.e. NPs that are neither initial, nor final, as represented in Table 3. The reason for that is that if we included initial and final NPs into the dataset of pre- and postverbal NPs, respectively, we would not be able to tear apart the effect of pre- vs. postverbality from the one of initiality vs. finality. In fact, because the frequency of initial/final NPs is higher than the one of medial NPs, we would see *mainly* the effect of initiality vs. finality. This is a trap that Czardybon, Hellwig & Petersen (2014) fell into when they concluded – based on a Polish corpus study, similar to the

 $^{^{5}}$  The relatively high frequency of indefinites – even singulars, where the ratio is 157:81 – could be interpreted as worrisome for Dayal's (2004) proposal that singular bare NPs in articleless languages are never genuinely indefinite.

⁶ Expected values used for pairwise comparisons are the same as in the full contingency table (Table 2 for the case at hand). Bonferroni-adjusted p is assumed for pairwise comparisons throughout the paper.

present one – that preverbality increases the likelihood of definiteness and postverbality of indefiniteness: they included initial and final NPs into their dataset and it is thus possible that what they observed is an effect of absolute rather than relative position.

	PREVERBAL		POSTV	TOTAL	
Def	28	(28.6)	30	(33.9)	58
INDEF	10	(9.4)	9	(11.1)	19
TOTAL	38	. ,	39		77

Table 3: Results qua the relative position hypothesis

Table 3 shows that definite and indefinite NPs are distributed around the verb in full accordance with the null hypothesis ( $\chi^2(1) = .11$ , p = .74, n = 77). There are neither more preverbal definites / fewer preverbal indefinites than expected ( $\chi^2(1) = .06$ , p = .82, n = 38), nor fewer postverbal definites / more postverbal indefinites than expected ( $\chi^2(1) = .05$ , p = .82, n = 39). We found no evidence for the relative position hypothesis.

A preliminary conclusion is that the definiteness of bare NPs depends on the absolute position in the clause but not on the position relative to the verb. We postpone further discussion until after we discuss the apparent effect of syntactic function on definiteness, which turns out to be a potential confound for the absolute position hypothesis.

### 4 Syntactic Function and Definiteness

### 4.1 Basic Observations

A naked-eye observation of Table 4 makes it clear that there is an effect of syntactic function on definiteness ( $\chi^2(2) = 19.22$ , p < .001, n = 315). More particulary, there are more definite & fewer indefinite subjects than expected ( $\chi^2(1) = 10.75$ , p = .001, n = 78) and more indefinite & fewer definite objects than expected ( $\chi^2(1) = 8.35$ , p = .004, n = 127). Being an adverbial has no effect on definiteness ( $\chi^2(1) = .12$ , p = .73, n = 110).⁷

⁷ Nominative-marking functioned as the proxy for subjecthood in the annotation. What could be of relevance is that 65 out of the 78 subjects were agents. An NP was

	SUBJECT		OBJEC	T	ADVE	TOTAL	
Def	65	(51.3)	68	(83.5)	74	(72.3)	207
INDEF	13	(26.7)	59	(43.5)	36	(37.7)	108
TOTAL	78		127		110		315

Table 4: Effect of syntactic function on definiteness

The effect of being a subject vs. being an object is thus qualitatively similar – although not so statistically robust – to being in the initial vs. in the final clausal position. It further turns out (see Table 5) that there is a strong correlation between being a subject and being initial on the one hand and being an object and being final on the other ( $\chi^2(2) = 74.21$ , p < .001, n = 315). More particularly, there are more initial & fewer final subjects than expected ( $\chi^2(2) = 48.65$ , p < .001, n = 78) and more final & fewer initial objects than expected ( $\chi^2(2) = 20.50$ , p < .001, n = 127). There is no statistically significant tendency for adverbials to be in any particular position ( $\chi^2(2) = 5.03$ , p = .08, n = 110).⁸

	SUBJECT		OBJEC	Т	ADVE	TOTAL	
INITIAL	41	(16.3)	9	(26.6)	16	(23.0)	66
FINAL	20	(41.1)	90	(66.9)	56	(58.0)	166
MEDIAL	17	(20.6)	28	(33.5)	38	(29.0)	108
TOTAL	78		127		110		315

Table 5: Interaction between syntactic function and position

Given this state of affairs, syntactic function could be a confounding factor for the absolute position hypothesis – at present we cannot rule out the possibility that the in/decreased likelihood of (in)definiteness reported in section 3.3, is caused by syntactic function rather than clausal position. That syntactic function (esp. being a subject) can have an effect on definiteness is a well-known hypothesis, as discussed in section 2, so the confound needs to be addressed properly.

annotated as an object when it was an obligatory internal argument (including 17 PPs). The majority of objects were accusative-marked direct objects (90 out of the 127).

⁸ We are coding position as the dependent variable for presentational purposes. The results are comparable if syntactic function is coded as the dependent variable.

### 4.2 Ruling out the Syntactic Function Confound

In order to separate the correlating factors position and syntactic function from one another, we need to look at four data subsets. These are suitable for testing the effect of the two pertinent factors in isolation, as summarized in (6). The rationale behind this is simple: if, e.g., the effect of position on definiteness is real, we should find it even by looking at subjects only (comparing initial and final subjects) or at objects only (comparing initial and final objects).

# (6) a. Subjects only & Objects only

 $\rightarrow$  Testing for the effect of position on definiteness (without the interference of syntactic function).

### b. Initial NPs only & Final NPs only

 $\rightarrow$  Testing for the effect of syntactic function on definiteness (without the interference of clausal position).

Table 6 demonstrates that the effect of position on definiteness is preserved even without the interference of syntactic function, esp. for the subset of subjects (p < .001, n = 61) and, less clearly but significantly so, for the subset of objects (p = .017, n = 103). More particularly, we find more initial definite & fewer initial indefinite subjects than expected (p = .003, n = 41) and more final indefinite & fewer final definite objects than expected (p = .001, n = 20). The position effect in the subset of objects is caused by the effect of the initial position, where there are more initial definite & fewer initial indefinite objects than expected (p = .021, n = 9). We find no effect of object finality on definiteness (p = .27, n = 94).⁹

SUBJECTS ONLY				OBJECTS ONLY				
	INITIAL		FINAL		Initi	AL	FINAL	
Def	40	(33.6)	10	(16.4)	8	(4.5)	44	(47.5)
INDEF	1	(7.4)	10	(3.6)	1	(4.5)	50	(46.5)

Table 6: Effect of position on definiteness of subjects & objects only

⁹ Due to low expected frequencies (below 5), one-tailed Fisher exact test (rather than Pearson chi-square) is used for Tables 6 and 7.

The pattern revealed by Table 7 is strikingly different: when considering initial NPs only and final NPs only – in order to test for the effect of syntactic function on definiteness – we find no departure from the null hypothesis (initial NPs: p = .33, n = 50; final NPs: p = .49, n = 114).

	INITIAL NPS ONLY				FINAL NPS ONLY			
	SUBJECT		OBJECT		SUBJECT		OBJECT	
Def	40	(39.4)	8	(8.6)	10	(9.5)	44	(44.5)
INDEF	1	(1.6)	1	(0.4)	10	(10.5)	50	(49.5)

Table 7: Effect of syntactic function on definiteness of initial & final NPs only

Based on this post-hoc analysis, we can conclude that the effect of position (initial vs. final) on definiteness is real, while the effect of syntactic function (subject vs. object) on definiteness is a mere illusion, caused by the fact that subjects are typically initial and objects are typically final.¹⁰

# 5 Discussion and Outlook

We found strong support for the absolute position hypothesis, repeated for clarity in (7).

- (7) ABSOLUTE POSITION HYPOTHESIS: The absolute clausal position of bare NPs (initial/final) has an impact on their (in)definiteness.
  - a. Clause-initial bare NPs are more likely to be definite.
  - b. Clause-initial bare NPs are less likely to be indefinite.
  - c. Clause-final bare NPs are more likely to be indefinite.
  - d. Clause-final bare NPs are less likely to be definite.

¹⁰ As noted by an anonymous reviewer, a comparable refutation might not be applicable to languages like Mandarin Chinese, where the initial (or rather preverbal) position of subjects is basically obligatory. For a related corpus-based discussion of pre/postverbal subjects in Russian, see Slioussar (2011).

Of the sub-hypotheses (a)–(d), (b) turned out to be the most strongly supported one: there are **4.5-times fewer initial indefinites** than what is expected under the null hypothesis. A post-hoc analysis confirmed this strong trend for both subjects and objects individually (although the numbers are very low and so is the level of confidence). This finding lends support to the specific proposal of Geist (2010), who takes the effect of initial position to be a "restriction on indefiniteness" (rather than a requirement to be definite). In her proposal, indefinite bare NPs are ruled out in the initial position by the conjunction of the following three assumptions: (i) initial bare NPs are topics (exception: thetic sentences in the sense of Sasse 1987), (ii) topics are referential (Reinhart 1981), and (iii) indefinite bare NPs cannot be referential.

The effect of clause-initiality on definiteness - sub-hypothesis (a) is less pronounced: there are 1.3x more initial definites than what is expected under the null hypothesis. This effect is stronger for objects (1.8x) than for subjects (1.2x), which correlates with the fact that subjects are initial by default. Despite the common assumption that clause-final position has no impact on bare NPs' (in)definiteness, we did find a trend in the expected direction: there are 1.4x more final indefinites (sub-hypothesis (c)) and 1.3x fewer final definites (subhypothesis (d)) than what is expected under the null hypothesis. Our post-hoc analysis reveals that this trend is clearly visible for subjects (1.6x fewer definites and 2.8x more indefinites), but virtually nonexistent for objects, whose (in)definiteness remains unaffected by being placed in final position. A plausible explanation of this subject-object asymmetry builds on the notion of focus: clause-final objects correlate with focus-size neutrality (availability of "focus projection"), whereas clause-final subjects strongly correlate with narrow subject-focus. If, in turn, focus correlates with novelty and novelty with indefiniteness (Heim 1982), the observed subject-specific effect follows (and particularly the strong tendency towards indefiniteness).¹¹

Our findings fail to support the relative position hypothesis – the idea that the position of bare NPs relative to the verb (pre-/postverbal) has an impact on their (in)definiteness. This sheds doubt on the traditional concept of verb as a "transition" between a contextually dependent and a

¹¹ Unfortunately, this explanation finds no support in our annotation, as all of the clause-final indefinite subjects are found to be parts of focus, not narrow foci.

contextually independent area of the sentence (Firbas 1965), as well as on what could be considered its generative incarnation – Kučerová's (2007) G-operator-based approach, which establishes an intimate connection between overt verb position and the presupposed–nonpresupposed partition. The consequences for Diesingian (1992) approaches are pending a precise (and perhaps case-by-case) analysis of the syntactic position of the main verb.

Last but not least, our findings fail to support the idea that syntactic function (being a subject or object) has an effect on bare NP definiteness. As revealed by our post-hoc analysis (despite the relatively low numbers), any effect on (in)definiteness that could apparently be attributed to syntactic function is directly derivative of the effect of clausal position. This is because subjects are likely to be initial and objects are likely to be final.

We hope that this work has proved the usefulness of applying corpus methodology to test the existing generalizations and hypotheses about the definiteness–word order interaction. Hopefully it also demonstrates the need to systematically control for closely related factors such as absolute vs. relative position or position vs. syntactic function.

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# Gender and Declension in Agreement Processing*

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# 1 Introduction

Many experimental studies examined different aspects of number agreement, while agreement in other features received less attention. In this paper, we study subject-predicate gender agreement processing in Russian, assessing the role of two potentially relevant factors: the gender of the head noun and its inflectional class, or declension. Russian has three genders: masculine, feminine, and neuter. Gender agreement can be observed only in singular, on adjectives, participles and past tense verb forms (plural forms are the same for all three genders).

One of the major problems discussed in agreement processing literature is associated with asymmetric effects of different features, which are usually explained in terms of feature markedness. Russian gender is interesting in this respect because markedness relations in the system are not entirely obvious. For example, in impersonal sentences, where unmarked forms are expected, neuter predicates are used. However, masculine nouns are the most frequent. As we discuss in more detail in section 2, most experimental studies of agreement assume that

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masculine is the unmarked gender in Russian, while Slioussar and Malko (2016) found that masculine differed from the two other genders in some tasks and neuter in the others. This calls for further experimental research and a reexamination of theoretical explanations of psycholinguistic data.

Another property of Russian nouns that is closely, but not straightforwardly connected to gender is their inflectional class, or declension. Russian nouns are inflected for case and number, and, depending on the set of their inflections, are divided into several declensions. We will rely on the system of three declensions usually identified in the Russian grammatical tradition (e.g. Shvedova, ed., 1980), as well in many other studies (e.g. Aronoff, 1994; Halle, 1994). Information about them is provided in Table 1. In addition to them, there are some irregular nouns and substantivized adjectives that have their own set of inflections.

Declension and gender	Percentage of nouns in the RNC ¹	Ending in Nom.Sg and prototypicality	Examples
1 st decl. feminine ²	29% nouns	end in <i>-a/ja,</i> 'prototypical F'	zhena 'wife'
1 st decl. masculine	1% nouns	end in <i>-a/ja,</i> 'non-prototypical M'	djadja 'uncle'
2 nd decl. masculine	46% nouns	end in a consonant, 'prototypical M'	<i>syn</i> 'son', <i>gel'</i> 'gel'
2 nd decl. neuter	18% nouns	end in <i>-o/e,</i> 'prototypical N'	pole 'field'
3 rd decl. feminine	5% nouns	end in a consonant, 'non-prototypical F'	<i>mel'</i> 'shallow'
irregular and indeclinable	1% nouns		

Table 1. Declension and gender in Russian nouns

¹ Slioussar and Samoilova (2015) identified the frequency of nouns with different grammatical characteristics in the grammatically disambiguated subcorpus of the Russian National Corpus, or RNC (http://www.ruscorpora.ru). Unfortunately, substantivized adjectives were not taken into account.

 $^{^{2}}$  This is the 2nd declension in the *Russian grammar* (Shvedova, ed., 1980), but we will follow the more widespread notation.

Alternative approaches to inflectional classes either divide the  $2^{nd}$  declension in Table 1 into two classes with masculine and neuter nouns (e.g. Alexiadou & Müller, 2008; Corbett & Fraser, 1993; Müller, 2004), or make a primary distinction between the  $1^{st}$  and  $2^{nd}$  ('core') declensions on one hand and the less frequent  $3^{rd}$  declension on the other hand (e.g. Zaliznjak, 1987; Wiese, 2004). Crucially for our study, all existing approaches agree that there is no one-to-one correspondence between the gender of the noun and its declension, and that some combinations are much more frequent than the others.

In particular, almost all masculine nouns end in a consonant in nominative singular and belong to the 2nd declension, while most feminine nouns end in -a or -ja and belong to the 1st declension. In Table 1, we call these groups prototypical, compared to the two less frequent groups:  $1^{st}$  declension masculine nouns that end in -a or -ja, like the majority of feminine nouns, and 3rd declension feminine nouns that end in a consonant like the majority of masculine nouns.³ We introduce the term *prototypical* as purely descriptive. It can be recast in terms of morphological regularity or even representational markedness (in featural approaches to declensions), but it is not readily evident how in particular. For example, although the share of nouns in the 3rd declension is small, the Grammatical dictionary of the Russian language (Zaliznjak, 1987) lists more than 4000 nouns that belong to it, and it is productive — mainly because of the -ost' suffix used to derive abstract nouns. On a more theoretical level, as the brief overview above shows, no approach to Russian declensions and to the connection between declensions and gender has gained wide acceptance so far. So we opted for a theory-neutral term.

As we will show in section 2, many experimental studies found differences between nouns with more and less morphologically regular inflections in a variety of languages. However, these studies usually looked at the processing of isolated nouns or, if agreement was examined, at the phenomenon of agreement attraction. Only one paper (Taraban & Kempe, 1999) addressed this problem in Russian, comparing  $2^{nd}$  declension masculine and  $3^{rd}$  declension feminine nouns. No differences between them were found for native speakers. We decided to

 $^{^3}$  The range of stem-final consonants in the  $3^{\rm rd}$  declension is smaller than in the  $2^{\rm nd}$  one.

come back to this question using a different experimental method, which could let us observe earlier processing stages. We conducted a self-paced reading study assessing the role of head noun gender and declension (including prototypicality) in subject–predicate gender agreement processing.

### **2 Previous Experimental Studies**

#### 2.1 On Gender

There are very few experimental studies of gender agreement in Russian. In three of them (Akhutina et al. 1999, 2001; Romanova & Gor 2017) adjectives were presented before nouns audially or visually. In congruent conditions, adjectives agreed with the following nouns, in incongruent ones they did not, and some experiments also included a baseline condition where bare adjective stems without inflections or adverbs were presented. Several methods were employed, including lexical decision (answering whether the presented stimulus is a real word or a nonce word), grammaticality judgment (answering whether the presented fragment is grammatical) and cued-shadowing in which participants must repeat the second presented word (the target noun).

However, the question was always the same: would participants answer significantly faster and more accurately in congruent conditions compared to incongruent ones, and would there be any differences associated with the gender of the nouns? In experiments with a baseline condition, it was also possible to check whether the difference between congruent and incongruent conditions was primarily due to facilitation in the former, or to inhibition in the latter, or both effects were equally prominent. In brief, Akhutina et al. (2001) observed significant facilitation and inhibition effects for feminine nouns, while for masculine nouns, only inhibition was significant, and for neuter ones, only facilitation was significant.⁴ Results from other studies were similar. Thus, Romanova and Gor (2017) compared only masculine and feminine nouns, and observed that inhibition effects were more prominent in the former case, while facilitation effects were more prominent in the latter.

⁴ This study also involved aphasiac patients, while Romanova and Gor (2017) compared native speakers to second language learners, but we will not discuss these groups here.

The explanations offered in these studies go along the same lines. Masculine gender is assumed to be unmarked, or default, while neuter is considered the most marked. Thus, masculine is expected by default, and strengthening this expectation by a masculine adjective prime does not produce a big difference (hence no significant facilitation effects). Neuter is the least expected option, so priming a neuter noun with a neuter adjective has the largest effect compared to the baseline condition (hence, facilitation effects for neuter nouns are larger than for feminine nouns). Inhibition effects are explained by rechecking, which is especially costly for masculine nouns presented after non-masculine adjectives.

None of these three studies looked at  $3^{rd}$  declension feminine nouns, while the experiments by Taraban and Kempe (1999) specifically focused on them. They stressed that a noun ending in a palatalized consonant could theoretically be a  $2^{nd}$  declension masculine or  $3^{rd}$ declension feminine (opaque condition), while nouns ending in other consonants or in -a/ja are unambiguously masculine or feminine (transparent condition). Taraban and Kempe examined the role of such transparency for subject–predicate agreement using word-by-word selfpaced reading and forced choice tasks. Participants were asked to read sentence beginnings like (1a) or (2a) and then to select one of the two verb forms in the remaining fragment like (1b) or (2b). In some conditions, sentence fragments contained adjectives.

(1) a	. Daže	(obyčnaja)	muka/sol'	teper'
	even	ordinary _F	$flour_{F.1D}/salt_{F.3D}$	now

b. isčez/isčezla iz magazinov. disappeared_{M/F} from stores

'Even (ordinary) flour / salt now vanished from the stores.'

(2) a. Nakanune (otëkšij) palec/lokot' sil'no... the-day-before swollen_M finger_{M.2D}/elbow_{M.2D} strongly

b. bolel/bolela ot udara. hurt_{M/F} from injury
'The day before the (swollen) finger / elbow strongly hurt from the injury.'

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Participants were adult native speakers and L2 learners. For native speakers, transparency and the presence of a gender-marked adjective did not play any role. Knowing the gender of a noun was enough (native speakers may have problems determining a noun's gender only when there are some differences between literary and colloquial Russian or a noun is very infrequent).

Slioussar and Malko (2016) studied gender agreement attraction. To give an example, an attraction error is present in the English sentence "The key to the cabinets are rusty", where the verb agrees not with the head of the subject DP, but with another noun, termed *attractor*. In production, such errors are more frequent than agreement errors without attraction. In comprehension, they are missed more often and produce smaller delays in reading times and less pronounced ERP responses.

Number agreement attraction is widely discussed in the experimental literature, while gender agreement attraction was analyzed only in a few studies so far. Among other things, it was noted that both in production and in comprehension, attraction effects can be observed in the sentences with singular heads and plural dependent nouns (e.g., "The key to the cabinets..."), but not in the sentences with plural heads and singular dependent nouns (e.g., "The keys to the cabinet..."). Almost all proposed explanations of this asymmetry appeal to feature markedness, although approaches to markedness may be very different, from representational to frequency-based. Looking for similar asymmetries in gender agreement attraction, several studies of Romance languages obtained controversial results (e.g. Acuña-Fariña et al., 2014; Anton-Mendez et al., 2002; Martin et al., 2014; Vigliocco & Franck, 1999). Badecker and Kuminiak (2007) found that neuter behaves as unmarked in a series of production experiments on Slovak, in which neuter is the least frequent gender, but used in impersonal sentences, like in Russian.

Slioussar and Malko (2016) conducted one production and three comprehension experiments. The results of the former were similar to the Slovak study, while in the latter, masculine behaved differently from feminine and neuter. Namely, attraction was observed for all dependent noun genders, but only for neuter and feminine heads. In other words, masculine heads were significantly more resistant to attraction: readers

detected agreement errors irrespective of possible attractors' interference.⁵

This result can be reconciled with the observations made in (Akhutina et al. 1999, 2001; Romanova & Gor 2017). However, given that different patterns were observed for production and comprehension, we cannot explain them by a particular single property of gender features anymore. This reminds us that markedness usually invoked to explain all asymmetries between features is a problematic term because some studies rely on representational markedness (primarily counting the number of positive feature values), while the others consider the most frequent value to be the default. From the representational point of view, neuter is the unmarked gender in most accounts, while if we rely on frequency, masculine is. Maybe, these approaches should be seen as complementary, because different properties of features appear to be relevant in different experimental tasks. Since further research is clearly required in this area, we decided to conduct an experiment studying subject-predicate gender agreement in Russian in the absence of attraction phenomena, because no such studies have been reported so far.

Finishing an overview of experimental studies of gender agreement in Russian, let us mention that Sekerina (2012) conducted an eyetracking study where participants listened to sentences instructing them to move objects on a display. She showed that in so-called splitscrambling constructions, when an adjective is separated from its noun, listeners effectively use gender information on the adjective to make guesses about the upcoming noun. No differences between genders were reported.

### 2.2 On Inflections

Now let us turn to the problem of inflections that are more or less typical for a particular gender. Many experimental studies used different tasks (for example, determining a noun's gender or selecting an article) to show that nouns with more typical inflections are associated with faster and more accurate answers. This was demonstrated for Italian, French,

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⁵ It is traditionally assumed that the features of the dependent noun are crucial for attraction, but both this study and some other findings suggest that the features of the head might be more important. We will not discuss this problem here.

Hebrew, Bulgarian etc. (e.g. Andonova et al., 2004; Bates et al., 1995; Gollan & Frost, 2001; Spalek et al., 2008).

However, fewer studies investigated the role of this factor in sentence processing. To give an example, Caffarra et al. (2015) looked at Italian nouns with more and less typical endings presented in the same sentences. They were preceded by articles, which carried gender information. Nouns from the two groups elicited different ERP responses. Franck et al. (2008) and Vigliocco and Zilli (1999) demonstrated for Italian, Spanish, and French that heads with regular inflections are more resistant to agreement attraction. The same is true for number agreement attraction (e.g. Bock & Eberhard, 1993; Vigliocco et al., 1995).

As for Russian, nouns with inflections that are not typical for their gender, which we called non-prototypical masculine and feminine nouns in the introduction, are known to be problematic for the L1 and L2 acquisition (e.g. Janssen, 2016; Rodina & Westergaard, 2012; Schwartz et al., 2015; Tseitlin 2000). For example, Russian children make errors like  $(3a-d)^6$  using a wrong set of endings with non-prototypical nouns, or putting adjectives, pronouns and verbs that agree with such nouns in a wrong gender.

- (3) a. *Gde moja papa? Correct agreement: *moj*. where my_{F.NOM.SG} dad_{M.NOM.SG} 'Where is my dad?'
  - b. *Ty mužčin? Correct 1st declension noun form: *mužčin-a*. you man_{M.NOM.SG}
     'Are you a man?'
  - c. *Peč' sam topitsja? Correct form: *sama*. stove_{F.NOM.SG} itself_{M.NOM.SG} burns 'Does the stove burn by itself?'
  - d. *Ja bojus' noča. Correct 3rd declension noun form: *noči*. I fear night_{F.GEN.SG}
    'I am afraid of the night'.

 $^{^{6}}$  (3a-c) are taken from (Tseitlin 2000: 118–120), (3d) is a personal observation: the sentence was produced by a one year 11 months old Russian girl.

The only experimental work addressing this problem is the study by Taraban and Kempe (1999) discussed above. The authors found no differences between prototypical and non-prototypical subject nouns. However, the task they used required selecting a correctly agreeing verb form, which is a less immediate measure than simple reading times. For this reason, we decided to come back to this factor in the present study.

# 3 Experiment

### 3.1 Method

The goal of the experiment was to find out whether subject-predicate gender agreement is processed differently depending on the declension and gender the subject noun belongs to. 35 native speakers of Russian aged 18-55 (22 males, 13 females) took part in the experiment.

It is impossible to test all potentially interesting combinations of gender and declension in one experiment, so we selected the following three groups of nouns as subjects: masculine nouns of the  $2^{nd}$  declension (prototypical masculine), feminine nouns of the  $1^{st}$  declension (prototypical feminine), and feminine nouns of the  $3^{rd}$  declension (non-prototypical feminine). The materials included 36 sets of target sentences in six conditions exemplified in (4a-f). All sentences had the same structure: a subject noun, *byl/byla* 'was_{M/F}', an adjective or participle, and a three-word PP.

(4) a. **2DM G:** 2nd declension masculine subjects (propotypical), grammatically correct agreement

Xalatbylpotrepannymotmnogoletnej noski. $robe_{M.NOM.SG}$  $was_M$ shabby_Mfromyears-longwear'The robe was shabby from being worn for many years.'

b. **2DM U:** 2nd declension masculine subjects (propotypical), ungrammatical agreement

*Xalat byla potrepannoj ot mnogoletnej noski. robe_{M.NOM.SG} was_F shabby_F from years-long wear

c. **1DF G:** 1st declension feminine subjects (propotypical), grammatically correct agreement

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Kurtka byla potrepannoj ot mnogoletnej noski. jacket_{F.NOM.SG} was_F shabby_F from years-long wear 'The jacket was shabby from being worn for many years.'

d. **1DF U:** 1st declension feminine subjects (propotypical), ungrammatical agreement

*Kurtka byl potrepannym ot mnogoletnej noski. jacket_{F.NOM.SG} was_M shabby_M from years-long wear

e. **3DF G:** 3rd declension feminine subjects (non-propotypical), grammatically correct agreement

Šinel'byla potrepannojotmnogoletnej noski.overcoat<br/>F.NOM.SGwas<br/>Fshabby<br/>Ffrom years-long wear'The overcoat was shabby from being worn for many years.'

f. **3DF** U: 3rd declension feminine subjects (non-propotypical),

ungrammatical agreement

*Šinel' byl potrepannym ot mnogoletnej noski. overcoat_{F.NOM.SG} was_M shabby_M from years-long wear

Half of the sentences contained gender agreement errors on the predicate because taking previous studies of agreement into account (primarily agreement attraction experiments), the effects of these two factors could be expected to be different in grammatical and ungrammatical sentences.⁷ Subject nouns in the three declension groups were balanced for frequency and length using the *StimulStat* lexical database (http://stimul.cognitivestudies.ru, Alexeeva et al., in print). Frequency information in this database is taken from *The Frequency Dictionary of Modern Russian Language* (Lyashevskaya & Sharoff, 2009). To avoid additional semantic considerations, no nouns selected as subjects denoted humans. Before the experiment, all sentences were checked for plausibility and naturalness by two speakers of Russian who did not take part in the main study.

⁷ We selected predicates that consisted of a copula and an adjective or participle because such predicates were used in the previous experimental studies of subject–predicate gender agreement in Russian. As (4a-f) show, in ungrammatical sentences, agreement errors appeared both on the verb and on the adjective or participle.

Target sentences were distributed into six experimental lists so that each participant saw only one sentence from each set. The lists also contained 80 grammatically correct filler sentences.⁸ All lists began with five fillers, and then fillers and experimental items were presented in pseudo-random order, with the constraint that no more than two experimental items occur consecutively.

The sentences were presented on a PC using Presentation software (http://www.neurobs.com). We used the word-by-word self-paced reading methodology. Each trial began with a sentence in which all words were masked with dashes while spaces and punctuation marks remained intact. Participants were pressing the space bar to reveal a word and re-mask the previous one.

One third of the sentences (both targets and fillers, grammatical and ungrammatical ones) were followed by forced choice comprehension questions to ensure that the participants were reading properly. All participants read an instruction asking them to read sentences as fast as possible and to answer questions as accurately as possible. They were not informed in advance that sentences would contain errors.

# 3.2 Results and Discussion

We analyzed participants' question-answering accuracy and reading times. On average, participants answered 12% questions to target sentences incorrectly, no participants made more than 3 errors. Reading times that exceeded a threshold of 2.5 standard deviations, by region and condition, were excluded (Ratcliff, 1993). For two participants, this led to the exclusion of more than 15% responses, so we did not include their data in further analysis.

As a result, we had 33 participants (five or six in each experimental list). In total, 2.0% of the data were excluded as outliers. Average reading times per region in different conditions are presented in Figure 1.

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⁸ In the experimental designs that do not involve explicit grammaticality judgments it is customary to have no more than 20% ungrammatical sentences — otherwise participants might stop reacting to errors as they normally do. In our study, 15,5% sentences in every list were ungrammatical.



Figure 1. Average reading times per region (in ms) in different experimental conditions

For each region, we made pairwise comparisons between the three conditions using a  $2 \times 2$  Repeated Measures ANOVA with grammaticality and declension as factors. Analyses by participants (F₁) and by items (F₂) were performed. In region 1 (the subject noun), there were no significant results, which means that nouns in different conditions were properly balanced and that nouns of a particular gender or declension are not intrinsically more difficult to process.

Region 2 contains the verb *byl / byla* 'was_{M/F}' — this is where agreement errors appear in ungrammatical sentences. Figure 1 suggests that participants' reaction to these errors was different depending on the declension of the subject noun. In the conditions 1DF and 2DM (with prototypical feminine and masculine subjects), reading times in ungrammatical sentences are longer than in grammatical ones, while no such difference can be seen in the 3DF conditions (with non-prototypical feminine subjects), which indicates that the error tends to remain undetected in the latter case.

Statistical analyses support this intuition. In the comparison between 1DF and 3DF conditions, grammaticality and the interaction between declension and grammaticality are significant ( $F_1(1,32) = 8.13$ , p < 0.01,  $F_2(1,35) = 4.20$ , p = 0.05;  $F_1(1,32) = 7.41$ , p = 0.01,  $F_2(1,35) = 4.05$ , p = 0.05), while the main effect of declension does not reach significance. This means that the influence of grammaticality depends on the

declension of the subject. In the comparison between 2DM and 3DF conditions, grammaticality reaches significance, while the interaction between declension and grammaticality is marginally significant ( $F_1(1,32) = 8.01, p < 0.01, F_2(1,35) = 4.09, p = 0.05; F_1(1,32) = 3.98, p = 0.05, F_2(1,35) = 3.17, p = 0.08$ ). When 1DF and 2DM are compared, only the grammaticality factor is significant ( $F_1(1,32) = 18.66, p < 0.01$ ,  $F_2(1,35) = 10.21, p < 0.01$ ).

In region 3 that contains an adjective or participle, differences between grammatical and ungrammatical sentences become visible in all conditions. Accordingly, the grammaticality factor is significant in all pairwise comparisons ( $F_1(1,32) = 15.90$ , p < 0.01,  $F_2(1,35) = 21.24$ , p < 0.01 for 1DF vs. 2DM;  $F_1(1,32) = 11.98$ , p < 0.01,  $F_2(1,35) = 6.20$ , p = 0.02 for 1DF vs. 3DF;  $F_1(1,32) = 9.73$ , p < 0.01,  $F_2(1,35) = 7.83$ , p < 0.01 for 2DM vs. 3DF). No other factors or interactions reach significance.

Regions 4–6 contain a three-word PP. In region 4, a tendency that can be already detected in region 3 becomes statistically significant: the error-related delay in reading times is more pronounced in the 2DM conditions (with masculine subjects) than in the 1DF and 3DF conditions (with feminine subjects). In the comparison between 1DF and 2DM conditions, grammaticality and the interaction between declension and grammaticality are significant ( $F_l(1,32) = 36.95$ , p < 0.01,  $F_2(1,35) =$ 15.91, p < 0.01;  $F_l(1,32) = 9.77$ , p < 0.01,  $F_2(1,35) = 6.45$ , p = 0.02), while declension is not significant. The same is true for the comparison between 3DF and 2DM ( $F_l(1,32) = 50.11$ , p < 0.01,  $F_2(1,35) = 13.17$ , p <0.01;  $F_l(1,32) = 11.38$ , p < 0.01,  $F_2(1,35) = 5.51$ , p = 0.03). When 1DF and 3DF are compared, only the grammaticality factor is marginally significant ( $F_l(1,32) = 12.34$ , p < 0.01,  $F_2(1,35) = 3.65$ , p = 0.07).

In region 5, ungrammatical sentences with masculine subjects are still read slower than the ones with feminine subjects, but this difference does not reach statistical significance. Only the grammaticality factor is significant in all pairwise comparisons ( $F_1(1,32) = 18.51$ , p < 0.01,  $F_2(1,35) = 17.67$ , p < 0.01 for 1DF vs. 2DM;  $F_1(1,32) = 14.78$ , p < 0.01,  $F_2(1,35) = 6.10$ , p = 0.02 for 1DF vs. 3DF;  $F_1(1,32) = 18.07$ , p < 0.01,  $F_2(1,35) = 10.07$ , p < 0.01 for 2DM vs. 3DF). In region 6, there are no significant differences in any comparison.

### 4 Conclusions

Our experiment demonstrated that both gender and declension of the noun influence processing of the subject–predicate gender agreement in Russian. But, firstly, this influence can be detected only in the sentences with agreement errors, i.e. no gender or declension is intrinsically more difficult to process (at least, in the sentence context⁹). Secondly, declension plays a role at a very early stage and its effect is very short-lived, while the role of gender becomes visible later and its effect is more pronounced.¹⁰

The fact that a masculine verb form is less readily detected after a  $3^{rd}$  declension subject noun can be explained by the fact that its ending is more typical for masculine nouns that for feminine ones. However, alternative explanations are also possible, for example, all agreement errors (in masculine or in neuter) may be harder to detect after  $3^{rd}$  declension subject nouns, i.e. their gender can be in general harder to retrieve. To exclude this and some other possibilities, other experiments should be conducted. Another line of further research should look at non-prototypical masculine nouns like *papa* 'dad'. The picture may be different not only because of their different gender, but also because all these nouns denote humans, so the gender feature is not semantically empty in this case, which may aid its processing and retrieval.

As for the role of gender as such, we saw that agreement errors with masculine subjects cause a larger delay in reading times compared to errors with feminine subjects, i.e. were costlier for processing. This is in line with the previous findings on gender agreement in comprehension reported in the literature (Akhutina et al., 1999, 2001; Romanova & Gor, 2017; Slioussar & Malko, 2016). However, to have a full picture, neuter subjects and predicates should be introduced in further experiments.

⁹ It is well known that many differences that can be detected in the processing of isolated forms disappear when these forms are embedded in an appropriate context.

¹⁰ Following an anonymous reviewer's question, let us note that having an overt affix in the nominative singular did not play any role: we observed no differences between 1DF nouns that end in -a/ja vs. 2DM and 3DF nouns with no overt affixes.

So far, several explanations are possible. It is well known that while reading, we generate expectations about the upcoming predicate based on the features of the subject and rechecking is prompted if these expectations are violated (which is associated with increased reading times). Perhaps, the masculine form of the predicate, being the most frequent, causes less disruption if used incorrectly — similarly, using a frequent word instead of an infrequent one provokes less surprise than the opposite mistake. Maybe, these expectations are more robust for masculine subjects, so violating them is more disruptive. Maybe, if an agreement error is detected and rechecking is initiated, masculine subjects are retrieved more readily and reliably— this is what Slioussar and Malko (2016) suggested based on their agreement attraction results where all combinations of genders on subjects, attractors and predicates were examined. All these explanations are compatible with the observed difference between ungrammatical sentences with masculine and feminine subjects. Further experiments are necessary to tease them apart and to gain a better understanding of the patterns observed in previous studies.

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# **Extraction out of Coordinate Structure Conjuncts***

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This paper discusses several patterns of extraction out of the first and second conjunct in a coordinated NP in Serbo-Croatian (SC). It argues that even though such patterns look surprising in light of the Coordinate Structure Constraint (CSC) (Ross 1967), they are actually expected, once the voidability of the CSC in SC discussed in Stjepanović (2014) is taken into consideration. It shows that the extraction out of conjuncts patterns with Left Branch Extraction (LBE) and that the existence of such patterns has important theoretical consequences for our understanding of the CSC.

The paper is organized as follows. Section 1 presents data from Stjepanović (2014) that involve movement of the first conjunct out of coordinated NPs in SC and summarizes Stjepanović's (2014) account of these facts. Given that these data show that the CSC can be voided with respect to the extraction <u>of</u> a conjunct, the question is whether the extraction <u>out of</u> conjuncts is also allowed. Section 2 turns to extraction out of the first conjunct, showing that it is indeed possible under well-defined conditions. More precisely, it is possible whenever it occurs from the edge of the first conjunct. Section 3 shows that the same is true of the extraction out of the second conjunct, as long as the first conjunct also moves away. This suggests that the first conjunct creates an intervention effect for the extraction out of the second conjunct. After showing that this pattern of extraction mirrors multiple LBE out of a single NP discussed in Bošković

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(2014) and Stjepanović (to appear), Section 3 argues that they can be accounted for in the same way by assuming the rescue-by-PF deletion mechanism as applied to copy deletion (Bošković (2011, 2013)) and some properties of phasal edgehood discussed in Bošković (2016). Section 4 provides further examples that support the proposed analysis and show parallelisms between multiple left branch extraction and extraction out of the second conjunct. Section 5 is a conclusion.

# 1 Movement of the First Conjunct out of Coordinated NPs

Bošković (2009) and Stjepanović (2014) show that extraction of the first conjunct out of a coordinated NP is possible in SC, as in (1b).

(1)	a. Juče	su	joj	se [ConjP	suknje	i	šešir ]	
	yesterday	are	her _{dat}	REFL	skirts _{nom.pl.f}	and	hat _{nom.sg.m}	
	dopali.							
	liked _{pl.m}							
	'Skirts and	a ha	t were	pleasing	g to her yeste	erday.'		
	b. <i>Suknje</i> i	su	joj	se	juče [ConjP ti	i	šešir]	dopali.
	skirts _{nom.pl.f}	are	her _{dat}	REFL	yesterday	and	hat _{nom.sg.m}	liked _{m.pl}
	'Skirts and	a ha	t were	pleasing	g to her yeste	erday.'		

Stjepanović (2014) accounts for this possibility by showing that the coordinate structure island (ConjP) in (1) is headed by a trace, which, according to Bošković (2011, 2013), voids islandhood. Based on a variety of islands from a number of languages, Bošković (2011, 2013) puts forth the generalization in (2). The generalization is illustrated here by the rescuing effect of article incorporation on extraction out DP adjunct islands in Galician in (3), but the reader is referred to Bošković's work for more empirical arguments for it.

- (2) Traces do not head islands.
- (3) a.* de que semana_j traballastedes [DP **o** [Luns t_j]]? of which week worked the Monday 'Of which week did you guys work the Monday?'
  - b. de que semanaj traballastede-lo_i  $[_{DP} [_{D'} t_i [Luns t_j]]]$ ? of which week worked-the Monday

(3a) shows that extraction out of DP adjuncts is disallowed in Galician. However, when the article head of the DP incorporates into the verb, as in (3b), *wh*-movement from the DP becomes possible. The adjunct DP in the above examples thus ceases to be an island if it is headed by a trace, in accordance with (2).

Bošković (2011, 2013) deduces this generalization from a rescue-by-PF-deletion mechanism by extending Chomsky's (1972) account of Ross's island amelioration effects under sluicing to copy deletion. Ross (1969) observed that island violations can be rescued by ellipsis, as in examples like (4) from Merchant (2001).

- (4) a. *Ben will be mad if Abby talks to one of the teachers, but she couldn't remember [which (of the teachers)]_i Ben will be mad [if she talks to t_i].
  - b.Ben will be mad if Abby talks to one of the teachers, but she couldn't remember which_i Ben will be mad [if she talks to t_i].

(Merchant 2001: 88)

Both (4a) and (4b) involve an island violation, but (4b) is grammatical, while (4a) is not. The only difference between (4a) and (4b) is that sluicing applies in (4b). Thus, Ross (1969) concluded that sluicing can rescue an island violation. Chomsky (1972) formulated a rescue-by-PF-deletion account of island amelioration effects under sluicing. He proposed that when an element crosses an island, a * is assigned to the island. If the * remains in the final structure, a violation incurs. If the *-marked element is deleted before it is pronounced, the derivation is rescued. If we apply this account to examples like (4), when *wh*-movement crosses the adjunct island, the island is *-marked in both (4a) and (4b). Given that in (4a) the * is present in the final PF representation, the derivation crashes. However, in (4b) the same problem does not arise, given that the *-marked island is deleted at PF.

Extending Chomsky's (1972) account, Bošković (2011, 2013) proposes that when a violation occurs, a * is assigned to the <u>head</u> of the island, rather than the whole island. If the head moves, its base-generated copy is deleted together with the *, and the derivation is rescued. Given this, Bošković (2011, 2013) accounts for the grammaticality of examples like (3b) in the following way:

- (5) a. D undergoes incorporation.
  - b. Wh-movement of de que occurs and causes an island violation.
  - c. A * is placed on the copy of the article in D, the head of the island.
  - d. At PF, the copy of the article in D with the * is deleted, and the derivation is rescued.

Going back to examples like (1) in SC, Stjepanović (2014) argues that they can be accounted for in the same way. Stjepanović shows that the conjunction i 'and' is a proclitic, which procliticizes to the second conjunct, leaving a trace (copy). More precisely, the second conjunct first undergoes movement to the lower SpecConjP (tucking in below the first conjunct, which is in a higher Spec), and then the conjunction procliticizes to it, as illustrated in (6).

```
(6) \begin{bmatrix} \text{ConjP} & suknje & i_k - šešir_j & \begin{bmatrix} \text{Conj}^{\prime} & t_k & t_j \end{bmatrix} \end{bmatrix}
```

Evidence for this is based on the fact that the conjunction behaves as other proclitics in SC, i.e., prepositions illustrated in (7).

(7)	a. Uša	ao je	e[ _{PP}	u	veliku	sobu ].	
	ente	ered _{3sg.m} is	S	in	big	room	
	'Нe	e entered a	big	roor	n.'		
	b. [PP $u_k$ -veliku _i [P' $t_k$ [NP $t_i$ sobu]]						
		in-big			roon	1	
	<b>c</b> .[U	veliku] _i	jeu	šao	[PP	t _i sobu ].	
	in	big	is e	ntere	d _{3sg.m}	room	

According to Talić (2014), in examples like (7b), AdjP *veliku* 'big' first moves to SpecPP, and then P u 'in' procliticizes to it. If AdjP undergoes further movement as in (7c), P is carried along with it. This movement is often referred to as extraordinary LBE (Bošković 2005, among others). A strong piece of evidence for the P incorporation analysis comes from Talić (2014) based on the accent shift from the AdjP (clitic host) to the clitic P. Talić shows that the accent shift occurs only under incorporation of P and for AdjPs that can be independently moved, but not for those that cannot. This means that P is not lowering onto AdjP, but AdjP must raise for the P to be able to incorporate to it.

Stjepanović (2014) shows that the conjunction in examples like (1b) behaves with respect to accent shift and incorporation just as prepositions.¹ Given this, Stjepanović accounts for the procliticaztion of the conjunction in the same way. And, since due to proclitization the ConjP ends up headed by a trace, its islandhood can be voided in much the same way as the islandhood of DP adjunct in the Galician example in (3b) (see also Oda (2016) for voiding coordinate structure islandhood in Japanese, where the conjunction is an enclitic). So, the derivation of the example in (1b) proceeds in the following steps: (a) The second conjunct (NP *šešir* 'hat') moves to SpecConjP and tucks in under the first conjunct (NP *suknje* 'skirts'). (b) Next, *i* 'and' raises and incorporates into the second conjunct. (c) The first conjunct then moves out of ConjP. (d) A * is placed on the copy of *i* 'and'. (e) Finally, at PF, the copy of *i* 'and' is deleted, together with the *, and the derivation is rescued.

In this section, we have seen that movement of the first conjunct out of ConjP is allowed in SC, and that the islandhood of ConjP in such examples can be voided due to the fact that ConjP ends up headed by a trace. However, if the islandhood of ConjP can be voided, then is it possible to have movement out of conjuncts, if all other locality constraints are respected? Below, we will see a positive answer to this question.

# 2 Movement out of the First Conjunct

Examples in (8) show that, surprisingly in light of CSC, extraction out of the first conjunct is allowed in SC under certain circumstances:²

¹ Thus, Stjepanović (2014) shows that the accent shift from an AdjP host onto conjunction can only occur under incorporation of the conjunction and for AdjPs that can be independently moved, but not for those that cannot. For actual examples, please see Stjepanović (2014).

² The ungrammaticality of (i) shows that in (8), we are indeed dealing with movement, rather than the base-generation of the AdjP at the front of the sentence:
(i) * Zelene_i sam otišla prije nego što su im se [[ t_i suknje]

green am_{1sg} gone before than what are them refl skirts_{nom.pl.f.} i crni šešir] dopali.

and black hat_{nom.sg.m} liked_{pl.}

^{&#}x27;I was gone before they liked the green skirts and black hat.'

[[ t_i suknje] (8)a.  $Zelene_i$  su joj se juče i crni REFL yesterday skirts_{nom.pl.f.} and black green are her_{dat} šešir] dopali. liked_{pl.m} hat_{nom.sg.m} 'The green skirts and the black hat were pleasing to her yesterday.' b. Sa kakvim *džepovima*^{*i*} su joj se juče with what-kind pockets are her_{dat} REFL yesterday [[suknje t_i] i kakav šešir] dopali? skirts_{nom.pl.f} and what hat_{nom.sg.m} liked_{pl.m} 'Skirts with what kind of pockets and what kind of hat were pleasing to her vesterday?'

(8a) involves extraction of AdjP *zeleni* 'green' modifying the head noun *suknje* 'skirts' of the first conjunct. In (8b), the PP adjunct of the head noun of the first conjunct is extracted (see also Bošković (2017) for the possibility of extracting possessors modifying nouns out of NP, which morphologically behave just like adjectives in SC). Furthermore, while AdjP/PP adjuncts can be extracted in such cases, (9) shows that extracting a genitive complement of the head noun of the first conjunct is banned.³

 (ii) a.* Mašinskii su joj se juče [[ oni ti tehničari] i njihov mechanical are herdat REFL yesterday those techniciansand their šef ]dopali.

 $bossliked_{pl.m}$ 

Example (i) shows that a clausal adjunct island boundary cannot intervene between the AdjP *zelene* and its noun *suknje*. Therefore, *AdjP* must have moved. Likewise, the following contrast excludes the possibility that the whole ConjP moves first, and then undergoes some type of scattered deletion of its copies:

^{&#}x27;She liked those mechanical technicians and their boss yesterday.'

b. *Oni*_i su joj se juče [[ t_i mašinski tehničari] i njihov šef dopali.

If (iia) and (iib) involved the scattered deletion analysis, it would be very difficult to explain why scattered deletion would be possible in (iib), but not (iia). The contrast is easily accounted for under movement, since (iia) violates locality constraints, while (iib) does not, as explained below with respect to the examples in (16).

³ Note that the extraction of inherently case-marked complements of Ns out of the first conjunct is possible, which also patterns with the extraction out of single non-coordinated NPs (see Bošković (2012) for examples of extraction of inherently case marked NP complements of Ns out of single NPs).

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(9) ?*Koje prijateljicei su joj se [[ suknje ti]i
which friendgen are herdat REFL skirtsnom.f and kakav šešir] dopali.
what hatnom.m likedm.pl
'Which friend's skirts and what kind of hat were pleasing to her?'

Interestingly, exactly the same pattern is obtained with the extraction of AdjP and PP adjuncts out of single, non-coordinated NPs, as shown by Bošković (2012, among others), and illustrated in (10).

(10)	a.	<u>AdjP le</u>	AdjP left branch extraction out of NP:								
		Skupa/	tai	je	vidio	) [	$t_i$	kola]			
		expensi	ive/that	is	seen			car			
		'He sav	v an exp	ensi	ve/tha	at c	ar.'				
	b.	Extract	ion of P	P ad	junct	out	of	NP:			
		Iz	kojeg	gra	da _i j	e	Pet	ar sre	0 [ _{NP}	djevojke	ti
		from	which	city	v i	S	Pet	er me	t	girls	
		'Girls f	rom whi	ch c	ity di	d P	eter	meet	?'		
	c.	Extract	ion of a	geni	tive c	om	plei	ment o	out of ]	NP:	
	?	*Ovog	student	a _i sa	am p	oro	našl	a [ _{NP}	knjigu	ıt _i ]	
		this	student	gen a	m f	ou	nd		book		
		'Of this	s student	I fo	und t	he/a	a bo	ok.'			

Bošković (2012) argues that the difference in extraction possibilities between PP adjuncts/AdjPs and genitive complements in examples like (10) has to do with the fact that only PP adjuncts/AdjPs can move out of the NP phase without violating the Phase Impenetrability Condition (PIC) (Chomsky 2000, 2001) or anti-locality. PIC bans all movement that does not happen from the edge of a phase. Anti-locality bans movement that is too short (Grohmann 2003, Abels 2003, Bošković 2005, among others), which, according to Bošković, means that movement must cross a full phrase. Given PIC and anti-locality, and given the assumption defended by Bošković that NPs are phases in SC, the difference in extraction possibilities between AdjP/PP adjuncts and genitive complements of Ns is

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⁽i) Kakvom smrćuⁱ su ga [pretnja t_i] i kakav odgovor uplašili? what death_{instr} are him threat and which reply scared 'The threat with what kind of death and which reply scared him?'
explained straightforwardly. AdjPs and PP adjuncts are at the edge of the NP phase, being adjoined to NP or in its Spec, while genitive complements are not. Therefore, AdjP and PP adjuncts can undergo movement without violating PIC or anti-locality. Genitive complements, though, first have to move to the edge of the NP (SpecNP), to satisfy PIC. However, given that this movement does not cross a full phrase, anti-locality is violated, as in (11a). If they try to satisfy the anti-locality by not moving through SpecNP, PIC is violated, as in (11b). Thus, the interaction of PIC and anti-locality dooms genitive complement movement, but allows AdjP and PP adjunct movement out of NP phase.

(11) a. 
$$[NP [N' N Complement]]$$
 PIC:  $\checkmark$ ; anti-locality: *  
b.  $[NP [N' N Complement]]$  PIC: *; anti-locality:  $\checkmark$ 

Since the same patterns obtain with the coordinated NPs in (8) and (9), they can be explained in the same way, if we make a reasonable assumption that the first conjunct is a phase (see also Bošković 2017), being an NP. AdjPs and PP adjuncts are at the edge of the first conjunct, while its complements are not. Since the islandhood of ConjP itself is voided in SC, as seen in Section 1, and since the extraction of elements from the edge of a phase is allowed, then it is not a surprise that movement of AdjP and PP adjuncts out of the first conjunct is allowed in SC.⁴

So far we have seen that SC allows both extraction of the first conjunct and out of the first conjunct in a coordinated NP. While the possibility of extraction out of the first conjunct is interesting, it can be shown that SC also allows extraction out of the second conjunct under well-defined conditions. I turn to these data in the next section.

⁴ If the whole ConjP is a phase and the first conjunct is at the edge of this phase, then movement occurs from the edge of the edge of a phase, which is allowed in SC (see Talić 2014, Bošković 2014, 2016, and Stjepanović to appear, among others).

### 3 Movement out of the Second Conjunct

The examples in (12) show that the AdjP *čiji* 'whose' can undergo movement out of the second conjunct, with the first conjunct undergoing movement as well.

(12) Koja serijai se i-čijik tebi [ti tk film] dopadaju? which series_{3sg.f} SE and-whose youdat movie_{3sg.m} please_{3pl} 'Which series and whose movie are pleasing to you?'

There are several interesting things to observe about this example. First, note that the conjunction *i* 'and' has to move out of the second NP conjunct together with the left branch (LB) element  $\check{c}iji$ , as the contrast between (12) and (13) shows.

(13) * *Koja serija*^{*i*} se *čiji*^{*k*} tebi [ t_i i t_k film] dopadaju? which series_{3sg.f} SE whose you and movie_{3sg.m} please_{3pl.m} 'Which series and whose movie are pleasing to you?'

Thus, in this respect, i 'and' behaves exactly the same as SC proclitic prepositions in cases of extraordinary Left Branch Extraction (LBE) illustrated in (7) above. The movement of  $i \, \check{c}iji$  'and whose' in (12) is, therefore, an instance of extraordinary LBE.

Furthermore, these examples provide a strong piece of evidence for Stjepanović's (2014) proposal regarding the voidability of CSC in SC, which is based on the argument that the conjunction i 'and' undergoes movement and leaves ConjP headed by a trace. While Stjepanović (2014) argues for proclitization of the conjunction to its AdjP host based on data involving accent shift from the host to the conjunction, in examples like (12), we can clearly see that the conjunction has procliticized to AdjP, and has been pied-piped with the host, just as it is the case with the prepositions in examples like (7). Thus, it is clear that ConjP is headed by a trace.

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Next, note that extraordinary LBE out of the second conjunct is possible only if the first conjunct moves away. In contrast to (12), examples like (14) are ungrammatical.⁵

(14) * [*I* čiji]_i se tebi [_{ConjP} koja serija [t_i film]] dopadaju and whose SE you which series film please 'Which series and whose movie are pleasing to you?'

In this respect, movement out of the second conjunct exhibits the same pattern as movement of an inner left branch element in cases of multiple left branch extraction (LBE), discussed in Bošković (2016) and illustrated in (15).

(15)	a.	$Onu_i$	proda	$ije [NP t_i]$	staru	kuću]
		that	sells		old	house
		'He is a	selling	that old h	ouse.'	
	b. '	* <i>Staru_i</i> p	orodaje	_{NP} onu	t _i k	uću]
		old	sells	tha	t	house
		'He is a	selling	that old h	ouse.'	
	c.	$Onu_i$	staru	kprodaje	$[_{NP} t_i$	t _k kuću].
		that	old	sells		house
		'He is a	selling	that hold	house.	,

Examples in (15) involve NP *onu staru kuću* 'that old house', where the head noun *kuću* 'house' is modified by two AdjPs: *onu* 'that' and *staru* 'old'. In the baseline order, *onu* 'that' must precede *staru* 'old', as the contrast in grammaticality in (16) shows.

⁵ But see also discussion related to (29)-(32) in Section 4. Note also that the same result as in (14) obtains if we move an inner conjunct LB element that has no *i* procliticized to it:

⁽i) * *čiji*^{*i*} se tebi [_{ConjP} koja serija [ t_i film] i kakva knjiga] dopadaju

whose SE you which series film and what book please 'Which series, whose movie and what book are pleasing to you?'

We can refer to onu 'that' as an outer LB element, and to staru as an inner one. Going back to examples in (15), (15b) shows that an inner left branch element in an NP cannot undergo movement, if the outer element remains in situ. However, (15c) shows that an inner element can move if the outer LB element also moves away. Bošković (2016) explains the contrast between (15b) and (15c) in terms of a slight variation of Chomsky's (1972) rescue-by-PF-deletion account of island amelioration as extended to copy deletion discussed in relation to examples in (3) above. More precisely, in case of PIC violations, he argues that the * is placed on the edge of the phase (rather than on its head). If the *-marked element at the edge is moved and turned into a copy, the derivation will be rescued at PF by copy deletion. Furthermore, given the contrast between (15b) and (15c), Bošković proposes that only the outmost element of a phase XP counts as the edge of the phase for the purposes of PIC. So, onu is the edge of NP phase as far as the PIC is concerned. Second, the movement of the outer LB element allows the edge to be turned into a copy. So, once *onu* moves, the edge of NP is turned into a copy:

(17) onu.....[NP onu [NP staru [ kuću ]]]

Next, in multiple Spec/Adjunct cases, when an element moves out of a phase XP in violation of PIC, a * is placed on the outmost edge (Spec/Adjunct). So, in (15c), after staru moves out of NP in violation of PIC and tucks in under onu, a * is placed on the copy of onu at the edge of NP.

(18) [onu staru ....[NP onu* [NP staru [ kuću ]]] Finally, once copy deletion applies at PF, the * is deleted together with the copy and the violation is repaired:

(19) [onu staru ....  $[NP \text{ onu}^{*}]_{NP}$  staru [ kuću ]]]] (PF)

Having seen that PIC violations can be rescued if the outmost edge is turned into a copy, let us go back to examples like (12) that involve extraction out of the second conjunct. I argue that both versions of the *marking mechanisms (i.e., *-marking of the head of the island and *marking of the edge of a phase) apply to account for them, given that there

are two locality violations to worry about in such cases. First, ConjP is an island, and any movement out of it results in a * on its head. However, as discussed above, the islandhood of ConjP can be voided by turning its*marked head into a copy and deleting the copy at PF (see also Oda 2016 and Bošković 2017). This is why the first conjunct can move out of a coordinated NP in SC. This also opens up a possibility for other elements to be extracted out of ConjP (e.g., movement out of the first or second conjunct), if all other locality constraints are respected. Second, the data above have also shown that we have to worry about the edgehood of ConjP and conjuncts. As we have seen from the contrast between (12) and (14), movement out of the second conjunct is not allowed, unless the first conjunct moves. Thus, the first conjunct creates an intervention effect for extraction out of the second conjunct.⁶ This intervention effect mirrors the intervention effect that an outer LB element in an NP creates for the movement of an inner LB element over it, as in (15b), and can be explained in the same way, that is, in terms of the highest edge effect proposed in Bošković (2016). In other words, the highest edge is *-marked in the case of movement over it. If this edge is turned into a copy, the derivation can be rescued by copy deletion at PF.

Given this, let us see how we derive examples like (12) that involve movement out of the second conjunct. Prior to extraction out of ConjP, the first conjunct and the LB element extracted from the second conjunct and with the conjunction procliticized to it are in multiple Specs of ConjP:

Next, in order to obtain the right surface order in (12) without countercyclic movement operations, *i čiji* has to move out of ConjP first, crossing its edge (the first conjunct), in violation of PIC. At this point, a * is placed on the first conjunct.

(21) i-čiji...[conj^P koja serija* i-čiji [conj^P i čiji film ]]

⁶ Note also that the inner conjunct itself cannot undergo movement out of ConjP over the first conjunct, which can also be explained in terms of the highest edge effect proposed in Bošković (2016).

Since *i čiji* moves out of the ConjP island, a * is placed on the copy of the head of ConjP as well.

(22) i-čiji...[_{ConjP} koja serija* i-čiji [_{Conj}, i* čiji film ]]

*Koja serija* then undergoes movement to a higher projection, leaving a copy with a * on it.⁷ The copy of the head of ConjP gets another *, given that *koja serija* moves out of the ConjP island.

(23) koja serija...i-čiji_i..._{[ConjP} koja serija* i-čiji [_{Conj}, i** čiji film]]

Finally, at PF, the starred copies of *koja serija* and *i* are deleted, and the derivation is rescued.

(24) koja serija...i-čiji...[conjp koja serija* i-čiji [conj, i** čiji film]]

Thus, examples like (12) can be successfully derived. Given the rescue by PF deletion mechanism as extended to copy deletion at PF and the contextual determination of phasal edgehood that have been proposed by Bošković on independent grounds, these examples are actually expected and well-behaved. They, therefore, provide a strong piece of evidence for Bošković's proposal. We have also seen that various types of extraction (i.e., extraction out of the first and second conjunct) out of ConjP in SC mirrors left branch extraction. The next section discusses examples that provide further comparisons of extraction out of ConjP and multiple LBE.

## 4 Further Examples: Multiple LBE and Extraction out of Conjuncts

Examples in (25)-(28) illustrate a further parallelism between multiple LBE and multiple extractions out of ConjP. (25) shows that multiple LBE allows the tucking-in of the extracted LB elements, as discussed in Bošković (2014, 2016) and Stjepanović (to appear).

⁷ Note that the * is not copied under movement. In all cases discussed here, the * is always on the original copy of the offending element. The reason for it is not clear at this point, but it should be revealed once we understand the *-marking mechanism better.

(25)  $Onu_k staru_i$  je on prodao [NP t_k t_ikuću]. that old is he sold house 'He sold that old house.'

In this example, the LBE-ed AdjPs *onu* 'that' and *staru* 'old' target multiple Specs of the same head, as confirmed by the fact that a second position clitic (Aux *je*) follows them. In other words, they are in the same phrase, and the clitic following this XP is in the second position. Bošković (2014, 2016) shows that in such cases, each AdjP is LBE-ed out of NP separately. So, according to Bošković, in (25), *onu* undergoes movement first with *staru* tucking in below it, as illustrated in (26).

(26) [[ $onu_k$  staru_i [F]] jeon prodao [NP t_k t_i [N' kuću]

Going back to extraction out of ConjP, examples like (27), which on the face of it appear quite puzzling, are allowed.

(27) *Ta serija i ovaj* mi se film dopadaju. that series and this me SE film please 'That series and this movie are pleasing to me.'

Here we see that the first conjunct *ta serija* 'that series' and part of the second conjunct *i ovaj* 'and this' precede the second position clitics *mi se* 'me SE'. Even though this example looks surprising because it appears to involve movement of a non-constituent, it can actually be derived in a principled way. It looks a lot like a case of multiple LBE in (26), where the highest LB element moves to a Spec and the lower one tucks in a Spec below it. Recall that prior to any movement, the first conjunct is in SpecConjP, while the second conjunct LB element undergoes movement and tucks in below it, with the subsequent proclitization of the conjunction *i* 'and' to it. Thus, they are in a multiple left branch configuration, just like the two AdjPs in (26). Once *ta serija* 'that series' undergoes movement to the Spec of a higher head, *i ovaj* 'and this' tucks in a Spec below it:

(28) [[ta serija_k [i ovaj_i [F]]] mi se [_{ConjP} ta serija_k i ovaj_i [_{Conj}, i ovaj_i film] ...

So, we have seen that extraction out of ConjP in SC mirrors both cases of split multiple LBE, where the moved LB elements occupy different projections, as in (12), and cases of tucked-in LBE, where they occupy multiple Specs of the same projection, as in (27). However, there is one case where this parallelism between multiple LBE and extraction out of ConjP seems to break down, which I turn to next.

The example in (29) illustrates that split multiple LBE (unlike its tucked-in version) allows the order of the extracted elements to be reversed in certain contexts, as discussed in Stjepanović (to appear).

(29) Staru_k je on  $onu_i$  prodao [  $t_i t_k kuću$ ] (ne novu). old is he that sold house not new 'He sold that old house (not that new one).'

However, this type of reordering is not allowed in examples involving extraction out of ConjP: if an inner conjunct LB element crosses a moved first conjunct, the example is ungrammatical, as in (30).

(30) * *I* ovaj se ta serija tebi film dopadaju. and this SE that series you film please 'That series and this movie are pleasing to you.'

With respect to (30), where the conjuncts move to separate projections, I tentatively put forward the generalization in (31) as a possible reason for this impossibility, and leave its explanation open for future research.⁸

(31) C-command relations between elements undergoing movement out of a ConjP must be preserved in the final representation.

Note, however, that a similar constraint actually holds of split multiple LBE, where the initial left branch elements has a preposition procliticized to it, as for example in (32).

(32) a. U svoju je on veliku ušao sobu. in his is he big entered room 'He entered his big room.'

⁸ In cases where the elements tuck in the Specs of the same projection, this is already derived from Richards' (2001) tucking-in constraint.

b.* Veliku je on u svoju ušao sobu. big is he in his entered room 'He entered his big room.'

As the contrast between (32a) and (32b) shows, it is not possible to have an inner LB element moving over the outer LB element that has undergone extraordinary LBE. Recall that this type of crossing was possible in cases of split multiple LBE in (29), where no LB element was undergoing extraordinary LBE. Thus, it seems that whenever we have extraordinary LBE and multiple LBE in the same sentence, c-command relations between the LB element undergoing extraordinary LBE and other LB elements must be preserved in the final representation. Even though (31) appears to be part of this generalization, it can be shown that it should be dealt with separately. If we extract an inner LB element that has no *i* procliticized to it, as in (33), the example is still ungrammatical. It is simply not possible to have the surface order of conjuncts reversed.

(33) * $Ovaj_i$  se ta serij $a_k$  tebi  $t_k$ , [ $t_i$  film] i njegova knjiga dopadaju this SE that series you film and his book please 'That series, this movie and his book are pleasing to you.'

So far we have seen that SC allows extraction of conjuncts as well as extraction out of the first and second conjunct. Given the analysis in this paper, it is predicted that SC should also allow extraction out of the first and the second conjunct in the same sentence, as long as the first conjunct moves away. This indeed is the case, as shown in (34).

(34) Koja se serija (danas) i čiji tebi film dopadaju? which SE series today and whose you film please 'Which series and whose film are pleasing to you today.'

## **5** Conclusion

In this paper I have shown that SC allows violations of Coordinate Structure Constraint. In addition to allowing extraction of a conjunct out of a coordinated NP discussed in Stjepanović (2014), it also allows extraction out of a conjunct in a coordinated NP under well-defined conditions. Movement out of NP conjuncts is allowed for elements that appear at the edge of the conjuncts, and extraction out of an element at the edge of the second conjunct is possible only if the first conjunct moves away. This means that the first conjunct creates an intervention effect for the extraction out of the second conjunct, but this intervention effect can be voided by movement of the first conjunct. I have shown that these facts follow straightforwardly if we assume the rescue by PF deletion mechanism as applied to copy deletion proposed in Bošković (2011, 2013) and contextual phase edge determination proposed in Bošković (2016).

To the extent that the analysis is correct, it also has several other important theoretical implications. First, the examples discussed above show that extraction <u>out of</u> NP conjuncts mirrors left branch extraction (LBE), just as extraction of NP conjuncts does, which was shown by Stjepanović (2014). Second, they show that once the mechanism of rescue by PF deletion as extended to copy deletion frees a ConjP from islandhood, the extraction out of conjuncts is, in principle, allowed, as long as it occurs from the edge of the conjuncts.

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# Introducing Possessors in Russian: A New Perspective Based on the Single Argument Introducer*

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This paper focuses on predicative possession in Russian featuring a locative (*u*-PP, *u* 'at' + genitive DP) and a dative possessor (DP_[DAT]). There are two questions surrounding these possessors: (i) How are they introduced into the structure? (ii) What are the structural options provided by the functional head introducing them? I offer an analysis of these possessors, assuming a single argument-introducing head, *i** (Wood & Marantz 2017). I will show that there are two possible configurations, in which *u*-PP and DP_[DAT] are either part of an extended nominal projection or part of a small clause, in which they are c-commanded by a subject DP introduced by *i**. The structure of the paper is as follows. Section 1 presents both possessors in existential BE clauses and outlines their analysis in terms of *i**. Section 2 scrutinizes the relationship between the existential BE and *u*-PP. Section 3 brings up the cases in which *u*-PP and DP_[DAT] are predicated of a DP, and Section 4 concludes.

# 1 Predicative Possession with the Locative and the Dative

Russian is known as a BE language (Isačenko 1974; Freeze 1992) that uses locative morphosyntax to express actual possession (cf. "locational possessive" in Stassen 2009):

^{*} I am grateful to two anonymous reviewers for their comments; they helped me to refocus the paper and led to a substantive revision of the first draft.

(1) U Vani tože est' (eta) igruška. at Vanja_{GEN} also be_{EXIST} this toy_{NOM} 'Vanja also has a/(this) toy.'

The locative *u*-PP in (1) can be replaced by  $DP_{[DAT]}$ , as in (2), with two apparent changes: (i) the demonstrative determiner is no longer possible, and (ii) the dative is not an actual possessor but a possessor-to-be (it entails a transfer of possession).¹

(2) Vane tože est' (*eta) igruška. Vanja_{DAT} also be_{EXIST} this toy_{NOM} 'There is also a/(*this) toy for Vanja.'

This type of utterance could be used as consolation for someone who is upset by the fact that Vanja does not have a toy (*don't worry, Vanja will also have a toy*). The adverbial modifier, which seems to make this utterance more natural, implies that there is a presupposed set of toys; all but one member of this set are already distributed to other individuals, but this remaining member is yet to be in Vanja's possession. Interestingly, both *u*-PP and DP_[DAT] can co-occur in the same structure.

(3) U menja tože est' Vane (*eta) igruška. at me_{GEN} also be_{EXIST} Vanja_{DAT} this toy_{NOM} 'I also have a/(*this) toy for Vanja.'

To my knowledge, the structures like (2) and (3) have received very little (if any) attention in the literature.² Thus, previous analyses of predicative possession in Russian focused exclusively on the pattern in (1). My goal is to fill in this gap and to propose a unified analysis of both *u*-PP and  $DP_{[DAT]}$  in BE clauses.

In this section, I will first overview the structures recently proposed by Markman (2009), Livitz (2012) and Myler (2016) (Section 1.1). Afterwards, I will revisit these structures, using Wood & Marantz's (2017)

¹ The structure in (2) corresponds to the Goal schema (Y exists for/to X) in Heine's (1997) event schemas for predicative possession.

² Markman (2009:132) discards the dative used with BE, as it does not express "true possession" (see discussion of (4b) below).

single argument introducer (Section 1.2) and showing how it can be applied to (1)-(3) (Section 1.3).

#### 1.1 Previous Proposals

Markman (2009) proposes that *u*-PP is introduced by a stative applicative head (Appl_{AT}) that is opposed to the dynamic applicatives, Appl_{TO} and Appl_{FROM} (Pylkkänen 2008; see Cuervo 2003 for Romance). According to Markman, *u*-PP can be introduced either very high, above VoiceP, in which case it has a control-over-event reading (4a), or very low, in which case it has a possessive reading (4b). Markman (2009:132) considers (4b) as a "pure possessive construction", ruling out a dative DP in this particular case.

- (4) a. U menja Dima pel i tanceval. at me_{GEN} Dima sang and danced 'I had Dima sing and dance.' (Markman 2009:130)
  b. U menja / (*mne) est' kniga.
  - at me_{GEN} / me_{DAT} be_{EXIST} book 'I have a book.' (Markman 2009:132)

In Markman's low applicative structure, as in (5), a possessive relation is established by  $Appl_{AT}$  relating two individuals (following Pylkkänen 2008).³

$$(5) \qquad VP \\ BE \qquad Appl_{AT}P \\ u-PP \qquad Appl_{AT}' \\ Appl_{AT} \qquad NP$$

It is not clear how this structure would accommodate  $DP_{[DAT]}$ ; see examples in (6). Assuming Pylkkänen's (2008) framework and Markman's tripartite typology of applicatives in Russian,  $DP_{[DAT]}$  should

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³ Markman (2009) uses Pred(eciation) as a label of BE.

be introduced by a dynamic Appl_{TO} head, which seems to be a good fit for the transfer-of-possession meaning.

(6)	a.	U menja est' Vane kniga.
		at megen beexist Vanjadat booknom
		'I have a book for Vanja.'
	b.	U vas budet mne mašina?
		at yougen will.beexist medat carnom
		'Will you have a car for me?'
	c.	Ja nadejus', čto u Maši est' mne plat'je.
		I hope that at Mašagen beexist medat dressnom
		'I hope that Maša has a dress for me.'

We have to assume that one applicative structure can be embedded into another. That is, in (4b)/(5) Appl_{AT} selects an NP (e.g., *kniga* in (4b)), but in more complicated cases, as in (6), it can also select Appl_{TO}P (e.g., *Vane kniga* in (6a)). This scenario can be imagined if Appl_{TO}'s categorial feature, as a selectee, is flexible enough to allow both selections. More precisely, Appl_{TO}'s categorial feature would depend on the category it is merged with: Appl_{TO} would have to "inherit" the categorial feature of the NP it merges with. Thus, whatever we have, *kniga* in (4b) or *Vane kniga* in (6a), the categorial label would remain the same in both cases, NP. This type of flexibility is not foreseen in Pylkkänen's framework, but it has recently been advocated by Wood & Marantz (2017) (see Section 1.2).

Livitz (2012) proposes an almost identical structure with the only difference in the category of the head introducing u-PP, labeled as Poss(essor).



Again, the same question arises: How would  $DP_{[DAT]}$  fit into this structure? Poss could in fact be a head introducing a dative possessor. That is, Poss

could be parameterized in such a way that, in some languages, this head is not a Case assigner – thus, the possessor has to move for Case reasons (e.g., Hungarian; see Myler 2016:100-111 and references therein) – or Poss is an inherent (dative) Case assigner (Russian would then be such a language). In this case, we should have  $DP_{[DAT]}$  in Spec,PossP and the locative possessor has to be introduced by another head.⁴

The Poss head is also used by Myler (2016) in his crosslinguistic analysis of clausal possession. His structure of sentences like (4b) is shown below (Myler 2016:58; nP is a root with a categorizing head n).

# (8) [vP *u*-PP [vP BE_{exist} [PredP EXPL [Pred' Pred [DP D [PossP Poss nP]]]]]]

Myler uses three main assumptions. First, Poss creates a relational DP that should have a possessor. However, as a second assumption, a possessor does not have to be merged immediately in Spec, PossP and can appear later in the structure – so-called "delayed gratification" (Myler 2016:47). Thus, u-PP in (8) is merged as an adjunct to vP, but it is a semantic argument of a DP-internal Poss. This assumption immediately raises a question about timing: How delayed can a delayed gratification be? Why is u-PP not merged in Spec, DP or Spec, PredP? We need additional assumptions to preclude these options. Moreover, there is an empirical problem with the data in (3) and (6). If Poss is instantly gratified by DP_[DAT] (in Spec, PossP), there is no motivation for *u*-PP to be merged later. We expect that the dative and the locative possessor should not co-occur, contrary to fact. Finally, the third assumption concerns the existential BE. Myler assumes that it is a contextually conditioned allomorph of the copula. The copula does not introduce any arguments (hence, no Spec,vP in (8)), and its only function is to verbalize a predicative structure (PredP). The existential *est*' is determined by the content of PredP, namely, the presence of a null expletive in Spec, PredP. As far as I can see, there is no independent motivation for a null expletive in this construction.⁵

⁴ Kayne's (1993) prepositional determiner (P/D) could be such a head (but see Myler 2016:326-327 and references therein).

⁵ We could also assume a special existential PredP (with *u*-PP in Spec,PredP), following Hartmann & Milićević (2008).

The structure in (8) can be revisited as in (9) to fit the data in (3)/(6). Here I abstract away from PredP with a null expletive and assume that DP_[DAT] is base-generated in Spec,PossP. Everything else is the same.

(9)  $\begin{bmatrix} vP & u-PP & [vP & BE_{exist} & [DP & D & [PossP & DP_{[DAT]} & [Poss' & Poss & nP]] \end{bmatrix} \end{bmatrix}$ 

Wood & Marantz (2017) have recently proposed to revisit P and Poss (along with Voice and Appl) in terms of  $i^*$  (acategorial head selecting a DP). In Section 1.3, I revisit (9), assuming  $i^*$ . Independently from this theoretical move, the structure in (9) raises a question about adjunction of *u*-PP. In Myler's analysis, this adjunction was motivated by a spec-less Poss and the possibility to saturate it by a delayed gratification. In (9), Poss is fulfilled by DP_[DAT]. Why is *u*-PP merged, then? A subsequent question concerns the copula (v-head) and the existential form *est*'. If this is an allomorph of v, as Myler (2016) suggests, how is it conditioned? I will address these questions in Section 2. For the time being, let me first spell out assumptions about  $i^*$ .

#### 1.2 The Single Argument Introducer

The hallmark of  $i^*$  is its combinatorial and interpretative flexibility as described below:

There are essentially three factors that interact to determine the syntactic and semantic properties of  $i^*$ . Firstly,  $i^*$  can merge with a variety of syntactic categories, so its interpretation can be read off its structural position. Secondly, the categorial feature of  $i^*$  may be valued by the categorial feature of the first or the second constituent it merges with. Lexical roots may adjoin to  $i^*$ ; when they do they affect the interpretation of  $i^*$  [...]. (Wood & Marantz 2016:258)

The asterisk characterizes  $i^*$ 's essential syntactic function to "close off the extended projection of the first constituent it merges with." (ibid.) In terms of features,  $i^*$  is defined as a head with an unvalued categorial feature and a selectional requirement for D: {[CAT:__], [S:D]} (Wood & Marantz 2016:257). Crucially, the selectional feature does not force  $i^*$  to be immediately merged with a DP. Consider two more quotes from the original source:

- (10) a. "[...] a selectional feature [of *i**] cannot be checked until the categorial feature is valued." (Wood & Marantz 2017:257)
  - b. "In cases where the selectional feature is checked and a categorial feature is unvalued, the categorial feature will automatically get the value 'P'." (ibid.)

These statements seem to be contradictory: if (10a) applies systematically, the situation described in (10b) should not normally arise. We need a weaker version of (10a), which is otherwise a descriptive statement, as the authors admit themselves. In other words, valuation of [CAT:__] should be prioritized over [S:D] checking, but cases when [S:D] is checked before [CAT:__] is valued should not be excluded in principle. I reformulate (10a) and (10b) as follows.

- (11) a. [CAT: ] is valued first, if possible.
  - b. If [S:D] is checked first, [CAT:__] is automatically valued as P.

In brief, both [CAT:__] and [S:D] are the driving force for Merge with a proviso that the categorial valuation is given priority.⁶

As an illustration, consider the following abstract structure, created in three steps: (a) merger with a root, (b) merger with an xP (which values [CAT:__]), and (c) merger with a DP (which checks [S:D]). The asterisk, projected all the way up, signals the portion of the structure expanded (and "closed off") by *i**.

⁶ Categorial valuation could be a precondition for a selection-driven Merge. However, if Merge can apply freely (i.e., it is not driven by a feature), we cannot avoid cases when *i** merges with a DP "by accident". If it happens, [S:D] is checked automatically. Normally, [CAT:__] should also receive a value from this DP, which would make *i** categorically indistinguishable from its selectee. That is, (11b) could be derived from some version of the obligatory contour principle applied to syntax.



There is one issue, which is not discussed by Wood & Marantz (2017), but has to be addressed here; it is related to Case assignment. Suppose (12) is equivalent to an applicative structure where Appl assigns Case to its specifier. How can this Case assignment be implemented in the current framework? By definition, *i** does not have features other than {[CAT: ], [S:D]}. It cannot bear a Case feature. However, it is plausible to assume that such a feature is part of the root, which can supposedly bear an idiosyncratic (lexical) Case feature. In fact, Case could be the root's only grammatical feature that is projected upward once the root adjoins to  $i^*$ . More precisely, I assume the following process. We start with two separate sets of features: [CASE] (i.e., a Case value) on the root and {[CAT: ], [S:D] on  $i^*$ . When Merge applies (i.e., the root adjoins to  $i^*$ ), these features are projected, resulting in a new set: {[CASE], [CAT: ], [S:D]}. At this point, [CASE] is bundled with [S:D] and, subsequently, assigned to the constituent that checks [S:D]. This is how a Case feature is "transmitted" from the root to the DP in (12). It can simply be said that a root is a Case assigner, and I will use a subscript to show its Case value ( $\sqrt{ROOT_{ICASEI}}$ ). If there were no root, the DP would not be Case-marked within x*P.

Now we can return to locative and dative possessors and revisit them in terms of  $i^*$ .

# 1.3 Implementation

In my analysis, I use two relevant roots,  $\sqrt{AT_{[GEN]}}$  and  $\sqrt{TO_{[DAT]}}$ . The former is spelled out as *u* 'at'; the latter has a zero exponent.⁷

⁷ The preposition k 'towards', which also assigns dative Case, supposedly spells out a more complex root (entailing nearness). This preposition cannot be used in the possessive contexts analyzed here.

The internal structure of *u*-PP is shown in (13). This is an instance when the value P is assigned to  $i^*$  because the latter merges with a DP before [CAT:__] is valued by another category, based on (11b).⁸

(13) 
$$\begin{array}{c} PP \\ P*_{\{[S:D], [GEN]\}} & DP_{[GEN]} \\ \hline \\ \sqrt{AT}_{[GEN]} & i^* \\ u & P_{[S:D]} \end{array}$$

In (14), we have a variant of (12), exemplifying the string *Vane igruška* 'toy for Vanja'.  $DP_{[DAT]}$  is part of the extended nominal projection closed off by *i**. Note that we cannot have a DP (e.g., *eta igruška* 'this toy') instead of the nP here. If a DP were merged with *i**, this DP would check [S:D] in the same manner it is done in (13), and we would have a PP instead of n*P. The projection would be closed right away with a consequence that *eta igruška* is assigned dative Case, and no other DP can be part of the same projection (we would need to add another *i** to expand the PP; this possibility is discussed in Section 3). We thus have a partial explanation as to why the dative and the demonstrative are incompatible in (2) and (3).⁹

(14) 
$$n^*P$$
  
 $DP_{[DAT]} n^*P_{\{[S:D], [DAT]\}}$   
 $Vane$   
 $n^*_{\{[S:D], [DAT]\}} nP$   
 $\sqrt{TO}_{[DAT]} i^*$   
 $\emptyset n_{[S:D]}$ 

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⁸ PPs are not marked with * (based on notation in Wood & Marantz 2017).

⁹ Note that *takaja* 'such' in (i) is not a determiner, but an AP adjoined to nP. *Takaja* can be used as a predicate (e.g., *ona takaja* [lit.: 'she is such']), while *eta* 'this' cannot (e.g., **ona eta* [lit.: 'She is this']).

⁽i) U menja tože est' Vane takaja igruška. at me_{GEN} also be_{EXIST} Vanja_{DAT} such toy_{NOM} 'I also have such a toy for Vanja.'

However, there is nothing in principle that would prevent D from merging with the n*P in (14).¹⁰ The function of this D would be to identify a discursively salient set (see comments under (2)). Why then can we not have a DP like the one in (15) (cf. 3)?

(15) *U menja tože est' [DP eta Vane igruška]. at megen also beexist thisnom.sg.f Vanjadat toynom.sg.f [Lit.: 'I also have this for Vanja toy.']

As we can observe in (15), the demonstrative has to agree with noun, but  $DP_{[DAT]}$  intervenes. Following Preminger (2014), I assume that a failure to agree does not result in a "derivational crash" but – in this particular case – in a failure to spell out  $\phi$ -features on D. That is, if  $\phi$ -features do not have a phonetic form, the categorial feature D will not have one either. It seems to be the right generalization for Russian that the spell-out of the categorial feature D is parasitic on the spell-out of  $\phi$ -features (Russian does not have non-agreeing determiners). To conclude, adding D to the structure in (14) leads to a null realization of this head because of a failed agreement.

Putting both (13) and (14) in the same predicative structure, we obtain the structure in (16), which is a revisited version of (9); the latter – I remind – is a simplified version of Myler's (2016) structure in (8). This is not the final version yet, as we still have to motivate the merger of *u*-PP. Recall that the merger of *u*-PP is motivated in Myler's analysis by the delayed gratification. In his structure, (8), the merger of *u*-PP is motivated by the presence of the Poss head in situ. According to Myler, the existential BE is an allomorph of the copula, which is just a verbalizing head that does not have a specifier (hence, a merger by adjunction).

¹⁰ In this paper, I assume that D is a universal category. Otherwise, we would need to restate our assumptions regarding the selectional feature of  $i^*$  (which could be parameterized). For example, we could postulate a plausible functional category on the top of nP, for example, KP (unvalued Case phrase), and we would have [S:K] instead of [S:D].



In (16), the merger of *u*-PP is unmotivated; *u*-PP appears to be an optional adjunct. However, a locative/possessive phrase seems to be required in existential statements like (17a), vs. (17b), unless they are discourse-linked, as in the answer to the question in (17c), in which case a location/possessor is implied.¹¹

(17)	a.	U menja / zdes'	est'	kniga.
		at me _{GEN} / here	beexist	booknom
		'I have a book' /	' 'There	is a book here.'
	h	* Eat? Indian		

- b. *Est' kniga.
- c. Q: Kakoj-nibud' document pri vas imeetsja? 'Do you have any document?'
  - A: Est' pasport. beEXIST passportNOM 'There is a passport.'

Note we cannot postulate  $i^*$  on the top of vP to introduce *u*-PP. A PP does not have the right category to check [S:D]. Assuming  $i^*$ , we have a restricted number of structural options, which is a welcome result. So what

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¹¹ In statements like *est' takaja kniga* 'such a book exists', the implied location is the entire actual world.

could motivate the merger of u-PP? This question brings us to the next section in which I will refine the structure in (16). Incidentally, I will also touch upon the spell-out of the v-head and the existential *est*'.

#### 2 Inclusion and an Existential Projection below vP

In this section, I consider two options: (i) u-PP is merged because the existential BE has a special feature, and (ii) it is merged below vP within an existential projection for independent reasons. I will choose the second option, but I would like to start with a discussion of the first one.

Bjorkman & Cowper (2016) have recently proposed to analyze possession as a fundamentally asymmetric relation of inclusion, which is understood broadly (extending beyond part-whole relations). That is, we deal with inclusion in a "sphere of influence" (Bjorkman & Cowper 2016:34). The latter, in its turn, can have several strata or zones (cf. "zonal inclusion" in Belvin 1996:78): the body, the immediate physical space, home, belongings in general, personal relations, and even events and situations that can be controlled by an individual. Bjorkman & Cowper (2016) formalize inclusion as a morpho-semantic feature specifying a verbal head. In HAVE languages like English, this feature would specify a Case-assigning transitive light verb (VHAVE). In BE languages, this feature would specify a Caseless light verb (v_{BE}). Thus, to implement this approach we would need to assume that the existential est' has the inclusion feature that forces the merger of a location in Spec.vP. In this way, we obtain a relationship of inclusion between a location and the complement of v_{BE}. Possession would follow from the semantics of the PP in Spec, vP. In fact, Matushansky et al. (this volume) propose that PPs like u menja 'at me' (containing a sentient individual) denote a sphere of influence

There is a number of reasons for which assuming a special feature on the existential *est*' is not the best choice. Let me mention two of them. First, this assumption would expand the inventory of potential argument introducers. If we start postulating features that can be responsible for the merger of additional arguments, we are at risk of compromising the whole idea of *i**. The second reason, specific to Russian, is that inclusion is quite plausibly encoded by the preposition *u* 'at' (more precisely, the root  $\sqrt{AT_{[GEN]}}$ ). Thus, assuming that every sentient individual has a sphere of influence, a PP like *u menja*, actually denotes inclusion within a sphere of influence, along the lines of (18) (cf. Matushansky et al. this volume).

(18)  $[[u menja]] = \lambda x$ [within.speaker's.sphere.of.influence'(x)]

As was pointed out above, the variable x can belong to the domain of individuals or that of events/situations (controlled events/situations). I assume that the domain of this variable is determined contextually. If this is the right way to describe the meaning of u menja, it is redundant to postulate a feature on the verbal head that would also encode inclusion. For these reasons, I take an alternative route.

My intuition behind the merger between *u*-PP (and its likes) and a *est* 'phrase is that the former provides a nuclear scope for the existential quantifying head,  $Q_{exist}$  (cf.  $\exists$  projection in Kondrashova 1996 with some differences). This  $Q_{exist}$  does not have  $\phi$ -features and it selects for a nominal category (bare nP or DP) of type  $\langle e, t \rangle$ . The relevant structure is shown below.



Normally a QP has to raise to take the scope but, in the situation at hand, there is no embedding structure yet, just a QP, which is the result of Merge applied to  $Q_{exist}$  and an nP/DP. *u*-PP adjoins to QP to saturate the quantified expression thus formed. The copula (little v) is subsequently merged to form a vP.

At the sensory-motor interface, the copula has three possible realizations:  $\emptyset$  (present), *byl*-_past), and *bud*- (future). In the copular context,  $Q_{exist}$  (which presumably head-moves to v) is spelled out as *est*'/jesⁱt^j/ if v is  $\emptyset$ :

(20) a.  $Q_{exist} \Leftrightarrow jes^{j}t^{j} / v - \emptyset$ 

b.  $Q_{exist} \Leftrightarrow \emptyset / \text{elsewhere (the copula has a phonetic form)}$ At the conceptual/intentional interface, *est* '-phrases are interpreted as generalized quantifiers. Let us take a bare nP first, for example, *est* '*kniga* 'be_{EXIST} book' in (17a).  $Q_{exist}$ , which is of type  $\langle (e, t), \langle (e, t), t \rangle \rangle$ , composes with the nP, which is of type  $\langle e, t \rangle$  (based on Heim & Kratzer 1998). Assuming that *u*-PP, like other locative PPs, is of type  $\langle e, t \rangle$ , we obtain a truth-value in the upper QP node in (19). The copula does not have a semantic contribution; its only function is to verbalize the structure. Overall, we have two intersecting sets (related by  $Q_{exist}$ ), a set of books and a set of individuals within a sphere of influence.

This analysis implies that when  $Q_{exist}$  selects a DP, this DP has to be of type  $\langle e, t \rangle$ , not of type  $\langle e \rangle$ . Indeed, the sentence in (21) does not mean that there is a uniquely identifiable book, which is in the speaker's possession. Here the DP *eta kniga* is a member of a set of books of a certain discursively salient kind. In terms of Ward & Birner (1995:732),¹² "[it] has two distinct referents simultaneously: the hearer-old type and the hearer new token".

(21) U menja est' [eta kniga]. at megen beexist [this book]NOM 'I have this (kind of) book.'

Consider now (22a). This utterance does not mean that the speaker's car belongs to the addressee. It is entailed that the speaker's car serves a purpose. For example in (22b), it is a viable alternative to walking.

(22)	a.	U tebja est' [moja mašina].
		at yougen beexist [my car]NOM
		'You have my car (that can serve you).'
	b.	U tebja že est' [moja mašina]. Počemu ty prišël
		at you _{GEN} FOC be _{EXIST} [my car] _{NOM} why you came peškom? by.foot
		'You actually have my car. Why did you come on foot?'

¹² Thanks to an anonymous reviewer for suggesting this reference.

By the same token, the first clause in (23a) and (23b) does not mean that the speaker owns a human individual. Both the indefinite in (23a) and the definite in (23b) entail usefulness or helpfulness in a discursively salient situation alluded to by the second clause.

- (23) a. U menja est' odin znakomyj. On smožet tebe pomoč'. at me_{GEN} be_{EXIST} [one friend]_{NOM} he can you help 'I have a friend. He will be able to help you.'
  - b. U menja est' ty. Začem mne eto delat' samomu? at megen beexist youNoM why me this to.do self 'I have you. Why should I do it myself?'

Ward & Birner classify such DPs as "hearer-old entities newly instantiating a variable" (1995:734). "That is, the individuals constitute hearer-new instantiations of the variable in some salient OPEN PROPOSITION." (ibid.) Under my analysis, these DPs have a characteristic function: they serve a discursively salient purpose. Like the DP in (21), the DPs in (22) and (23) are of type  $\langle e, t \rangle$ ; the difference between (21) and (22)/(23) is in the specific characteristic function involved: a salient kind vs. usefulness/ helpfulness in a discursively identifiable situation.

To summarize, (19) is the final version of (16) (the internal structure of *u*-PP and DP is not concerned). In this structure,  $Q_{exist}$  is spelled out as *est* ' whenever the verbalizing copula (v) is phonetically null. It is possible to have an either definite or indefinite DP as a complement of  $Q_{exist}$ . This DP is interpreted as a member of a set with a characteristic function; it has the semantic type  $\langle e, t \rangle$ . The next section deals with one more structural possibility entailed by *i**.

# **3** Figure and Ground

Consider the data in (24). In each of these cases, the clause-initial DP is intended to be a unique individual (a previously mentioned book or an indexical). For example in (24c), the DP *eta kniga* does not have a kind reading, as it does in (21).¹³

¹³ With a kind reading of the DP in (24c), *est* ' would be possible. The intended reading is that of a temporary possession/location, not the permanent ownership.

- (24) a. [Eta kniga] (*est') Vane. (Ne trogaj.) [this book]_{NOM} be_{EXIST} Vanja_{DAT} don't touch 'This book is for Vanja. (Don't touch it.)'
  b. [Eta kniga] (*est') dlja Vani. (Ne trogaj.)
  - [this book]_{NOM} be_{EXIST} for Vanja_{GEN} don't touch 'This book is for Vanja. (Don't touch it.)'
  - c. [Eta kniga] sejčas (*est') u Vani. [this book]_{NOM} now be_{EXIST} at Vanja_{GEN} *Intended*: 'This book is now at Vanja's location.'¹⁴

The ungrammaticality of *est*' suggests that we have a structure different from (19) – that is, there is no  $Q_{exist}$ . What could this structure be?

The analysis in terms of  $i^*$  outlined in Sections 1.2 and 1.3 provides us with a straightforward answer to the above question. In fact, these sentences instantiate a structure that we expect in a framework with  $i^*$ . In (25), I show the structure of (24a).



What happens in this structure is that  $i^*$  with the adjoined root  $\sqrt{TO}_{[DAT]}$  immediately merges with a DP. It is exactly the same  $i^* + \sqrt{TO}_{[DAT]}$  that we have in (14), but [S:D] is checked before [CAT:__] is valued, leading to the label PP, based on (11b). Subsequently, we have a bare  $i^*$  merged with the PP, and this second  $i^*$ , whose [CAT:__] is valued as 'p', introduces another

¹⁴ Location is determined contextually: it can be Vanja's home or part of Vanja's immediate physical space (e.g., Vanja's pocket).

DP (figure) (see Wood & Marantz 2017:258-259). Finally, the copula verbalizes the small clause. Since we do not have  $Q_{exist}$ , *est*' is impossible in this context.

All three sentences in (24) have the same structure with the difference in the root adjoined to the lower *i** (and, hence, different Case values assigned within the PP):  $\sqrt{TO}_{[DAT]}$  (24a),  $\sqrt{FOR}_{[GEN]}$  (24b), or  $\sqrt{AT}_{[GEN]}$  (24c). The structure in (25) expresses a spatial relationship between an individual (figure) and a physical space (ground). As was pointed out in Section 2, a physical space surrounding a sentient individual is one of the multiple strata/zones within its sphere of influence. Thus, depending on the root used, the figure is either within that physical space (and, consequently, within a sphere of influence; root  $\sqrt{AT}_{[GEN]}$ ) or outside of it, in which case only a transfer of possession can be expressed (roots  $\sqrt{TO}_{[DAT]}$  and  $\sqrt{FOR}_{[GEN]}$ ).

## **4** Conclusion

To conclude, I have proposed an analysis of possessive BE clauses in Russian, focusing on their previously overlooked property: the possibility to add a dative argument, DP_[DAT], in a clause with a locative possessor, *u*-PP. In my analysis, I used Wood & Marantz's (2017) single argument introducer, *i**, which has an unvalued categorial feature and a selectional requirement for D (valuation of the categorial feature is prioritized). This definitional property of *i** restricts the number of structural possibilities we can have. There are two options for DP_[DAT]: (i) it is introduced by *i** +  $\sqrt{TO_{[DAT]}}$  that merges with an nP first, as in (16); (ii) it is the only argument of *i** +  $\sqrt{TO_{[DAT]}}$ , in which case it is part of a PP, as in (25). Given the selectional restrictions of *i**, it cannot be used to introduce a PP. There are two options for *u*-PP: (i) it is adjoined to an existential quantifier phrase to provide a nuclear scope, as in (19), repeated as (26a); (ii) it is part of a structure like (25), repeated as (26b).

(26) a.  $\begin{bmatrix} vP \ V \ QP \ u-PP \ QP \ QP \ Qexist \ nP/DP \end{bmatrix} \end{bmatrix}$ b.  $\begin{bmatrix} vP \ V \ p^*P \ DP \ p^*P \ i^* \ u-PP \end{bmatrix} \end{bmatrix}$ 

In (26b), we have a relationship between a figure (DP of type of type  $\langle e \rangle$ ) and a ground (*u*-PP of type  $\langle e, t \rangle$ ). In (26a), we have a relationship between

two sets: a sphere of influence (*u*-PP of type  $\langle e, t \rangle$ ) and a characteristic function (nP/DP of type  $\langle e, t \rangle$ ). In (26a), it is possible to have  $i^* + \sqrt{\text{TO}_{[DAT]}}$  introducing DP_[DAT] inside DP (complement of Q_{exist}). If this is the case, DP_[DAT] intervenes between D and the noun, resulting in a failing agreement and a zero spell-out of D and its  $\phi$ -features (discussion of (15)). Finally, there is a verbalizing head (copula) that does not introduce any arguments; *est* ' spells out Q_{exist} in the context of a null v (the rules in (20)).

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# The Grammatical Source of Missing Epistemic Meanings for Modal Verbs in Child BCS^{*}

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Children use functional modals (e.g., *must, have to*) with root meanings (e.g., abilities, obligations) by age 2, but with epistemic meanings (i.e. knowledge-based inferences) only by age 3 (Stephany 1979; Papafragou 1998; i.a.). What can explain this Epistemic Gap (EG)? We present a corpus study of eight Bosnian/Croatian/Serbian (BCS) children and their maternal input. The BCS children's EG lasts until at least age 4, a year longer than observed for English children. We show that the EG can be accounted for by language-specific syntactic differences between epistemic and root representations of modal verbs (Cournane 2015), rather than conceptual or input-frequency differences. We argue that epistemic use of modal verbs relies on TP-embedding in English, but on later CP-embedding in BCS (Veselinović 2017).

# 1 The Epistemic Gap

Modal verbs in many languages, including English, are functional (i.e., auxiliaries or functional verbs) and express both major modal flavors: root (1a) and epistemic meanings (1b). Lexical modals express only one of the broad flavors of modality ((2); see Hacquard 2013).

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- (1) a. Mary must do her homework.
  - b. Mary must be doing her homework.
- (2) It is **probable** that Mary is **obliged** to do her homework.

Longitudinal naturalistic acquisition studies observe that root modal uses precede epistemic (e.g., Kuczaj & Maratsos 1975; Papafragou 1998), showing what we call an Epistemic Gap (EG). The EG refers to an approximately year long period from 2 to 3 years-old (with some crosslinguistic variation, see Stephany (1993) for an overview, and Smoczynska (1993) for Polish) in which children use functional modals with only root meanings. We present new results from a corpus study of eight children acquiring BCS and their maternal input, and establish that BCS children exhibit an EG for a year longer than observed in English. Our findings support the grammatical hypothesis (Cournane 2015), that during the EG children lack the grammatical representations needed to support epistemic interpretations of functional modal verbs. We show that neither the conceptual hypothesis (children lack the conceptual ability necessary for epistemic meanings) nor the frequency hypothesis (EG as an effect of input frequency) account for the protracted EG in BCS straightforwardly. We further argue that the syntax of individual languages affects acquisition of epistemic uses of modal verbs. While TP-embedding suffices in English, BCS children cannot use modal verbs epistemically until they can embed CPs (Veselinović 2017).

#### 1.1 The Conceptual Hypothesis

A longstanding and widely-accepted account of the EG suggests that children lack the conceptual abilities necessary to support epistemic meanings (Astington et al. 1990; Shatz & Wilcox 1991; Papafragou 1998, i.a.). This account developed primarily based on naturalistic uses of English canonical functional modals, as well as functional modals cross-linguistically (Greek, Stephany 1979; German, Stephany 1993; French, Bassano 1996). Previous literature highlights several issues with this approach to explaining the EG (de Villiers 2007; Cummins 2013).

Cournane (2015) argues that the prior focus on functional modals like *must* or *can*, to the exclusion of simpler lexical modals like *maybe* or *probably*, introduced a grammatical complexity confound. As languages express epistemic modality using multiple grammatical categories (e.g., Palmer 1986; Kratzer 2012), studying only functional modals constitutes a sampling error. Lexical epistemic modals with dedicated epistemic meanings (Rett & Hyams 2014) occur during the EG. At age 2, English children use *maybe* and *probably* (O'Neill & Atance 2000, Cournane 2015), French children use the adverb *peut-être* 'maybe' (epistemic uses of the functional modal *pouvoir* occur after 4; Bassano 1996), and Polish children use the adjective *-chyba* 'probably' (Smoczynska 1993).

While we do not explicitly test conceptual development, we predict that we will see BCS lexical modals from age 2, as in other languages, providing further evidence against a solely conceptual trigger for epistemic language (see de Villiers 2007 for discussion).

### 1.2 The Grammatical Hypothesis for BCS

This hypothesis states that the EG occurs because children lack the grammatical representations needed to support epistemic interpretations of functional modal verbs (Cournane 2015, also Heizmann 2006; de Villiers 2007). These interpretations are argued to arise from syntactic structures more complex than needed for their root counterparts (e.g., Roberts 1985; Brennan 1993; Cinque 1999). The general consensus is that root modality is eventive, with the modal below T, while epistemic modality is propositional, and the modal is interpreted as scoping over T (e.g., Palmer 1986) and bound by the speech act event (Percus 2000). Following Hacquard (2006), we assume functional modal verbs are anaphoric to events, and have only one lexical entry (cf. Cinque 1999).

Cournane (2015) ran a corpus study of Sarah (2;3-5;1, Brown 1973; CHILDES, MacWhinney 2000) to test Hacquard (2006)'s analysis of functional modal verbs in English, where modal auxiliaries like *must* take non-finite complements. Cournane tested whether the development of TP-embedding (representative of embedding propositions) correlated with first epistemic functional modals. Sarah's first spontaneous use of such modals is at 3;0 (*must be gone*), soon after her first *to*-infinitive form on the second verb at 2;10 (*I want to see him*), and first embedded subject at 2;11 (*watch me do horsie*). This is likely generalizable for English, as TP-embedding is reported to appear in the months leading up to 3;0 (de Villiers & Roeper 2016, i.a.) and research on the EG reports first epistemic uses of functional modals at age 3 (Papafragou 1998, i.a.).

For BCS, Veselinović (2017) argues that modal verbs, when root (3), have the structure in (4), and when epistemic (5), they have the CP-embedding structure in (6) (structures simplified). Note that (3) shows

agreement on both the modal and the lexical verb, with the subject preceding the modal, and the lexical verb marked for perfective present, a form that needs a licensor (in this case, the modal) in the same clause. See Veselinović (2017) for more arguments for this analysis.

(3) Djeca_i mora-ju DA t_i po-jed-u povrće¹ children_{NOM} must-_{3PL.PRS} DA _{PFV}-eat-_{3PL.PRS} vegetables 'The children must eat the vegetables.' (root)



¹ Within BCS, some dialects use infinitive MoodP here, primarily in the Northwest, including parts of Croatia and Bosnia (see Mišeska-Tomić (2006) for the distribution of infinitive and subjunctive within BCS). This does not affect the analysis, as monoclausal structures in those dialects derive root interpretations, and epistemic interpretations of *morati* 'must' and *moći* 'can' can still be derived from biclausal structures as in (5) and (6). For example, out of 56552 utterances in HrAL (*Croatian Adult Spoken Language corpus*, Kuvač Kraljević & Hržica 2016), with high dialectal variance, 4 utterances containing *morati* and 1 with *moći* are as in (6). Our analysis and discussion pertain to the dialects of BCS that use these modal verbs in both root and epistemic contexts, granting that not all dialects of the language have both uses.





Since BCS modal verbs obligatorily show CP embedding for epistemic uses, unlike English, we can refine the Grammatical Hypothesis into two grammar-driven hypotheses. First, if representing epistemics depends on the ability to scope a modal above a proposition, represented by at least a TP in the syntax, we predict that the EG in BCS will resolve around 3;0, as in English (Cournane 2015). Second, if it depends on the input syntax, we predict that the EG in BCS children will last until CP-embedding emerges, around 4;0 cross-linguistically (de Villiers & Roeper 2016).

#### 1.3 The Frequency Hypothesis

Finally, it is important that we test whether the EG is an effect of input frequency, as suggested by Shatz et al. (1983), Papafragou (1998) and O'Neill & Atance (2000). This is an important hypothesis, as epistemic uses form only  $\sim$ 8% of functional modal input in English (van Dooren et al. 2017, cf. Cournane 2015). Cournane found that the child she studied showed an EG for functional modals, and epistemic uses remain significantly lower than the input through to the end of the corpus (5;2). We test this hypothesis by examining all maternal input in the corpus. If

frequency drives epistemic delay, we expect correlations between maternal rates of epistemic uses and child epistemic delay.

### 2 Methods

This study uses the SCECL corpus (*Serbian Corpus of Early Child Language*; Anđelković, Ševa, & Moskovljević 2001) from CHILDES (MacWhinney 2000). SCECL contains data from eight children, aged 1;6 to 4;0, gender balanced, half from Belgrade, Serbia (DAC, JEL, LUK, MIL) and half from Banja Luka, Bosnia and Herzegovina (ANA, ANE, LAZ, NIK). All children come from middle-class urban families with parents with at least secondary education. Recording occurred between 6/1998 and 12/2000, once every two months for 90 minutes, with additional 30 minutes at six month intervals. This yields 128 recordings, with 95,105 child and 72,305 mother utterances, focusing on mothers' speech as representative of the children's input.

To assess whether the EG exists in BCS, we extracted all child utterances containing any form of *moći* 'can' and *morati* 'must', with 16 lines of discourse (8 preceding, 8 following). The discourse context was examined to determine the interpretation of the modal as root or epistemic based on contextual and grammatical cues. If the discourse sampled was insufficient to determine this, we examined the situational context in the original file (i.e. non-verbal elements coded in the corpus).

To test the frequency hypothesis, we extracted all maternal input utterances with the collocations of *mora (biti) da* 'must (be.INF) DA' and *može biti da* 'can be.INF DA'. As with the child data, we use the discourse to code these uses of *moći* 'can' and *morati* 'must' as root or epistemic. We assumed that uses of *moći* and *morati* outside of these constructions have root meanings, as adult speakers find them ungrammatical in epistemic uses (Veselinović, 2017). This conservative choice may underestimate the rate of epistemic uses of modal verbs in the input.

To test the conceptual hypothesis, we extracted epistemic modal adverbs (*možda* 'maybe', *valjda* 'probably', *sigurno* 'surely') from the children's corpora, checking for epistemic contexts as with modal verbs.

To test both versions of the grammatical hypothesis, we looked for evidence of TP- and CP- embedding in BCS children and their maternal input. For evidence of TP-embedding, we looked for V+DA collocations, where DA is a mood marker, as in (2) (see Browne 1986, Mišeska-Tomić
2003, i.a. for arguments for non-C DA in Mod/Mood). We chose *htjeti* 'want' as the verb, as *want* is used early with TP-embedding by English-speaking children (Shatz & Wilcox 1991, a.o.). We searched the corpora from the beginning (1;06) until we found sustained use of *htjeti* + DA, omitting the uses of *htjeti* with non-TP complements from consideration.

On strict criteria, we assume this to be minimum necessary evidence of CP-embedding: the embedding verb would need to be non-imperative and followed by an overt complementizer DA. This is not sufficient, as some TP-embedding structures meet that requirement, but given the nature of the work, we accept such structures as CP embedding in the strict sense. Again, this is conservative, as we only possibly accept non-CP-embedding structures, and do not reject CP-embedding ones.

To find evidence of CP-embedding, we found and extracted all utterances of typical CP-embedding verbs *reći* and *kazati*, both meaning 'say/tell', with 5 utterances before and after the target. We coded complement types (null, nominal, adverbial, CP, direct speech, other²) for each target. We coded *to* 'that', *nešto* 'something', *šta* 'what' or accusative pronouns (7), as nominal complements, and *kako* 'how', *ovako* 'this way' and manner adverbs as adverbial complements (8).

Z, 2;08)
4, 3;02)

We coded utterances as having a null complement to the embedding verb when there was nothing overt that could be analyzed as the verbal complement, or if only the indirect object was present. These were often imperatives, or utterances like *Rekla sam ti!* (I told you!). Utterances like

² Not to imply we believe the adverbs or nominals are complements here. However, the children's grammar is not necessarily adult-like, and all they need to produce these constructions are adverbial adjuncts or nominal complements. ³ Only clear spontaneous uses will be reported throughout the paper.

(9) were also coded as having null complements, as the complement is dislocated and the utterance can be analyzed as a two sentence sequence.

(9) *MAJ: a kol(i)ko me voliš nis(i) mi rekla. and how-much I_{ACC} love_{2SG} NEG-be_{2SG} me_{DAT} tell_{PPT.F.SG} 'You didn't tell me how much you love me.' (ANA, 2;02)

Direct speech complements were not coded as CPs because early uses of *reći/kazati* 'say/tell' involve utterances like *krava kaže mu* 'cow says moo' and null complements, including non-imperative forms with null complements. Utterances like (10) provide only equivocal evidence for CP embedding. We thus coded these utterances as a separate category.

(10)*CHI:	rekla	mi	baba	[:hoćeš]	li na	[:sankanje].
	sayppt.f.sg	IDAT	grandma	want _{2SG.PRS}	Qon	sledding
	'Grandma	a told 1	ne: "Wann	a go sledding	g?"'	(JEL, 3;0)

Finally, we coded the complements as CPs when the verb was followed by wh-questions (11a), yes/no questions (11b), or clauses introduced by complementizer DA (11c). Utterances like (11a) and (11b) can be viewed as sequences of two CPs, especially with imperative matrix verbs. However, we wanted to err on the side of caution and find the earliest embedded CP, rather than narrow the search to utterances containing DA.

(11)a.	*CHI:	kaži	šta	si	jela.	
		say _{IMP}	what	be _{2SG.PRS}	eat _{PPT.F.SG}	
		'Say wl	hat you a	ite.'		(JEL, 3;00)
b.	*CHI:	reci	meni	jel ti	[:imaš] [:ž	vaku].
		tell _{IMP}	me _{DAT}	is-Q you	u have gu	m
		'Tell m	e, do you	a have gun	n?'	(ANE, 2;10)
c.	*CHI:	mama,	Ija, q:@	i)fp, Ija k	kaže da sam	ja glupača.
		Mom	Ija	Ija s	ays DA am	I dummy
		'Mom,	Ija says 1	that I am a	dummy.'	(ANA, 3;02)

To test if children acquire CP-embedding structures concurrently with *say/tell*, we follow Snyder (2007) and Cournane (2015) and use the

binomial test for concurrent acquisition⁴. This tests the hypothesis that the proportional use of CP-embedding structures in a child's speech after the first appearance is such that the prior zero rate of use is unsurprising. A non-null result refutes this, suggesting that the delay is unexpected if the CP-embedding uses were acquired concurrently with others.

## **3** Results

Of the 95,105 child utterances in SCECL, 2110 contain *moći* 'can' and 261 contain *morati* 'must'. All the children start using these modal verbs between 1;08 and 2;04, consistent with first child uses in other languages (Papafragou 1998, i.a.). Earliest uses in SCECL are mostly one- or two-word utterances with *moći* (12), which is more frequent than *morati* (13) for all children. Maternal input contains 72,305 utterances, 1958 with *moći* and 494 with *morati*. Five utterances with *moći* (2 mothers), and 18 with *morati* (4 mothers) are used in epistemic contexts.

(12)*DAR:	ajde	dohvat-i.	*CHI:	ne	možem.	
	come-on	reach-IMP		NEG	can _{1SG.PR}	S(overgeneralized)
	'Come on,	reach it.'		'I car	n't.'	(ANA, 1;08)
(13)*CHI:	mo:ram	da ga	popra	wim .		
	must _{1SG.PR}	s DA it _{AC}	c fix _{1sc}	J.PRS		
	'I must fix	k it' ( <i>pretend</i>	ing to fi:	x a toy	tractor)	(LUK, 2;04)

Crucially, no child utterances contain epistemic uses of modal verbs, suggesting that in BCS the EG lasts at least until 4;0. This differs from English children, whose EG resolves around 3;0 (Papafragou 1998, i.a.).

3.1 Conceptual hypothesis: lexical modal results

 $^{{}^{4}}$  p = (X / (X + Y))^Z, where X is the number of times the verbs *reći/kazati* 'say/tell' are used with a non-CP complement in the recordings following their first use with a CP complement, Y the number of times they are used with CP complements in those recordings, and Z the number of times they are used with non-CP complements in the recordings prior to the first clear use with a CP complement.

All the children except ANE use epistemic adverbs *možda* 'maybe' or *valjda* 'probably'; LUK uses both. ANA and NIK sporadically use *sigurno* 'surely'. Rates match those of English children for *maybe* and *probably* (O'Neill & Atance 2000; Cournane 2015). A summary of results is in Table 1, with examples in (14)-(16). Note that ANA's uses include 7 uses of variants of a semi-fixed *nije valjda* (it can't be).

Child	First clear	Total	Child	First clear	Total
	use (age)	uses		use (age)	uses
LUK	2;04	10	JEL	3;06	1
ANA	2;06	14	DAC	3;08	3
NIK	2;10	9	MIL	4;00	1
LAZ	3;02	2			

Table 1: Child uses of epistemic modal adverbs

(14)*CHI:k	o lupa?					
W	who thumps?					
*NAD:	ne znam.					
	NEG know					
*CHI:	Đuđa možda.					
	Đuđa maybe (LUK, 2;04)					
(15)*MAJ:	a šta radiš ovdje, ko je ovo s tobom?					
	and what do _{2SG.PRS} here who is this with you					
*CHI:	a:@i, moj medo valjda .					
	my bear probably (ANA, 3;08)					
(16)*SBA:	evo medvjed, a ovca nestala.					
	here bear and sheep disappeared					
*CHI:	sigurno je ovca ovamo, iza medvjeda.					
	surely is sheep here behind bear (NIK, 4;0)					

Fig. 1 shows that children use epistemic language during the EG, but they fail to use all the strategies used by adults.



**Figure 1**: Aggregate mean usage of possibility (left) and necessity (right) modal verbs and adverbs by children and mothers to express epistemic and root modal flavors. NB: root modal adverbs such as *obavezno* 'obligatorily' not included.

#### 3.2 Frequency Hypothesis: Input results

As no children in SCECL resolve their EG for the duration of the corpus, we could not use the binomial test for concurrent acquisition. We assess instead whether epistemic uses of modal verbs are less frequent in the BCS input than in English, where they form ~5% of all modal utterances. If so, the frequency could explain the cross-linguistic difference. Moreover, if the lack of epistemic uses of modal verbs in the input conditions their absence in the children's speech, we should expect the rate of root use of modal verbs in the input to be conditioning the rate at which they are acquired. As all the children have acquired root uses of modal verbs, this is a testable prediction, which we assess using mixed-effects models. Finally, if the epistemic uses of modal verbs are present, but infrequent, in the input, and the children reach adult-like frequencies of non-epistemic uses of modal verbs, we could expect adult-like frequencies of epistemic uses of modal verbs as well.

For each child corpus, the total number of utterances (TNU) is between 10,000 and 12,000, with one outlier at 17,000. Mothers in SCECL are much more variable, with TNUs ranging between 2600 and 19,000. We calculated proportional frequencies of epistemic modal verbs to total modal verbs, to assess whether mothers use modal verbs in epistemic contexts at rates similar to English adults (~5% of modal verbs). For the 5 BCS mothers who show epistemic uses of modal verbs⁵,

 $^{^{5}}$  These five mothers' TNUs are >9400, while TNUs of the other mothers are <5200.

the average proportion is 6.44% for *morati* 'must' and 0.8% for *moći* 'can'. It is unlikely that similarly low adult inputs differentially predict first child epistemic uses: English after 3;0, but BCS after 4;0.

The mixed-effects model for the children's frequency of use moći 'can', with a fixed effect for TNU and random intercept for subjects showed that age is a significant predictor, increasing the frequency by 8.51 ( $\chi^2(1)$ =33.697, p<0.0001). Having shown this, we used age as a fixed effect, along with a random intercept for subjects, to see if a mother's usage frequency of root possibility modal predicts a child's usage frequency, and found no significant effect. An increase by 1 in mother's usage frequency increases the child's usage frequency by 0.094  $\pm$  0.052 ( $\chi$ 2(1)=3.372, p=0.066).⁶ Similarly for the root necessity modal verb, where a child's age is a significant predictor, although the rate of increase is negligible ( $\chi^2(1)=33.552$ , p<0.0001), which is expected if we keep in mind that the model is applied to all the data (for the sake of uniformity) and the children use the necessity modal verb later and less frequently than the possibility modal verb. As was shown for *moći* 'can', the mother's frequency of use of the root necessity modal verb does not significantly affect the child's frequency of use of the same verb, increasing it by  $0.037 \pm 0.049$  ( $\chi 2(1)=0.6036$ , p=0.44).

Taking the average proportional frequency across all mothers and all recordings to be the best proxy for adult-like use⁷, we see in Fig. 2 that the average child proportional frequency of *moći* 'can' shows a steady increase over time, reaching the adult-like rate of 3% of all utterances at about 3;06. Fig. 3 shows that the first appearance of *morati* 'must' is delayed, and only reaches the adult-like rate of 0.6‰ of all utterances at 4;0. Figs. 2 and 3 also show the average child frequencies of the possibility and necessity modal adverbs, neither reaching adult-like rates.

⁶ Just in case, we ran the same model with TNU as a fixed effect, and we found a significant, but minimal effect: an increase by 1 in mother's frequency of use increases the child's frequency of use by  $0.16 \pm 0.057$ ,  $\chi 2(1) = 7.925$ , p=0.004.

⁷ We used only root modal verbs to calculate this, as those are the only child uses.



**Figure 2**: Average child usage frequency, at each point of recording (1;06-4;0), of the possibility modal verb *moći* 'can' and adverbs *možda* 'maybe' and *valjda* 'probably', compared to the 'adult-like frequency'.



**Figure 3**: Average child frequency of use of the necessity modal verb *morati* 'must' and adverb *sigurno* 'surely' compared to the 'adult-like frequency' at each recording point (1;06-4;0).

## 3.3 Grammatical Hypothesis: syntactic results

Our starting point for evidence of TP-embedding in BCS was strict: the inflected embedding verb *htjeti* 'want' followed immediately by DA. This yielded first uses shown in (17). While earlier TP-embedding may exist, with infinitival complements or verbs other than *htjeti* 'want', we see that most children have the first of repeated uses (FRU)⁸ between 2;06 and 3;02, consistent with de Villiers & Roeper's (2016) report for English, where children between 2;0 and 3;0 start using non-finite complement clauses, followed shortly by finite ones. In BCS, the exceptions to this are MIL, whose FRU occurs at 3;08, and ANE, who doesn't have

⁸ Based on Snyder (2007)'s *first of repeated uses*, FRU denotes the first use followed by a repeated use in the following recording.

repeated uses across consecutive recordings, but has 8 clearly distinct uses at 3;0, followed by uses in every other recording until 4;0. If TPembedding were sufficient for children to represent epistemic uses of modal verbs, as Cournane (2015) argues for English, we would expect the BCS children to use modal verbs in epistemic contexts shortly after first using TP-embedding. We see no epistemic modal verbs for BCS children, not even those who use TP-embedding early, which leads us to reject the TP-embedding version of the grammatical hypothesis.

- <b>J</b>		. 0		· · · ·	,		J		
(17)a. *CHI:	(h)oćem	o da	a se	igrar	no (.)	ovog	?		
	want _{1PL}	PRS D	A SE	play	1PL.PRS	thisGI	EN		
	'Shall w	e play	with th	nis?'				(LUI	K, 2;06)
b. *CHI:	mama,	[:hoću	ι] (	da vio	lim	kako	da	nađ	em[?].
	Mom	want ₁	SG.PRS I	DA see	elsg.prs	how	DA	find	1SG.PRS
	'Mom, I	want	to see h	now I c	an find	,		(NI	K, 2;10)
c. *CHI:	[:hoćeš]	da	a vic	liš	koj	i b	akin		broj?
	want _{2SG.}	PRS D	A see	2SG.PRS	s whi	ich g	randm	a's	number
	ʻWanna	see w	hat grar	ıdma's	s numb	er is?'		(Al	NE, 3;0)

No child produces *reći* and *kazati* 'say/tell' before 2;0, and no child uses CP-type complements before 2;04. When CP-type complements appear, child rate of use (even with broad criteria) stays at an average of 16% of utterances with *reći* and *kazati*, compared to 12% to 42% (24% avg.) of such utterances for mothers. The mean frequency of such constructions across all utterances is 0.04% for children, but 0.7% for mothers (Fig. 4).



**Figure 4**: Use of *reći/kazati* 'say/tell' by complement type. Each pair of bars shows the average proportional frequency for children (light) and mothers (dark) at child age (x-axis). The darker top portion of each bar, if present, depicts use of CP complements, compared to other complement types combined.

			CP Embedding				
	First		First CP-	FRU CP-	Total CP-		
	use	FRU	embedding	embedding	embedding		
ANA	2;00	2;00	2;10	2;10	17		
ANE	2;04	2;04	2;04	2;08	10		
LUK	2;00	2;06	2;06	2;06	9		
JEL	2;08	3;00	3;04	3;04	7		
LAZ	2;02	2;06	2;08	N/A	2		
DAC	2;06	2;06	3;02	N/A	1		
NIK	2;02	2;10	3;02	N/A	1		
MIL	3;04	3;04	N/A	N/A	0		

Table 2: Acquisition of reći/kazati 'say/tell' for each child in SCECL.

Table 2 shows the progression from first use of *reći/kazati* 'say/tell' to first repeated use of CP-embedding constructions with those verbs for each child. Only four children have repeated uses of CP-embedding constructions, and among them, ANE has uses at 2;08 and 2;10, then no uses until 3;06, and LUK has consistent use between 2;06 and 3;04, but no later utterances. For each child who shows repeated uses of CP-*say*, we ran a binomial test for concurrent acquisition (Snyder 2007), to test if the rate of use of CP-embedding 'say' before the first use is expected to be zero and found the likelihood of zero use to be p<0.0001.

## 4 Discussion

We show that the EG, which ends around 3;0 in English children, is protracted in BCS children until after 4;0. Regarding lexical epistemic modals, the results for BCS-learning children align with the reports for children learning English, French and Polish (O'Neill & Atance 2000, Cournane 2015, Bassano 1996, Smoczynska 1993). Seven of the eight BCS children use modal adverbs *možda* 'maybe', *valjda* 'probably' or *sigurno* 'surely' in contexts compatible with epistemic meanings, with use comparable to that of English-speaking children (Cournane 2015).

We see that despite BCS and English-speaking children having similar acquisition patterns of root uses of modal verbs and epistemic modal adverbs, we find different patterns for epistemic uses of modal verbs, which English-speaking children start using between 3;0 and 3;06, but BCS children do not produce before 4;0. This differential acquisition time across syntactic categories, within and across languages, provides further evidence against the conceptual hypothesis. A purely conceptual account of epistemic uses would have trouble trying to explain why BCS children are delayed by a year compared to their English counterparts.

Concerning the frequency hypothesis, for 5 of the children the maternal input proportional frequencies of epistemic uses of modal verbs are similar to those for English, making it unlikely that they would differentially predict the children's time of acquisition of epistemic constructions by as much as a year. To further assess the frequency hypothesis, given that no BCS child used an epistemic modal verb, we tested the frequencies of the root uses alone to see if modal input rates affect acquisition time for modal verbs with root meanings. We found that mothers' usage frequencies alone cannot predict when BCS children will attain adult-like usage for root modal verbs. The BCS children reach adult-like frequencies of use of root modal verbs for both the possibility and the necessity modal verbs, but epistemic uses remain conspicuously absent. We thus rule out input frequency as explanatory of the EG.

The grammatical hypothesis, as put forward in Cournane (2015), predicts that BCS children use modal verbs epistemically as soon as they acquire TP-embedding. However, since we found TP-embedding, as in English, but no epistemic uses of the modal verbs until at least 4;0, we rule out this version of the grammatical hypothesis. Our modified grammatical hypothesis, which takes into account the syntactic differences between English and BCS epistemic uses of functional modal, can account for the data. BCS epistemic uses rely on CP-embedding, and the milestone for acquiring CP-embedding is around 4;0 (de Villiers & Roeper 2016). Further work is needed to determine when BCS children first use epistemics functional verbs. We predict that the SCECL corpus just misses first uses, which should occur soon after 4;0.

This research also speaks against an analysis where epistemic modal adverbs and epistemic modal auxiliaries and verbs are all generated as specifiers of the same functional projection (Cinque 1999). It is unclear why a child who is able to represent verbal elements elsewhere in the syntax and also able to represent Cinque's Mod_{epi}P, would be able to represent adverbal elements as specifiers of this functional head, but not verbal ones. Unlike approaches where the position of functional modals conditions their interpretation (Hacquard 2006; Veselinović, 2017), Cinque (1999)'s approach states that it is the epistemic interpretation of

modal elements that conditions their position, wrongly predicting that children should acquire epistemic modal verbs and adverbs concurrently.

An important difference between English and BCS functional modals warrants further exploration. When the English children resolve their EG, the first modal verb they use in epistemic contexts is *might* for 3 of the children Cournane (2015) examined, and *must* for the fourth. *Might* is almost exclusively epistemic in English (Hacquard & Wellwood 2012), and *must* is also largely epistemic in adult English (van Dooren et al. 2017). BCS children are faced only with functional modal verbs with predominantly root uses, potentially contributing to their prolonged EG.

Further cross-linguistic work is needed to refine the languagespecific grammatical hypothesis we put forth here on the basis of BCS and English evidence. The language-specific grammatical hypothesis predicts acquisition patterns to differ depending on the syntax of the input modals, including whether the variable meaning modal verbal elements are verbs or auxiliaries. Bassano (1996) suggests this may be the case, as epistemic uses of *pouvoir* 'can' are not acquired before 4:0 in French, while *devoir* 'must' is not used epistemically before 3;3, and only 3 times after that (prop.freq: 0.0005). It is also possible that the children we do see using CP complements to reći/kazati 'say/tell' are treating these as TP complements (see Diessel & Tomasello 2001 for similar arguments for English sentential complements). Both types of constructions involve inflected embedding verbs followed by DA and both can involve distinct subjects of the two verbs. Experimental work is underway testing child comprehension and production of both epistemic modal verb constructions and biclausal (CP-embedding) constructions.

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## **Concealed Superlatives in Russian***

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## **1** Introduction

In this paper I will discuss Russian superlatives that have a form of a comparative where the standard of comparison is the quantificational expression *all people/things* (*vse* or *vsjo*) shown in (1) and (2). I will refer to such constructions as comparative+all superlatives.

(1)	Bystree faster 'Anja ran	vsex all-people _{GEN} n the fastest.'	probežala ran	Anja. Anja
(2)	Bystree Faster 'Anja ran	vsego all-things _{GEN} n the fastest.'	probežala ran	Anja. ¹ Anja

It seems very natural that the meaning of a superlative is built from a comparative with a universal quantifier in the *than*-phrase. It is possible to describe the same fact as the one described in (3) by saying (4).

^{*} I am grateful to Rajesh Bhatt and Roumyana Pancheva, two anonymous reviewers of FASL proceedings and FASL 26 audience for helpful comments and suggestions. All errors are my own.

¹ For some reason comparative+all sound more natural when it is fronted. I leave this issue out of the scope of this paper.

- (3) Anja ran the fastest.
- (4) Anja ran faster than everyone else.

I will compare comparative+all superlatives to regular comparatives like the one shown in (5), where the standard of comparison is not *all-things* or *all-people* (*vse* or *vsjo*).

(5) Anja probežala bystree Nasti. Anja ran faster Nastia_{GEN} 'Anja ran faster than Nastia.'

I observe that comparative+all superlatives behave differently than comparatives in several crucial ways. Based on those observations, I argue that despite the fact that comparative+all morphologically appears to be a comparative with a universal quantificational DP as a standard of comparison it is in fact a superlative. I will show how this explains the differences between comparative+all and regular comparatives.

## 2 Background Facts about Russian Comparatives and Superlatives

There are two types of DPs that can occur in a degree phrase in comparative+all construction. One form is *vseh*, which is the genitive of *vse* (*all people*), and the other form is *vsego*, which is the genitive of *vsjo* (*all things*). *Vse* quantifies over people, and because of that (6), where the verb "read" required an inanimate object due to its meaning, is not acceptable.

- (6) #Ja pročitala vseh. I read all-people_{ACC} 'I read everyone.'
- (7) Ja pročitala vsjo.
  - I read all-things_{ACC}
  - 'I read everything.'

Accordingly, (8) where the standard of comparison is *vseh* (*all-people*), can only mean that I love Barcelona more than other people love it. This

sentence cannot be used to express the thought that I love Barcelona more than I love any other place or thing. To express this thought one needs to use (9).

(a) Boi se vsen ja ijuoiju Baiselonu.	
More all-people _{GEN} I love Barcelona	
'I love Barcelona more than everyone.'	
Reading 1: 'I love Barcelona more than everyone else lo	ves it.'
Reading 2: "?I love Barcelona more than I love everyone	else ² .'
(9) Bol'še vsego ja ljublju Barselonu.	
More all-things _{GEN} I love Barcelona	

'I love Barcelona more than everything.' Reading 1: 'I love Barcelona more than everyone else loves it.'

Reading 2: 'I love Barcelona more than I love everything else.'

Interestingly, in (9) both readings are available, even though Reading 1 requires a comparison between me and other people and the phrase in the standard of comparison is *vsego* (*all things*). We can conclude that *vseh* selects only animate objects, and *vsego* does not impose any restriction of the type of objects it picks or quantifies over.

Russian has two kinds of comparatives, which differ from each other by the way the standard of comparison is introduced. In comparatives of the first type it is introduced by a *wh*-marker *čem* (*than*) (shown in (10)), in comparatives of the second type *than* is absent and the standard of comparison is a DP marked with the genitive case that directly follows an adjective or an adverb in a comparative form (11). The use of genitive comparatives is restricted to adverbials and short-form adjectives, which have been argued to be obligatorily predicative (Babby 1975, Bailyn 1994). *Čem*-comparatives are available for all adjectives and adverbs.

² Anonymous reviewer points out that for some speakers this reading 2 is available but the meaning is "I love Barcelona more than I love anyone", where my love for Barcelona is compared with my love for people.

- (10) Maša igraet na flejte lučše, čem Saša. Masha plays on flute better than Sasha 'Masha plays flute better than Sasha.'
- (11) Maša igraet na flejte lučše Saši.
   Masha plays on flute better Sasha_{GEN}
   'Masha plays flute better than Sasha.'

Following the existing literature (Bailyn 2004, Pancheva 2006), I will consider *čem*- comparatives to be clausal. I will discuss the structure of the genitive comparatives later in the paper.

Russian also has several kinds of superlatives (Matushansky 2008). The form comparative+all that I focus on in this paper is used specifically with adverbials and short-form adjectives (unsurprisingly, given that genitive comparatives can only be used with those forms). As observed in Matushansky 2008, most other types of superlatives are not available for short form adjectives and adverbs.

#### 3 Comparative+vsego Superlatives are not Comparatives

In this section I will discuss comparative+*vsego* superlatives and will demonstrate that they cannot be analyzed as comparatives with a DP denoting a universal quantifier in the *than*-phrase.

3.1 Properties of Comparative+vsego Superlatives

3.1.1 PP-correlates are Possible in Comparative+vsego Superlatives. Russian genitive comparatives can have nominative and accusative correlate readings, but not PP-correlate readings (see the discussion in Philippova 2016; similar facts are reported for Greek comparatives in Merchant 2009). The sentence in (12) can have both readings provided under the example. However, the sentence in (13) does not have Reading 1. The reason for this is that in Russian "misses" takes a PP object.

(12) Maša ljubit svoju mamu bol'še Ani. Masha loves self mom_{ACC} more Anja_{GEN} 'Masha loves her mom more than Anja.'

Reading 1: 'Masha loves her mom more than she loves Anja.' Reading 2: 'Masha loves her mom more than Anja loves her mom.'

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(13) Maša skučaet po svoej mame bol'še Ani. Masha misses by self mom more Aniagen 'Masha misses her mom more than Anja.'

Reading 1: *Masha misses her mom more than she misses Anja Reading 2: Masha misses her mom more than Anja misses her mom

However, the situation is different with comparative+all superlatives. Thus (14) has a reading where all places are compared to Barcelona. For example, this sentence can be true in the scenario where Igor travels a lot and we are comparing degrees of fastness of him coming back from different cities and report that his coming from Barcelona has the highest degree.

If *vsego* is substituted by another DP, say *Moscow*, like in (15), the sentence is not felicitous. This is because due to the unavailability of the PP correlate reading, the only possible reading is the reading where Moscow is compared with Igor in terms of the fastness of coming back from Barcelona, which is not very meaningful.

- (14) Bystree vsego Igor' priehal iz Barselony. Faster all-things_{GEN} Igor came from Barcelona 'Igor came from Barcelona faster than from any other place.'
- (15) #Bystree Moskvy Igor priehal iz Barselony.
   faster Moscow_{GEN} Igor came from Barcelona
   Intended: 'Igor came from Barcelona faster than from Moscow.'

## 3.2 There is No Good Paraphrase with Čem-comparatives

In all cases where a genitive comparative is available a *čem*-comparative is available as well. Thus, we can use a *čem*-comparative as a test of whether the reading we are interested in is in fact created by comparison of something with *vsjo*. In most cases it is not possible to paraphrase the meaning of comparative+*vsjo* by using *vsjo* in a *čem*-phrase. As shown in (16), *čem*-comparatives allow us to compare degrees of fastness of coming from Moscow and from Barcelona. However, the corresponding sentence in (17), where Barcelona is compared to *all things* (*vsjo*) is ungrammatical.

(16) Igor' priehal iz Barselony bystree, čem iz Moskvy. Igor came from Barcelona faster than from Moscow 'Igor came from Barcelona faster than from Moscow.'

(17) * Igor' priehal iz Barselony bystree, čem iz vsego.
 Igor came from Barcelona faster than from all_{GEN}
 Intended: 'Igor came from Barcelona faster than from any other place.'

The fact that corresponding *čem*-comparatives are not acceptable with *vsjo* shows that the language does not build the meaning of a comparative+*vsjo* superlative from comparison of things with *vsjo*, as in many cases it is not possible.

## 3.3 Vsego Cannot be Modified

Another observation that points in the same direction is that in cases like (14), the modification of *vsjo* with *ostal'noe (other)* contrary to the expectation not only does not improve the sentence, but also makes it ungrammatical.

(18) *Bystree vsego ostal'nogo Igor priehal iz Barselony. faster all_{GEN} other Igor came from Barcelona Intended: 'Igor came from Barcelona faster than from any other place.'

By itself *vsjo ostal'nogoe* is a well-formed phrase that can be used in some contexts, like in (19).

(19) Èta kartoška prodaetsâ lučše vsego ostal'nogo. This potato sells better all_{GEN} other 'This potato sells better than anything else.'

#### 3.4 Differential Measure Phrases are not Permitted

The most convincing argument against the idea that comparative+all superlatives are comparatives is that this construction is not compatible with differential measure phrases (20).

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(20) *Namnogo bystree vsego Igor priehal iz Barselony. Much faster all_{GEN} Igor came from Barcelona

Intended: 'Igor came from Barcelona much faster than from anywhere else.'

Differential measure phrases such as "much" can be used with comparatives (for example in *čem*-comparatives) when the standard of comparison is a universal quantifier (21). Since there is no internal meaning conflict between a comparison with everyone and the use of a measure phrase, the ungrammaticality of (20) has to have some other source.

 (21) Igor priehal iz Barselony namnogo bystreet čem iz Igor came from Barcelona much faster than from ljubogo drugogo goroda.
 any other city
 'Igor came from Barcelona much faster than from any other town.'

Measure phrases are not possible with superlatives (Stateva 2003, Matushansky 2008) as the ungrammaticality of (22) shows.

(22) *Mary runs much the fastest.

Thus, with respect to the use of differential measure phrases comparatives+all superlatives behave like superlatives and not like comparatives.

## **4** The Explanation for the Observed Differences

## 4.1 PP-Correlates

Genitive comparatives cannot have PP-correlate readings, thus in order to explain the fact that comparative+*vsego* do have those readings we need to develop an analysis where *vsego* plays a different role than the role of a standard of comparison in a comparative.

I will discuss two of the existing proposal that could potentially explain the restriction on PP correlates in genitive comparatives in Russian (both options are proposed in Merchant 2009 for Greek comparatives that have similar properties). Then I will show that the idea that comparative+*vsego*  are superlatives straightforwardly predicts the availability of the PPcorrelate readings. A possible reason why comparatives and superlatives differ in this respect is that for comparatives we need to create the relevant predicate in the structure via movement, while for superlatives the comparison class can be determined by focus.

Both possible explanations for the lack of PP correlate readings of genitive comparatives are related to the restriction on movement out of prepositional phrases in Russian. The first option assumes a direct phrasal analysis for genitive comparatives, the second – reduced clausal analysis.

4.1.1 Option 1: Genitive Comparatives are Phrasal. The standard of comparison in genitive comparatives can never contain a full clause. Thus, it is at least possible that genitive comparatives are not clausal.

Under the direct phrasal analysis a predicate of degrees and individuals has to be created in syntax. Below I will walk through the derivation of the accusative object correlate reading of (23).

(23) Olja ljubit svoju mamu bol'še Ani. Olja_{NOM} loves selfs mom_{ACC} more Anja_{GEN}

NOM-correlate reading: 'Olja loves her mom more than Anja loves her mom.'

ACC-correlate reading: 'Olja loves her mom more than she loves Anja.'

The predicate of degrees and individuals is created via two movement operations. First the DP *Anja* (the correlate) moves creating an argument of type  $\langle e,t \rangle$ . Then the degree operator QRs together with its first argument to the position above the lambda abstractor created by the first movement and below the moved DP (24) (the so-called parasitic scope) (Bhatt, Takahashi 2011).

(24) [ [her mom] [  $[_{DegP}$  er Anja₁] [  $\lambda 2$  [ $\lambda 1$  Olja loves d₂-much t₁] ]]]

The degree head is a 3-place operator that takes two arguments of type e and a predicate of degrees and individuals (25) (Bhatt, Takahashi 2011).

(25) [[er]] =  $\lambda x.\lambda P_{<d < et>}.\lambda y. \exists d[P(d, y)=1 \& \neg P(d, x)=1]$ 

Under the direct analysis the restriction observed in (15) (repeated here as (26)) must follow from the restriction on the covert movement of the correlate (Merchant 2009). If DPs in Russian cannot undergo covert quantifier raising out of PPs, the predicate of degrees and individuals that is necessary to create the PP correlate reading cannot be created.

(26) #Bystree Moskvy Igor priehal iz Barselony. faster Moscow_{GEN} Igor came from Barcelona Intended: 'Igor came from Barcelona faster than from Moscow.'

If this explanation is extendable to Russian, the expectation is that universal QPs cannot scope out of prepositional phrases. For example in (27) we predicts only the infelicitous reading where one athlete is from every city. Judging scopal interaction of quantificational expressions in Russian is notoriously difficult (Ionin, Luchkina 2015). Examples similar to the one given in (27) are reported as felicitous in (Antonyuk 2015) and I share this judgment. Thus it is unlikely that this explanation for the luck of PP-correlate readings is on the right track for Russian (at least it cannot be the case for all speakers).

(27) Putin pogovoril s odnim sportsmenom iz každogo goroda. Putin talked with one athlete from every city 'Putin talked to one athlete from every city.'

4.1.2 Option 2: Genitive Comparatives are Clausal. Under this analysis genitive comparatives are clausal like *čem*-comparatives (Pancheva 2006, Philippova 2016).

The genitive case is assigned by a silent P head (28). The standard of comparison moves from the embedded clause to the main clause from a position that is parallel to the position of the associate in the main clause. It lands in the specifier of PP (Merchant 2009). The remnant in genitive comparatives in Russian cannot be bigger than a DP, thus this analysis requires obligatory deletion of the rest of the clause.

(28) [Olja loves her mom [ $_{DegP}$  more [ $_{PP}$  Anja₁  $P_{null}$  [ $_{SC}$  [ $_{VP}$  wh₃-[ $_{VP}$  Olja loves t₁ d₃-much]]]]]]

The assumption that the movement has to be to the main clause is needed in order to explain the fact that subject oriented anaphors that have to be bound in the same clause are licensed in the degree phrase in genitive comparatives (29) (see the alternative small clause analysis of this fact in Pancheva 2006)³. Under this analysis after the movement the DP becomes a part of the main clause in genitive comparatives.

(29) Olja vyše svoej mamy.Olja taller self mom_{GEN}'Olja is taller than her mom.'

The PP-correlate reading of (14) would require an overt movement of the DP "Moscow" from a PP inside the elided clause (shown in (30)). Since Russian does not allow PP stranding, PPs are predicted to be impossible as correlates of genitive comparatives.

(30) *[Igor came from Barcelona [ $_{DegP}$  faster [ $_{PP}$  Moscow₁  $P_{null}$  [ $_{SC}$  [ $_{VP}$  wh₃-[ $_{VP}$  Igor came from t₁-d₃-fast]]]]]]]

It has been argued in the literature that preposition stranding is not always blocked in Russian. Specifically, Podobryaev 2008 and Philippova 2014 argue that phonologically heavy prepositions may be omitted under sluicing⁴.

(31) On sidel naprotiv kogo-to no ja ne mogu vspomnit' On sat opposite.to someone but I not can remember (naprotiv) kogo.
(opposite.to) whom
'He sat in front of someone, but I can't remember who.'

- (i) Olja vyše, čem ee / *svoja mama
  - Olja taller than her/*self mom-NOM 'Olja is taller than her mom'

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³ In this respect they contrast with *čem*-comparatives, where subject oriented anaphors bound by the subject of the main clause are not possible in *čem*-phrases. This is unsurprising given that the remnant carries the same case as the correlate and in this example it happens to be the nominative.

⁴ Thanks to an anonymous reviewer who pointed this out to me.

However, genitive comparative do not have PP correlate readings with those prepositions as well, as shown in (32).

(32) Ona sidela naprotiv Ani čaše Peti. She sat opposite.to Anya more.often Petya_{GEN}
Reading 1: 'She sat in front of Anya more often than Peter did.'
Reading 2: * 'She sat in front of Anya more often than in front of Peter.'

I do not think that these data present a challenge for the hypothesis considered here, because for some reason those prepositions cannot be stranded in *čem*-comparatives as well (shown in (33)) and *čem*-comparatives are unambiguously clausal. I do now know why PP stranding is meliorated in some ellipsis contexts, but not in others and I will leave this issue for future research.

(33) *Ona sidela naprotiv Ani čaše, čem Peti. She sat opposite.to Anya_{GEN} more.often than Petya_{GEN} Intended: 'She sat in front of Anya more often than Petya.'

4.1.3 PP Correlate Readings with Superlatives. We saw that (14) can be read as comparing the places Igor came from. Under the hypothesis that *bystree vsego* is a complex superlative this reading can be derived quite straightforwardly by constructing the relevant comparison set via focus (as it has been shown for other superlatives in Heim 1995), thus no DP movement is required. A possible structure for (14) is given in (34), where a comparative+all is treated as a single quantificational element – the superlative operator – that undergoes movement leaving a trace of type d and creating a predicate of type <d,t>. Barcelona is marked with focus. The superlative operator comes with a domain restriction variable C, the squiggle operator imposes a restriction on the value of this variable, namely, it has to be a subset of the focus value of the constituent ~ is attached to.

- (34) [-est C [1[Igor came from Barcelona_F d₁ fast ]] ~ C]  $a \sim C$  adds a presupposition that C is a subset of:  $[[a]]^{f}$
- (35)  $[[-ee \ vsego]]^{g} = [[est]]^{g} = \lambda Q_{\langle\langle d, t \rangle t \rangle} \cdot \lambda P_{\langle d, t \rangle} \cdot \exists d[P(d)=1 \& \forall R[R \neq P \& R \in Q \rightarrow \neg R(d)=1)$

The denotation for the *-est* that will allow us to derive the relevant reading is given in (35). *Est* first combines with a set of the predicates of degrees (created via focus) (36). Then it combines with a predicate of degrees created by its movement. It says that there is a degree of fastness of Igor coming from Barcelona such that no other set of degrees in (36) has that degree in it.

(36) {λd. Igor came from Barcelona d-fast, λd. Igor came from Moscow d-fast, λd. Igor came from Paris d-fast etc}

The crucial point here is that in order to create the right comparison class we did not have to move Barcelona out of the PP. "Vsego" was not interpreted independently as a standard of comparison, there was not direct comparison of Barcelona with other things.

#### 4.2 The Prohibition Against Measure Phrases

It is a well-established fact in the literature that superlatives do not combine with measure phrases (Matushansky 2008, Stateva 2003). Here I will consider two possible explanation for this fact and extend them to comparative+all superlatives.

Stateva (2003) proposes a theory where the meaning of a superlative is contributed by a combination of the two operators: a comparative (I will refer to it as *er*) and a superlative (I will refer to it as *t*). A possible way of thinking about the structure of a sentence with a superlative is given in (37). In (37) the superlative meaning is contributed by a complex operator (that undergoes QR as a constituent)⁵. This proposal captures the fact that in many languages superlatives seem to have a complex structure that contains a comparative operator as its part (Szabolcsi 2012, Bobaljik 2012). This is relevant for the construction I focused on in this paper as well.

(37) [ [[-t C] -er] [2 [Igor came from Barcelona_F d₂ fast]] ~ C]

⁵ This is not exactly the structure Stateva (2003) proposes as she adopts a non quantificational analysis for *est*.

According to this proposal, superlatives are not compatible with measure phrases because -t and measure phrases compete for the same slot syntactically (the specifier of the degree phrase).

In this system, we have two possible options for the role of *vsego*. It could be a bearer of the superlative morphology. Thus, it would not be a DP at all, like *most* in English is not a determiner in *most interesting*, but is only the bearer of the superlative morphology. On the other hand, it could be something like an *of-all*-phrase in (38), although more would have to be said about why it is not optional⁶.

(38) John runs the fastest of all.

A different explanation for the prohibition of measure phrases in superlatives is proposed in (Matushansky 2008). Her theory is based on the observation that attributive adjectives in the comparative form are also not compatible with measure phrases. While (39), where the adjective is used predicatively, is compatible with a measure phrase and (40) is a well-formed sentence, (41) is not grammatical. She suggests that the superlative operator can combine only with attributive adjectives. Thus the restriction we observe in (41) and (42) have the same nature. She extends her proposal to adverbs and suggests that superlatives in those cases also require a nominal restriction.

- (39) Mary is 5 cm taller than Jane.
- (40) Mary is a taller girl than Jane.
- (41) *Mary is a 5 cm taller girl than Jane.
- (42) *Mary is 5 cm the tallest.

As it was pointed out in Section 2, comparative+all superlatives are only used with adverbs and short adjectives, which are established in the literature to be predicative in Russian. Interestingly, however,

⁶ If *vsego* is absent like in (ii), the sentence can only have a comparative meaning and can only be pronounced if there is a salient standard of comparison in the discourse.

⁽ii) Bystree Igor' priehal iz Barselony. faster Igor came from Barcelona 'Igor came from Barcelona faster.'

Matushansky's proposal is not incompatible with the ideas developed here. So far it has been only shown that comparative+*vsego* constructions have to be superlatives in all cases. Matushansky's theory predicts that comparative+*vsego* cannot be used with a short adjective to form a superlative. This prediction is born out (43).

(43) Nastja vyše vsex/*vsego. Nastja taller all_{GEN} 'Nastja is the tallest.'

This restriction cannot be explained simply by the fact that "Nastja" is a person and "vsjo" has to quantify over things. As we saw earlier in (2), where a comparative+*vsego* form is used on an adverb, it is totally acceptable to compare Anya with other people.

Another relevant observation is that if an object is inanimate, there is no good way to apply a comparative+all superlative of a short-form adjective at all⁷.

(44) * Éta kniga interesnej vseh/vsego.
 this book interesting all_{GEN}
 Intended: 'This book is the most interesting.'

Thus we observe here that comparative+all superlatives in Russian support the generalization made by Matushansky (2008) according to which predicative adjectives are not compatible with the superlative operator. Matushansky (2008) suggests that adverbs in the superlative form in English have to come with an unpronounced noun, restricting the domain of a superlative (and additional domain restriction variables in superlatives are also attached to nouns). The same assumption can be extended to Russian adverbs. This would explain why adverbs allow comparative+all superlatives and short (predicative) adjectives don't. It is not entirely clear

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⁷ In order to express this meaning one needs to use an attributive (long) adjective and a different kind of superlative marker (iii).

⁽iii) Èta kniga samaja interesnaja.

This book most interesting 'This book is the most interesting '

^{&#}x27;This book is the most interesting.'

to me where to fit a noun within an adverbial and I will not speculate on this point here.

## 5 Comparative+vseh

So far this paper has been focusing on comparative+*vsego* superlatives. The remaining issue is the status of the same construction with *vseh*. I propose that this form is ambiguous between a comparative with a DP denoting a universal quantifier as a standard of comparison and a superlative.

Initial support in favor of the idea that comparative+*vseh* can be a comparative comes from the fact that the relevant paraphrase with *čem*-comparative is possible (as shown in pair (45) and (46)).

(45)	Anja probežala	bystreet	vseh.
	Anja ran	faster	all-people _{GEN}
	'Anya ran faster	than ever	yone.'

(46) Anja probežala bystree, čem vse.
 Anja ran faster than all-people_{NOM}
 'Anya ran faster than everyone.'

Another fact pointing at the same direction is that comparative+*vseh* is compatible with measure phrases (47).

(47) Anja probežala namnogo bystreet vseh.
 Anja ran much faster all-people_{GEN}
 'Anya ran much faster than everyone.'

However, with regards to the possibility of PP-correlates, comparative+*vseh* behave like superlatives and unlike comparatives. Thus (48) allows the PP-correlate reading unlike (49), where the standard of comparison is a proper name Nastya.

(48) Bol'še vseh ja boleju za Julju. More all-people_{GEN} I root for Julia
Reading 1: 'I am rooting for Julia more than other people do.' Reading 2: 'I am rooting for Julia more than for other people.'

(49) Bol'še Nasti ja boleju za Julju. More Nastya_{GEN} I root for Julia
Reading 1: 'I am rooting for Julia more than Nastya does.'
Reading 2: '*I am rooting for Julia more than for Nastya'

If comparative+vseh allow PP-correlate readings because they can be superlatives, the prediction is that PP-correlate readings should not be compatible with measure phrases. I think this prediction is born out, although the judgment is much more subtle and difficult here than with comparative+vsjo. The sentence in (50) is not well-formed. The absence of Reading 2 is predicted. The question is why Reading 1 is also unavailable. For some reason in this case the corresponding *čem*-comparative is not good with vse as well. In order to make it good ostal'nye (other) has to be added after vse.

(50) *Namnogo bol'še vseh ja boleju za Julju. Much more all_{GEN} I root for Julia
Intended:
Reading 1: 'I am rooting for Julia much more than other people.'
Reading 2: 'I am rooting for Julia much more than for other people.'

(51) Ja boleju za Julju namnogo bol'še čem vse *(ostal'nye). I root for Julia much more than all other_{NOM} 'I am rooting for Julia much more than anyone else does.'

Now, after we fix this issue and add "other" after *vseh*, the sentence with genitive comparative becomes acceptable, but it can only mean that I am rooting for Julia more than everyone else is rooting for her. As predicted, comparative+*vseh* looses its PP-correlate reading when it can only be interpreted as a comparative.

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(52) Namnogo bol'še vseh ostal'nyh ja boleju za Julju. Much more all_{GEN} other I root for Julia
Reading 1: 'I am rooting for Julia much more than all other people do.'
Reading 2: '*I am rooting for Julia much more than for all other people.'

## **6** Putting Things Together

*Vseh* and *vsego* in comparative+all superlatives compete for the same slot syntactically. We saw that *vsego* (*all-things*) does not place any animacy requirement on the comparison class. However, *vseh* (*all-people*) requires that the comparison class consist of people.

For example, (53) does not have a PP correlate reading and this is because Barcelona is not a person.

(53) Bystree vseh Igor' priehal iz Barselony.
faster all-people_{GEN} Igor came from Barcelona
Reading 1: *'Igor came from Barcelona faster than from any other place.'
Reading 2: 'Igor came from Barcelona faster than anyone else.'

If we rely on focus to derive PP-correlate readings, as I did in Section 3, there is no good way to implement this requirement given the assumptions that I made about focus value computation. The meaning of *est* that I suggested (based on Heim 1995) in (35) does not quantify over individuals, thus there is no way to implement the requirement that "Barcelona" should be a person if *vseh* is used instead of *vsego* and the unavailability of the reading 2 in (53) is not predicted⁸.

In order to account for this fact I propose that a predicate of degrees and individuals is created in the structure and Barcelona is one of the arguments of *est*. The structure in (54) will make this possible.

(54) [Barcelona [-t of all-things_C [-er]] [1[2[Igor came from t₂ d₁ fast ]]]

⁸ The idea that superlatives have to rely on focus can still be pushed if the structural approach to focus values is adopted instead (Jacobs 1983, Krifka 1991).

In (54) I am also trying to capture the fact that *est* is a complex operator that has *er* as its structural part. The domain restriction variable C is on the noun "things". First the DP "Barcelona" undergoes QR and creates a predicate of individuals. Then the complex operator *est* together with its restrictor also QRs and lands between the lambda operator left by the first movement and the noun "Barcelona" creating a predicate of degrees and individuals (as suggested for comparatives in Bhatt, Takahashi (2011)).

I am making the assumption here that *er* is pronounced in comparative+all superlatives in Russian, but *t* is silent. The meaning of the complex superlative operator is given in (55). It combines with a predicate of type <d,<et>> created by the two movements and with the moved individual (entity).

(55) [[ [-t of all-things_C [-er]] ]]^g= $\lambda P_{<d<e,t>>}$ ,  $\lambda x_e$ :  $x \in \{z: z \text{ is an entity}\} \cap g(C)$ .  $\forall y[y \neq x \& y \in \{z: z \text{ is an entity}\} \cap g(C) \rightarrow \exists d[P(d,x)=1 \& \neg P(d,y)=1]]$ 

*Er* that is inside this complex operator has the same denotation as the one that is used in phrasal comparatives in those languages where phrasal comparatives exist (Bhatt, Takahashi 2011) (56). *-t* has a more complex meaning. It first combines with its nominal restrictor denoted by *vsego* or *vseh* that I take to be of the predicative type <et>. After it takes *er* as its second argument we get the meaning of the complex *est* in (55). This operator carries a presupposition that the individual it combines with belongs to the intersection of the set denoted by *of-all-things/people* and the set denoted by the domain restriction variable. It universally quantifies over the individuals in the comparison class that belong to the same set. This explains why *vsego* cannot be modified by *others*: it would remove Barcelona from the denotation of the predicate and this would be in a conflict the presupposition of the *t*.

- (56)  $[[-er]]^{g} = \lambda x_{e} \cdot \lambda P_{\langle d \langle e, t \rangle \rangle} \cdot \lambda y_{e} \cdot \exists d[P(d, y) \& \neg P(d, x)]$
- (57)  $[[-t]]^{g} = \lambda Q_{\langle et \rangle} \lambda M_{\langle e \langle d \langle et \rangle \rangle \langle et \rangle \rangle} \lambda P_{\langle d \langle e, t \rangle \rangle} \lambda y_{e} : y \in Q. \ \forall z [z \neq y \& z \in Q \\ \rightarrow M(z)(P)(y) = 1]$

The resulting truth-conditions are given in (58).

(58)  $[[(14)]]^{g} = T \text{ iff } \forall z[z \neq Barcelona \& z \in \{y: y \text{ is an entity}\} \cap g(C) \rightarrow \exists d[Igor came from Barcelona d-fast \& \neg Igor came from z d-fast] <math>[[(14)]]^{g}$  is defined only if Barcelona  $\in \{y: y \text{ is an entity}\} \cap g(C)$ 

In order to account for the fact that *vsego* cannot be substituted by *vseh* in (53), I adopted an assumption that *Barcelona* can undergo QR movement out of a PP. This brings us back to the restriction on the PP-correlate readings in genitive comparatives. According to one of the options I considered, this restriction was explained by a ban of a QR from PPs. If (54) is on the right track, this option is ruled out. I adopted the second explanation for the luck of the PP-correlate readings in genitive comparatives, according to which genitive comparatives are clausal, the standard of comparison undergoes movement in the *than*-clause, and PP-correlates are impossible because of the ban on PP stranding in overt movement in Russian.

## 7 Conclusion

In this paper I studied Russian superlatives that are morphologically expressed as genitive comparatives with *all-things/people* as the standard of comparison. I observed that they do not have the same properties as Russian genitive comparatives. In particular comparative+*vsego* can have PP correlate readings, they cannot be paraphrased with corresponding *čem*–comparatives, in certain contexts they become ungrammatical when *all-things/people* is modified by "others" and they do not take measure phrases. I argued that we can account for all of those properties if we make an assumption that comparative+all are superlatives and their morphological form is misleading. I proposed that comparative+*vseh* is ambiguous between a comparative and a superlative structure.

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# Vowel Length Alternations in Czech Diminutive Derivation^{*}

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Czech is differentiated from many other Slavic languages in that vowel length is distinctive. In addition to the morphemic contrast, various morpheme-internal length alternations are observed. What is complicated is that these processes are not completely predictable in terms of phonology or morpho-phonology. The goal of the present study is to provide an explanation for vowel length alternations in nouns.

## **1** Vowel Length Alternations in Czech Nouns

Various vowel length alternations are observed in Czech (Short 1993; Scheer 2003, among others). Although some phonological factors such as syllable structure have been documented (see 2.1), these alternations primarily involve morphological processes, one of which is nominal inflection or derivation focused on by this paper. As illustrated in (1), alternations are observed in declension and diminutive derivation. First, as can be seen from (1a), stem-final long vowels in nominative singulars alternate with short ones in certain inflected forms. In contrast, as (1b) indicates, stem-final vowels in bases can bidirectionally alternate in length in diminutive derivation. Note that the citation forms of the /-(e)k/

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diminutives from masculine, feminine, and neuter nouns end in [-ek], [-ka], and [-ko], respectively. In other words, the syllabification patterns are determined by the gender of the noun.

a.	Nominal 3 <b>a:</b> b-a	declension 'frog'	$3ap^1$	(gen. pl.)
	li:h	'alcohol'	l <b>i</b> ĥ-u	(gen. sg.)
	but			
	kl <b>a:</b> d-a	ʻlog'	kl <b>a:</b> t	(gen. pl.)
	m <b>i:</b> r	'peace'	m <b>i:</b> r-u	(gen. sg.)

b. Diminutive derivation

obl <b>a</b> k	'cloud'	obl <b>a:</b> tf-ek ²	(dim.)
fil <b>a</b> v-a	'head'	fil <b>a:</b> f-k-a ³	(dim.)
kp <b>i</b> h-a	'head'	kpi:ʃ-k-a	(dim.)
most	'bridge'	mu:st-ek ⁴	(dim.)
ramen-o	'shoulder'	rame:n-k-o	(dim.)
sp <b>i:</b> x	'snow'	spe3-ek	(dim.)
3 <b>a:</b> b-a	'frog'	3 <b>a</b> p-k-a	(dim.)
mra:s	'frost'	mr <b>a</b> z-i:k	(dim.)
but			
sval	'muscle'	sv <b>a</b> l-ek	(dim.)
br <b>a</b> d-a	'chin'	br <b>a</b> t-k-a	(dim.)
okres	'district'	okr <b>e</b> s-ek	(dim.)
nos	'nose'	n <b>o</b> s-i:k	(dim.)
peni:s	'coin'	peni:z-ek	(dim.)
J <b>i:</b> r−a	'hole'	j <b>i:</b> r-k-a	(dim.)
kr <b>a:</b> l	'king'	kr <b>a:</b> l-i:k	(dim.)

¹ Final devoicing is observed in Czech.

(1)

² Root-final velar or glottal consonants change to post-alveolar ones before this affix:  $/k/ \rightarrow [\mathfrak{f}], /\mathfrak{h}/ \rightarrow [\mathfrak{f}]$ , and  $/x/ \rightarrow [\mathfrak{f}]$ . This palatalization process is triggered by some other affixes as well.

³ Regressive voicing assimilation is observed in Czech.

⁴ Vowel quality may also alternate, which must be related to the restriction on some long vowels (e.g., mu:st-ek/*mo:st-ek; spi:x/*spe:x; see also Short 1993). This issue is not discussed in this paper. Note that the qualitative change is unattested in loanwords (e.g., telefon 'telefon' ~ *telefu:n-ek/telefo:n-ek).
What should be considered is that many exceptions are observed for both patterns. Such variability that given sound alternations do not always occur under certain conditions has been discussed in previous studies (see 2.2).

The goals of this paper are to make clear how frequently these processes occur and to identify what triggers them. This paper primarily focuses on the nominal diminutive derivation, though the nominal declension is also considered to discuss the diminutive derivation. Especially complicated is that both lengthening and shortening are observed in the diminutive derivation. Later in this paper, however, the situation is shown to be simpler than it seems. One main point is that while vowel lengthening is widespread among Czech nouns, vowel shortening is restricted to several nouns. This suggests that the two processes are conditioned by different mechanisms: the former is triggered by the diminutive affix /-(e)k/, while the latter should be attributed to a lexical property specific to several nouns. Note that the shortening is observed before both /-(e)k/ and /-i:k/.

The remainder of the paper is organized as follows. Section 2 reviews previous research on Czech length alternations and phonological variability. Section 3 reports on a survey of an online dictionary regarding the frequency of the alternations in question. Section 4 presents a theoretical analysis of the given data in the framework of Optimality Theory (OT: Prince and Smolensky 1993/2004). Finally, Section 5 summarizes the discussion.

# 2 Previous Research

## 2.1 Previous Approaches to Czech Vowel Length Alternations

The length alternations illustrated in (1) may seem to be triggered by the change in syllable structure: when vowels are short in closed syllables (e.g., oblak 'cloud'), they emerge as long in open syllables (e.g., obla:tfek 'cloud (dim.)'); when vowels are long in closed syllables (e.g., fila:tfka 'head (dim.)'), they emerge as short in open syllables (e.g., fila:tha 'head'). Anderson and Browne (1973) thus argued for the rule of length "exchange:" when syllable structure alternates, short vowels change to long ones and vice versa. There are, however, some empirical problems with this analysis. First, this rule cannot account for the exceptional cases, in which length alternation does not occur despite a change in syllable

structure. In other words, the variation in the alternation cannot be explained by a certain phonological rule. Another problem is that diminutive derivation is not necessarily accompanied by a change in syllable structure. For instance, feminine nouns ending in a consonant (or a closed syllable) do not undergo a structural change in the diminutive derivation with the affixation of /-(e)k/. As seen in (2), vowel lengthening can also be attested in this context.

(2) pavlat ('balcony'	pavl <b>a:</b> tʃ-k-a (dim.)
cf.	
tramv <b>a</b> j 'tram'	tramv <b>a</b> j-k-a (dim.)

Finally, lengthening and shortening cannot be treated uniformly in terms of their frequency. Most strikingly, vowel lengthening has been reported exclusively for diminutive derivation (Short 1993). Moreover, while vowel lengthening seems to be relatively frequent, vowel shortening is restricted to several nouns. Since frequencies have not been reported in previous research, this work conducts a survey of Czech vowel lengthening and shortening frequency in Section 3.

Wolf (2006) attempted to account for morpho-phonological alternations under the OT framework, assuming several constraints on the behavior of certain phonological units on affixes to roots/stems. Following this analysis, for instance, diminutive affixes have a specific feature that triggers length alternation on base-final vowels. McCarthy and Prince (1993), in contrast, explained morpho-phonological processes by assuming morpheme-specific alignment constraints. These type of constraints have been assumed as a kind of Generalized Alignment (GA), due to which some morphemes as well as prosodic or morphological units are demanded to emerge on the edge of another unit. However, both OT analyses cannot account for the variability in which the given alternations are not always triggered by the relevant morphemes.

In the framework of Government Phonology, Scheer (2003) assumed moraic templates for some grammatical categories such as diminutives or feminine nouns, attributing the given alternations primarily to morphology. According to his account, for instance, three morae are weighed to diminutives (e.g., mrazi:k) and feminine nouns (e.g., 3a:ba). One problem here is that many cases do not obey these templates. In the diminutive derivation by /-(e)k/, many disyllabic masculine or neuter

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nouns undergo vowel lengthening, amounting to four morae (e.g.,  $\underline{o}$ bla: $\underline{f}$ ek); on the other hand, many monosyllabic feminine nouns do not undergo vowel lengthening, remaining with two morae (e.g., bratka). What is worse, vowel shortening in genitive plurals of feminine (and neuter) nouns results in one mora; the template does not motivate vowel length alternation. In summary, this approach, along with the above discussed rules or constraints, cannot explain the exceptions. Moreover, the differences between vowel shortening and lengthening in terms of frequency cannot be accounted for in this approach.

### 2.2 Lexico-Morphological Phonology

As discussed in Section 2.1, the vowel length alternations concerned are variable. Previous phonological research has proposed various approaches to such patterns.

The most straightforward approach is to assume underlying forms for segments that undergo (or avoid) given alternations. For instance, vowel-zero alternation or *yer*, which has attracted much attention in Slavic phonological studies, has been explained by assuming special representations such as floating features or empty nuclei (see Gouskova 2012 for a detailed discussion). Note that this approach is no longer phonological in that each lexical item is lexically specified for specific representations. In other words, such representations are exponents of certain lexical properties.

Although many researchers have admitted the necessity of considering lexically-specific information, some have objected to the representational approaches. In her analysis of Russian vowel-zero alternation, Gouskova (2012) claimed that phonological generalization cannot be accounted for by any representations specific to the alternating vowel. Characteristic to this process is that it is attested exclusively in morpheme-final positions. Gouskova argued that the alternation would occur in any position if a certain special representation could be assumed for any position. Her claim is consistent with Pater's (2007) suggestion that phonologically impossible patterns must be eliminated by phonological grammar and not by lexical properties. For this reason, these researchers proposed the stratification of the lexicon and lexically-specific constraints; lexically idiosyncratic sound alternations are triggered or blocked by constraints that are active exclusively for a certain lexical stratum.

Lexical stratification approach has another motivation. Ito and Mester (2001) noted that while loanwords can avoid some phonological processes that are obligatory for native words, some loanwords do undergo these processes. From this, they claimed that while loanwords originally belong to a different lexical stratum than native words, they can be assimilated to the native stratum. Remember that vowel lengthening is also attested in the diminutive derivation of some loanwords. Such extension of phonological process is difficult to explain by assuming specific representations. Needless to say, this approach can be applied to non-phonological properties other than etymology. The survey reported in Section 3 considered various factors in order to clarify the tendency of the sound patterns concerned under the relevant morpho-phonological conditions.

## 3 Survey

This section reports on a quantitative survey of vowel length alternations in Czech diminutive derivation. This survey is to make clear how frequently the length alternations occur under certain phonological and/or morphological conditions.

### 3.1 Methods

The data were collected from an online Czech dictionary (*Slovník spisovného jazyka českého*: http://ssjc.ujc.cas.cz/). The targets were diminutive derivation patterns in which either the affix⁵ /-(e)k/ or /-i:k/ is attached to nouns (either native or foreign). Diminutives were denoted by the abbreviation *zdrob* (*zdrobnělina* 'diminutive') in the dictionary. Nouns ending in highly frequent suffixes,⁶ nouns with no vowels (i.e., only with syllabic liquids: e.g., *vlk* ~ *vlček* 'wolf'), nouns whose final vowel is deleted in the derivation (called *yer*: e.g, *pes* ~ *psík* 'dog'), and proper names were excluded. Word-internal structure or word length was not considered. Consequently, 2111 diminutive derivation patterns were collected in total.

 $^{^5}$  These two affixes are frequently utilized to produce nominal diminutives. The vowel on /-(e)k/ emerges only when no vowel follows.

⁶ /-a:k/, /-ets/, /-ek/, /-ice/, /-i:k/, /-ina/, and /-ost/

Vowel length was judged based on the orthography: a ([a]), i ([i]), y ([i]), u ([u]), e ([e]),  $\check{e}$  ([e]), and o ([o]) were regarded as short, while  $\check{a}$  ([a:]), i ([i:]),  $\dot{y}$  ([i:]),  $\dot{u}$  ([u:]),  $\dot{u}$  ([u:]),  $\dot{e}$  ([e:]), o ([oi]), ou ([ou]), and ej ([ei]) were counted as long. *Lengthening* was defined as the alternation between short root-final vowels in nominal bases and long ones in their diminutives. *Shortening* was the opposite.

The factors this survey focused on were (i) the occurrence of a change in syllable structure, (ii) the presence of length alternation in the nominal declension, (iii) the gender of nouns (masculine, feminine, or neuter), and (iv) etymology (native or loanwords). The length alternation in the nominal declension was noted as an irregular pattern in the dictionary. The gender of nouns only involves the derivation by /-(e)k/; /-i:k/ is attached only to masculine nouns. The targets were judged as loanwords only when certain remarks were found in the dictionary (e.g., *z angl. = z angličtiny* 'from English').

# 3.2 Results

3.2.1 Overall Results. Table 1 and Table 2 summarize the overall frequency of the lengthening and shortening of root-final vowels for each affix.

Affix	Lengthening	No lengthening	Sum
/-(e)k/	597 (47.2%)	669 (52.8%)	1266
/-i:k/	0 (0%)	160 (100%)	160

Table 1: Lengthening in the diminutive derivation

Affix	Shortening	No shortening	Sum
/-(e)k/	36 (5.6%)	611 (94.4%)	647
/-i:k/	15 (39.5%)	23 (60.5%)	38

Table 2: Shortening in the diminutive derivation

These results suggest that vowel lengthening and shortening occur in different environments. The former process was triggered exclusively by /-(e)k/, whereas the latter process occurred before both affixes, though it was rare in general. The following subsections consider each of these patterns in more detail with statistical analyses.

3.2.2 Lengthening. In this subsection, since vowel lengthening was unattested before /-i:k/, only /-(e)k/ is focused on.

First, the frequency of the lengthening before /-(e)k/ varied depending on the gender of the noun: this process occurred frequently among masculine and neuter nouns, whereas it was rarely found among feminine ones, as shown in Table 3 (two plural nouns, whose gender cannot be determined, were excluded here). The differences between feminine nouns and masculine ones ( $\chi^2 = 259.87$ , p < .001) and neuter ones ( $\chi^2 = 113.13$ , p < .001) were statistically significant, respectively.

Gender	Lengthening	No lengthening	Sum
Masc.	467 (64.3%)	259 (35.7%)	726
Fem.	80 (16.8%)	396 (83.2%)	476
Neut.	49 (79.0%)	13 (21.0%)	62

Table 3: Lengthening in the diminutive derivation before /-(e)k/: for each gender of nouns

As noted above, feminine nouns are divided into two main types: those ending in a vowel in the citation forms and those ending in a consonant. In what follows, the former are called *a*-stem nouns after the traditional terminology. Only feminine nouns of this type are considered to undergo resyllabification. As seen in Table 4, vowel lengthening was more frequent among C-final nouns, when the structure of the base-final syllable remains unchanged, than among V-final or *a*-stem nouns ( $\chi^2 = 31.475$ , p < .001). This suggests that the change in syllable structure should not heighten and may even lower the rate of the lengthening.

Base	Lengthening	No lengthening	Sum
V-final	51 (12.6%)	353 (87.4%)	404
C-final	29 (40.3%)	43 (59.7%)	72

Table 4: Lengthening in the diminutive derivation of feminine nouns

One comment should be added about the surface syllable structure in diminutives. While root-final syllables are open among masculine diminutives (e.g., obla:tfek 'cloud (dim.)'), they are closed among feminine or neuter ones (e.g., feminine: fila:fka 'head (dim.)'). Hence, the surface syllable structure should not affect the vowel lengthening: on

one hand, feminine and neuter nouns showed opposite tendencies to vowel lengthening though they have the same syllable structure; on the other hand, masculine and neuter nouns tended to undergo vowel lengthening despite the different syllabification patterns.

Finally, as shown in Table 5, vowel lengthening was more frequent among native words than among loanwords ( $\chi^2 = 62.008$ , p < .001).

	Lengthening	No lengthening	Sum
Native	464 (55.0%)	379 (45.0%)	843
Loanwords	133 (31.4%)	290 (68.6%)	423
			0 1 ( ) 1

Table 5: Lengthening in the diminutive derivation before /-(e)k/: native words vs. loanwords

3.2.3 Shortening. As mentioned in Section 2.2.1, vowel shortening was rarely observed. Nevertheless, there was one condition under which this process was relatively frequent. When the relationship between the diminutive derivation and the above mentioned declension was considered, vowel shortening was likely to occur in both the diminutive derivation and the declension.

Affix	Shortening	No shortening	Sum
/-(e)k/	25 (61.0%)	16 (39.0%)	41
/-i:k/	10 (100%)	0 (0%)	10
Sum	35 (68.6%)	16 (31.4%)	51

 Sum
 SS (08.0%)
 10 (S1.4%)
 S1

 Table 6: Shortening in the diminutive derivation of nouns <u>alternating</u> in the declension
 the declension

Affix	Shortening	No shortening	Sum
/-(e)k/	11 (1.8%)	595 (98.2%)	606
/-i:k/	5 (17.9%)	23 (82.1%)	28
Sum	16 (2.5%)	618 (97.5%)	634

 Table 7: Shortening in the diminutive derivation of nouns not alternating in the declension

The results in Table 2 were divided into Table 6 and Table 7 in accordance with whether vowel shortening (or length alternation) occurs in the nominal declension, which indicate that the rate of vowel

shortening in the diminutive derivation was apparently heightened by the same process in the nominal declension. In other words, vowel shortening in the diminutive derivation was mostly accompanied by vowel shortening in the nominal declension. Note that the latter was generally restricted to several nouns.

#### 3.3 Discussion

The above reported observations can be generalized as follows. First, the lengthening was triggered by /-(e)k/, and not by /-i:k/. This process was frequent except among V-final feminine or *a*-stem nouns. It was also extended to loanwords, though they were less likely to undergo the process than native words. When *a*-stem and foreign nouns were excluded, 424 out of 626 nouns (67.7%) underwent the lengthening. As noted above, syllable structure should not be relevant to this alternation.

Vowel shortening was, in contrast, quite rare. The exception was nouns undergoing length alternation in the declension. This observation leads one to assume that there is a certain lexical property that conditions vowel shortening in the diminutive derivation as well as the nominal declension. Later in 4.2, I will propose that the shortening is conditioned by morpheme-specific underspecification for vowel length.

#### 4 **Proposals**

This section attempts to account for the alternations concerned. As discussed in Section 3, vowel lengthening and the shortening must be conditioned by different factors. Each of the following subsections thus deals with each pattern in order. In Section 4.1, I propose that vowel lengthening is triggered by an underlying mora in a diminutive affix due to a certain morpheme-specific constraint. In Section 4.2, in contrast, I argue that vowel shortening in the diminutive derivation as well as the nominal declension is conditioned by underspecification for vowel length.

## 4.1 Lengthening in the Diminutive Derivation

Let us begin with the lengthening triggered by the diminutive affix /-(e)k/, which was frequently observed except among *a*-stem nouns or loanwords.

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The relatively high frequency suggests that this process is triggered by a certain property specific to the morpheme. I assume here that an underlying floating mora specified in this diminutive affix is linked to root-final vowels due to a certain morpheme-specific constraint. Based on GA discussed in Section 2.1, the current analysis assumes the constraint in (3):

(3) ALIGN (μ_k, R, Root, R) (ALIGN-μ_k):
 "For every mora <u>on the morpheme /-(e)k/</u>, its right edge must coincide with the right edge of the exponent of a root."

Note that the floating mora is assigned exclusively to /-(e)k/, and not to /-i:k/, which does not trigger the lengthening. In addition, the underlying mora in /-(e)k/ is not deleted. This should be guaranteed by (4):

(4) MAX-μ:

"Every mora in the input must be mapped onto the output."

This constraint should be ranked higher than the faithfulness constraint on vowel length shown in (5).⁷

(5) FAITH-V-μ:

"Moraic specification for every vowel in the output must be identical to that in the input."

What should be considered next is that vowel lengthening is unattested for some nouns. While this exceptionality cannot be completely attributed to certain lexical properties, as the present survey indicated, some tendencies were observed. First, *a*-stem nouns were likely to avoid vowel lengthening. Further, loanwords avoided it more frequently than native words. As discussed in Section 2.2, this type of variability can be accounted for by lexical stratification or indexation (Ito and Mester 2001; see also Pater 2007). With regard to the vowel lengthening concerned, while *a*-stem or foreign nouns should be lexically

⁷ This constraint should be differentiated by the constraint on vowel deletion such as MAX-V, because vowels lost in some declension/derivation patterns can remain as such before /-(e)k/, i.e., without lengthening.

indexed so that they could be affiliated with the groups in which the lengthening is unattested, some of them are assimilated to the other type of lexical groups, in which vowel lengthening occurs. In other words, information as to which group a given morpheme is affiliated with is stored in speakers' lexicon.⁸ In OT terms, as claimed by Ito and Mester (2001), the avoidance of the given alternation is accounted for by assuming the faithfulness constraint blocking it that is specific to a certain lexical stratum. With regard to *a*-stem nouns, for instance, the constraint in (6) can thus be assumed:⁹

(6) FAITH_{*a*-stem}-V- $\mu$ :

"Moraic specification for every vowel in the output must be identical to that in the input that is the exponent of a morpheme affiliated with <u>a-stem</u>."

This constraint should be ranked higher than (3) or (4) in order to block vowel lengthening. Below, Table 8 demonstrates how the current constraint ranking predicts the patterns concerned (voicing assimilation or vowel deletion in the affix is not considered here). First, in (7a), the avoidance of lengthening is eliminated by MAX- $\mu$ , which is ranked higher than FAITH-V- $\mu$  or ALIGN- $\mu_k$ . Which vowel undergoes lengthening is determined by ALIGN- $\mu_k$ : the more segments intervene between the mora and the right edge of the root, the more seriously this constraint is violated. In (7b), in contrast, vowel lengthening is eliminated by FAITH_{*a*-stem}-V- $\mu$ , since this nominal root is affiliated with *a*-stem. Finally, as shown in (7c), /-i:k/ cannot violate MAX- $\mu$  (or ALIGN- $\mu_k$ ) due to the absence of an underlying mora. Vowel lengthening is thus eliminated by FAITH-V- $\mu$ . Note that the underlying mora is not linked to the affix. One way to eliminate this possibility is the constraint

⁸ Although the lexical groups can be defined partially by morphological (e.g., a-stem) or etymological (e.g., foreign words) categories, each group cannot coincide with a certain category; any morpheme in a lexical group can move to another group. Moreover, lexical grouping of morphemes can vary from speaker to speaker, which results in inter-speaker variation of sound alternations.

⁹ Similar faithfulness constraints can be assumed for the other feminine nouns or loanwords, though their ranking should be lower than (6) given the differences in lengthening rates.

on docking to the same morpheme as assumed by Wolf (2006). I leave this issue open to discussion.

(7) a.	/obl <b>a</b> k-	ek/	→ [ol	ol <b>a:</b> ffek	] 'clou	ıd (diı	n.)'
1	/1 1	1	/ \ [1	(1 7	< 1 ·	(1)	<b>`</b> ?

b.  $/brad_{a-stem}-ek-a/ \rightarrow [bratka]$  'chin (dim.)' c  $/nos-i'k/ \rightarrow [nosi'k]$  'nose (dim.)'

	FAITH _{<i>a</i>-stem} -V- $\mu$	ц-хьМ	FAITH-V-µ	ALIGN-µk
(7a) /obl <b>a</b> k-ek/ µ				
obl <b>a</b> tfek		*W	L	L
☞ obl <b>a:</b> tʃek			*	ţſ
u:bl <b>a</b> tfek			*	blatf W
(7b) /br <b>a</b> d _{a-stem} -ek-a/ µ				
☞ br <b>a</b> tka		*		
br <b>a:</b> tka	*W	L	*	t
(7c) /n <b>o</b> s-i:k/				
۳ nosi:k				
n <b>u:</b> si:k			*W	1

Table 8: OT analysis of the vowel lengthening

## 4.2 Shortening is Illusionary

Now let us move on to vowel shortening. As outlined in Section 3.2.3, this process must be related to a certain property specific to the alternating nominal morphemes.

One way to formalize such specificity is underspecification (Inkelas 1994). In this framework, the vowel length alternation can be accounted

for as follows. Since vowel length is specified in most nouns, it is preserved due to the faithfulness constraint as assumed in (5) in Section 4.1. When length is underlyingly underspecified, on the other hand, this constraint is vacuously satisfied. The alternations illustrated in (1, 2) thus occur due to certain constraints dominated by the faithfulness one.

What should be considered next is what constraints trigger the alternation. First, as noted earlier, this process is lexically or morphologically determined, which was generalized as moraic templates by Scheer (2003) (see Section 2.1). In the OT framework, such templates can be converted to certain constraints. Since these constraints are violable, the exceptionality can be accounted for: if they are dominated by the faithfulness constraint, the sound patterns should not obey the templates unless the vowel length is underspecified. Since the nominal declension is out of the main concern of this paper, I will not discuss in detail what constraints should be assumed.

In diminutives, in contrast, short root-final vowels tend to emerge for the alternating nouns regardless of which affix (i.e., /-(e)k/ or /-i:k/) follows, which cannot be accounted for by any moraic templates as assumed by Scheer (2003) (see Section 3). It should be remembered that /-(e)k/ has one mora; since root-final vowels are underspecified for length in the alternating nouns, the emergence of short vowels is the natural result for /-(e)k/. This implies that no additional mora is inserted into the diminutives derived by /-(e)k/. The question is, then, why short vowels also emerge before /-i:k/, though this affix has no underlying mora. Two assumptions are required. First, vowels should be specified for length on the surface, which is guaranteed by the constraint in (8):

(8) *MORALESSV:

"Every vowel must be specified for length."

This constraint should dominate the constraint on mora insertion, given in (9), to predict normal vowels for the alternating nouns before /-i:k/.

(9) DEP-µ:

"Every mora in the output must be specified in the input."

The other assumption is that long vowels are avoided if they immediately precede long vowels. This hypothesis is supported by the following fact.

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In addition to genitive plurals, vowel shortening such as shown in (1a) occurs, though not obligatorily, when the case/number suffixes are of more than one mora:¹⁰

Shorteni	ng in nom	inal declension (cf. 1	a)
3 <b>a:</b> b-a	'frog'	3 <b>a</b> p	(gen. pl.)
		3 <b>a</b> ba:m / 3 <b>a:</b> ba:m	(dat. pl.)
		3 <b>a</b> ba:x / 3 <b>a:</b> ba:x	(loc. pl.)
		3 <b>a</b> bami / 3 <b>a:</b> bami	(inst. pl.)
	Shorteni 3 <b>a:</b> b-a	Shortening in nom 3 <b>a:</b> b-a 'frog'	Shortening in nominal declension (cf. 1 3a:b-a 'frog' 3ap 3aba:m / 3a:ba:m 3aba:x / 3a:ba:x 3abami / 3a:bami

The markedness constraint in (11) should thus be assumed.

(11)  $V_{\mu\mu}/V_{\mu\mu}$ :

"Assign a violation mark for each long (or diphthong¹¹) vowel preceding another long vowel."

This constraint should be dominated by FAITH-V- $\mu$  (5) in order to predict the avoidance of vowel shortening in the non-alternating nouns.

Now let us consider the full ranking of the relevant constraints. The ranking arguments are demonstrated in Table 9. First, in (12a, b), when the length of root-final vowels is underspecified (such vowels are denoted by capital letters), FAITH-V-µ is vacuously satisfied. In (12a), since the diminutive affix has one underlying mora, MAX-µ is violated if the root-final vowel remains underspecified for length, whereas DEP-µ is violated if the root-final vowel emerges with two morae, i.e., as long. In (12b), in contrast, there is no underlying mora in the diminutive affix. The emergence of short vowels thus violates DEP-µ. However, it defeats the unchanged candidate due to *MORALESSV dominating DEP-µ. Long vowels are eliminated by  $V_{\mu\mu}/V_{\mu\mu}$ . Note that the ranking between *MORALESSV and constraints other than DEP-µ cannot be determined. In any case, the emergence of long vowels is defeated by that of short ones due to harmonic binding. Finally, as seen in (12c), underlyingly long vowels emerge as such before /-i:k/, because FAITH-V-µ dominates  $V_{\mu\mu}/V_{\mu\mu}$ 

¹⁰ This shortening can also occur before [-ou] in instrumental singulars (e.g,  $si:l-a \sim silou$  'power' cf. 3a:bou).

¹¹ [u] may alternate with a diphthong [ou] (e.g., kus 'piece' ~ kousek (dim.)).

	-					-
	$FAITH_{a\text{-stem}}\text{-}V\text{-}\mu$	MAX-µ	<b>FAITH-V-μ</b>	$^*V_{\mu\mu/}V_{\mu\mu}$	*MORALESSV	DEP-µ
(12a) /3 <b>A</b> b _{a-stem} -ek-a/ µ						
зApka		*W			*	
☞ 3 <b>a</b> pka						
3 <b>a:</b> pka						*W
(12b) /mrAz-i:k/						
mr <b>A</b> zi:k					*W	L
☞ mr <b>a</b> zi:k						*
mr <b>a:</b> zi:k				*W		**
(12c) /kr <b>a:</b> l-i:k/						
kr <b>a</b> li:k			*W	L		
☞ kr <b>a:</b> li:k				*		

(12)	a.	/3Ab _{a-stem} -ek-a/	<b>→</b> [3 <b>a</b> pka]	'frog (dim.)'
	b.	/mrAz-i:k/	$\rightarrow$ [mrazi:k]	'frost (dim.)'
	c.	/kr <b>a:</b> l-i:k/	$\rightarrow$ [kra:li:k]	'king (dim.)'

Table 9: OT analysis of the vowel shortening

The above discussion shows that vowel "shortening" in Czech is not directly motivated by any factors, unlike the vowel lengthening triggered by /-(e)k/, which was analyzed in Section 4.1. In other words, it is not the case that the same diminutive affix can trigger both vowel lengthening and vowel shortening. In the so-called shortening cases, as we have seen, the alternations result from certain markedness constraints. These constraints are active exclusively when vowel length is underspecified in the underlying form.

## 5 Concluding Remarks

This paper has considered vowel length alternations in Czech nominal diminutives. The discussion is summarized as follows. First, as pointed out in Section 3, vowel lengthening and shortening should be differently motivated: the former is frequently triggered by a diminutive affix /-(e)k/, whereas the latter is infrequent and related to a certain property specific to the alternating nominal roots. These patterns cannot be completely explained by phonological principles such as length exchange rules or morphological moraic templates. Moreover, some lexical factors should be considered to account for the phonological exceptions. In Section 4, therefore, I proposed that while vowel lengthening should be explained by assuming an underlying mora in /-(e)k/, vowel shortening is conditioned by underspecification of vowel length. In this way, the difference in productivity between these processes can be accounted for.

The discussion has affirmed the frequently claimed statement that non-phonological (e.g., lexical or morphological) properties should also be referred to by phonological grammar to account for variable sound alternations. What the present analysis has focused on is lexical specificity of nouns and their diminutives: an underlying mora specified in the diminutive affix /-(e)k/ that triggers vowel lengthening and underspecification of vowel length that conditions various length alternations. Although some researchers have objected to such representational approaches, as noted in Section 2.2, I assert here that these approaches are required in order to explain lexically-specific sound patterns. Although the frequency varies among the alternations, the above discussed length alternations are common in that they are not extended to other morphemes: the lengthening in diminutive derivation is triggered exclusively by /-(e)k/ or the so-called vowel shortening is not widespread among Czech nouns. In contrast, some sound patterns indeed extend their range within a lexicon, which is observed in loanword phonology. One example is the vowel lengthening analyzed in this paper. As discussed in Section 2.2, such patterns should not be attributed to lexically-specific representations but accounted for by assuming a certain phonological mechanism such as phonological subgrammar or lexical stratification as adopted by Ito and Mester (2001), Pater (2007), or Gouskova (2012). In summary, phonologically "exceptional" patterns

should be analyzed by focusing on their phonological productivity, i.e., whether or not they *can* be extended to more morphemes. Further research on idiosyncratic sound patterns in Slavic and other languages is expected in the future.

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